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1944

Need a "Chemical Magnet" For Your Product or Process?

Then consider Magnesol, the Synthetic Adsorptive Magnesium Silicate

T. M. Reg. U. S. Pat. Off.

Chemical counterpart of the electromagnet, Magnesol attracts polar compounds and by adsorption removes them from solutions. Widely used to remove color and odor-forming products of acid decomposition from dry-cleaners' solvents, Magnesol is also finding an ever-increasing number of industrial chemical uses, typical of which are

Decolorizing crude and reclaimed lube oils to meet aviation-grade specifications.

Clarifying dry-cleaning solvent without recourse to alkali treatment or distillation.

Removing colors, odors and acids from non-aqueous media.

Anti-caking additive in resinous molding powders.

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Special purpose filler compounding.

Magnesol can be supplied in a number of modified forms meeting a range of specifications. It is now available for prompt shipment in quantity. Inquiries and requests for samples will have immediate consideration. Address Technical Service Division.

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Westvaco CHEMICALS

WESTVACO CHLORINE PRODUCTS CORPORATION

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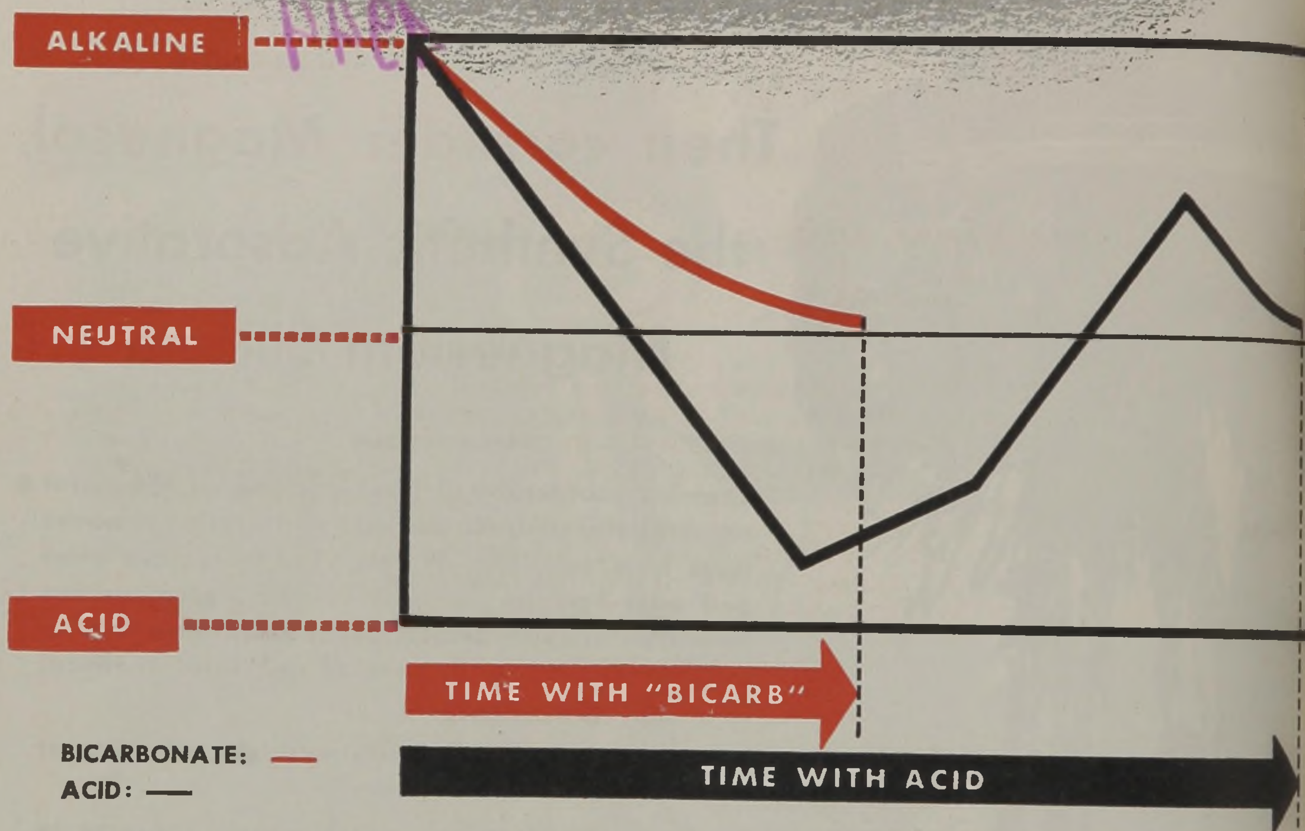
USE "BICARB"

TO REMOVE CAUSTIC!*



A NEW MATHIESON DEVELOPMENT

Eliminating acid's disadvantages, bicarbonate of soda effectively removes caustic by changing it into sodium carbonate or soda ash.

Originated and commercially developed by Mathieson Research, this new process offers certain definite advantages:

- *acid resistant equipment not required.*
- *no health or other hazards involved.*
- *production speeded by elimination of additional steps necessitated by acid process.*
- *careful chemical control unnecessary.*

These advantages, plus new ones stemming from intensive research, may hold important meaning for you — may bring to light possibilities you haven't thought of.

While complete details for the utilization of this process have been evolved specifically for textiles, Mathieson Research is prepared to carry out further assignments in other fields.

For best results, consult our Technical Staff in regard to adapting this new Mathieson development to your particular operations. Write for further information.

Mathieson
CHEMICALS

*PATENT PENDING

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CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . AMMONIA, ANHYDROUS & AQUA . . . HTH PRODUCTS . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS . . . SODIUM METHYLATE

Chemical Industries

THE BUSINESS MAGAZINE for MAKERS and USERS of CHEMICALS

Management • Research • Production • Marketing

VOL. 54—NO. 6

June, 1944

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"I THOUGHT THE LAB WAS A GONER!"

"But almost before you could yell—Plus-Fifty duGas—the fire was knocked out cold!

"Yes, I'd often heard that Plus-Fifty duGas worked plenty fast—but now I know it does. And how!"

PLUS-FIFTY DUGAS STOPS FIRES FASTER

This fact explains why so many chemical and industrial plants are now turning to Plus-Fifty duGas for fire protection that *protects!* Small fires can't become big fires...for when Plus-Fifty duGas hits flames, a huge fire-smothering blanket snuffs out the fire with record-breaking speed. Remember, too, that Plus-Fifty duGas is harmless to men and machines...harmless to everything but fire!

AND YOU CAN GET IT NOW! Plus-Fifty duGas is immediately available. For further information regarding it and for priority facts on duGas Fire Extinguishing Equipment, write or wire us today.

Approved by Underwriters' Laboratories and Factory Mutual Laboratories.

SEND FOR CHART showing comparative characteristics of all types of approved hand fire extinguishers.

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DRY CHEMICAL
U.S. PATENT 1793420

MODEL 15 AND 30 HAND EXTINGUISHERS

DCM-1-44

DUGAS ENGINEERING CORPORATION, MARINETTE, WISCONSIN
OWNED AND OPERATED BY ANSUL CHEMICAL COMPANY

THE READER WRITES

Balls-Tucker Data

To the Editor of Chemical Industries:

On page 55 of your July 1943 issue, describing the Balls-Tucker alcohol process, it says 2% of malt is used. Yet in another place it reads 20. bu. of grain to 4 bu. of malt. Is this an error?

JOHN SULLIVAN
34 Sullivan Street
Charlestown, Mass.

The malt consumption figures quoted in our article on the Balls-Tucker process ("New Process Cuts Alcohol Costs," CHEM. IND. July 1943) are correct. The 2% figure is on the basis of the total mash, which is 192 bushels per cook. The 20 bushels of wheat and four bushels of malt are the amounts used in making up the sodium sulfite solution, which is then added to the rest of the cook. These 24 bushels of grain are included in the 192 bushel total. Thus of the 192 bushels, four bushels or approximately 2% are barley malt.—EDITORS.

Wants Second-Hand Copies

To the Editor of Chemical Industries:

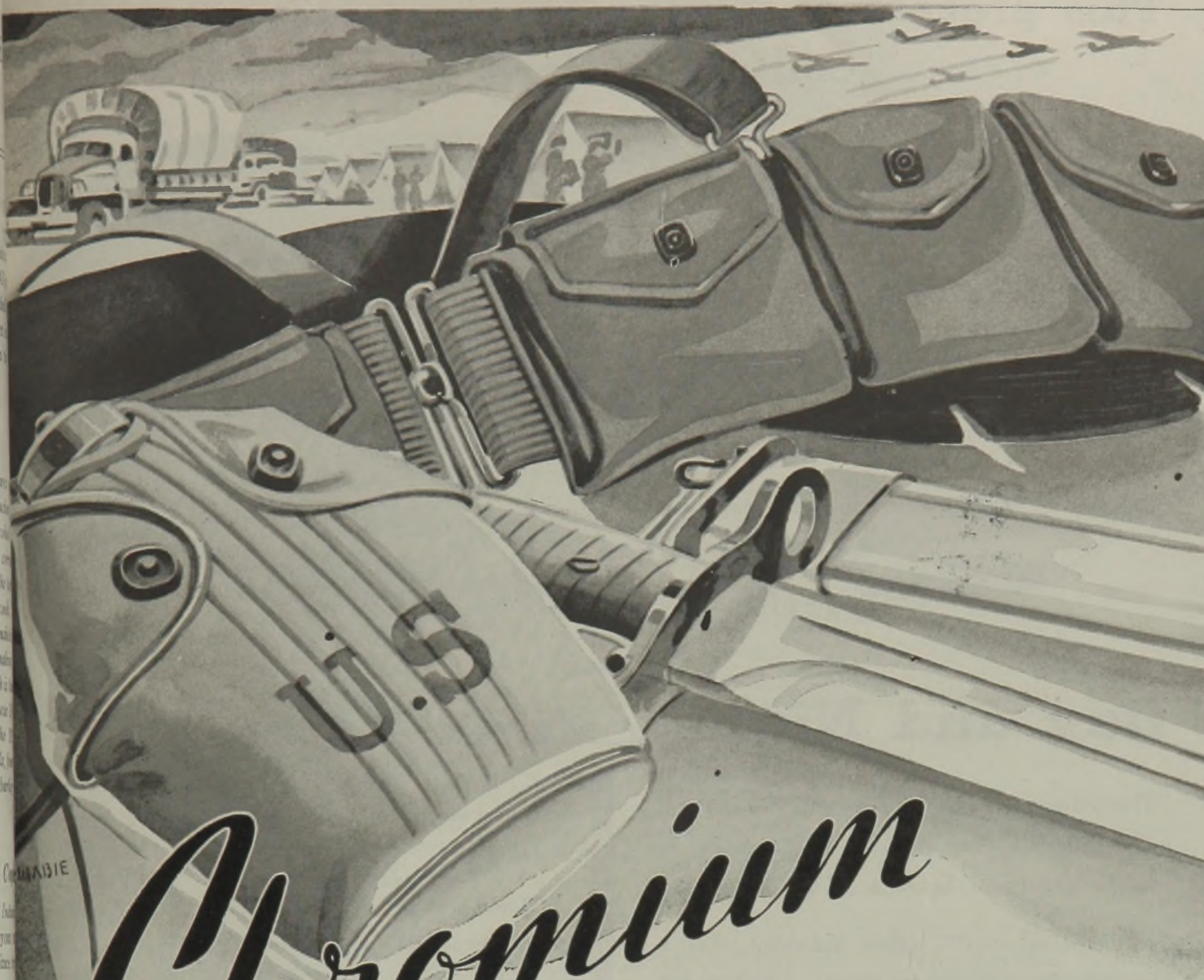
I have been a reader of your magazine for the past seven years. Since my induction into the Army some nine months ago, I haven't looked at CHEMICAL INDUSTRIES and I must confess I am quite lonesome for it.

I am aware that soldiering doesn't require a knowledge of chemistry but feel that I should make some attempt to keep abreast of the chemical world. Therefore, I am wondering if you might know of some subscriber who doesn't file his magazines and who might be willing to forward them to me after he finishes reading them. Many thanks for your kind cooperation.

PVT. LEWIS KNOX
On Maneuvers in Georgia

Here is a chance for someone to make his copies of CHEMICAL INDUSTRIES do double duty. The first such offer to be received by the editors will be referred to Pvt. Knox. Others will be kept on file for possible requests of a similar nature.—EDITORS.

PAPER IS STILL CRITICAL
DO YOUR PART BY
HELPING GET IN
THE SCRAP



Chromium

VITAL FOR WAR
Essential in Peace

Chromium is a vital ingredient in industry. Its more spectacular applications in stainless steel, armor plate, and other special alloys, are widely known, but it also has important uses as a chemical in plants which produce textiles, leather, colored pigments, and a variety of other products of primary importance in war and essential civilian industries.

The textile industry uses Mutual's Chromium Chemicals as a mordant on wool, as an oxidizing agent in dyeing vat colors on cotton fabrics, and for Chrome plating printing rolls.

In addition, Chromium Acetate is essential in the dyeing of cotton duck, which the Armed Services convert into tents, truck covers, and many other essential items. In fact, were the supply of Chromium to be suddenly cut off, our Army and Navy services of supply would face a critical situation.

Mutual's technical staff is available for consultation and collaboration with companies interested in problems involving Chromium Chemicals.

BICHROMATE OF POTASH • CHROMIC ACID • BICHROMATE OF SODA

MUTUAL CHEMICAL CO. OF AMERICA · NEW YORK, N.Y. · CHROMIUM CHEMICALS

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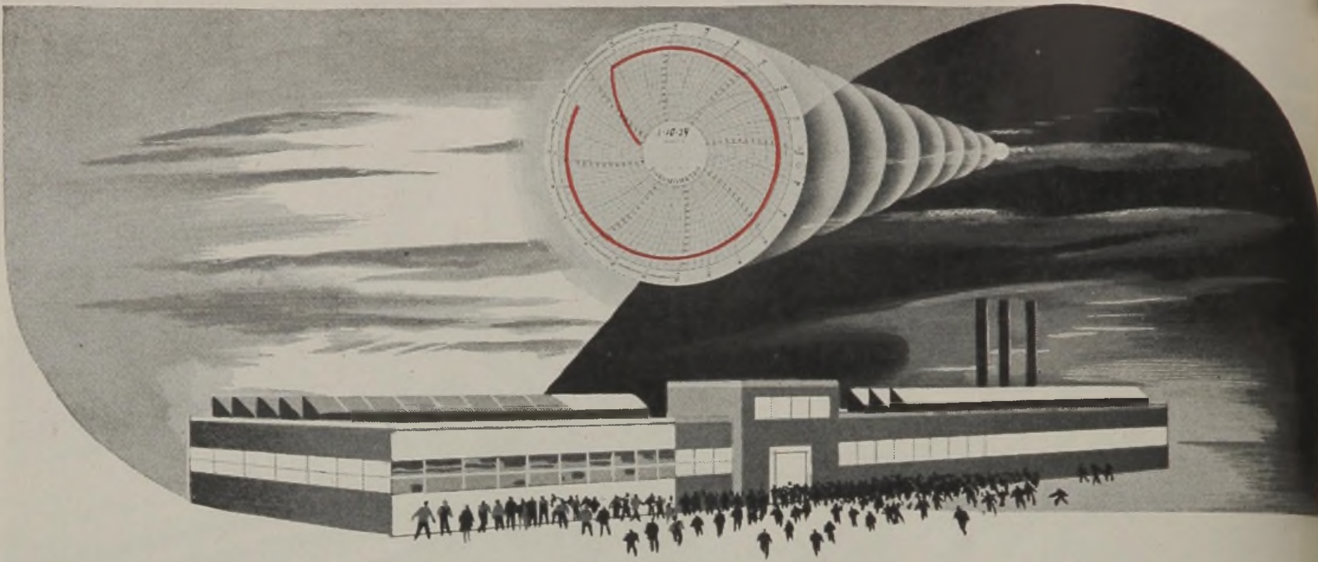
This process operation couldn't afford a SHUTDOWN



Day and Night *Dowtherm is on the job!*

"This plant must run 24 hours a day. Precision-controlled heat for processing operations at 725° F. must be on the job at all times."

Specifications to this effect indicated that a Dowtherm unit would be ideally suited to the tough task of keeping the "heat on"—literally all the time. And a Dowtherm unit went ahead to prove, through usage, that it was capable of delivering continuous, precision-controlled heat—exactly what the rigid specifications called for. In fact, according to reports concerning the aforementioned plant: "The Dowtherm unit has never had to come off the line during four years of operation, while the plant has been shut down only twice during this period because of other failures."

Dowtherm is dependable. Now installed in over 400 industrial plants, this advanced heat transfer medium accurately controls temperatures in the 400-725° F. range and completely eliminates the dangers of high pressures. In every job, an exceptional record of economy is evident. For Dowtherm is not only inexpensive to maintain—it effects substantial reductions in raw material losses and ends costly shutdowns and delays.

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The high temperature, low pressure, heat transfer medium

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

TVA Fertilizer • Aviation Gas • Chemical Inventions
Restriction on WPB Data • Stockpiling Policy

T. V. A. Fertilizer

The benevolent aspect of government in business usually stressed by its proponents is shown in a somewhat different light by the latest charges against T. V. A., and specifically its chairman, David Lilienthal, by Senator McKellar of Tennessee.

The Senator, as is well known, has been feuding with the T. V. A. boss for some time. There is a tendency around Washington to discount the Senator in this case; however, he has made a number of new charges against the agency and its head, which he appears to have documented.

It will be recalled that this department has referred from time to time to T. V. A.'s assumed role in fertilizer production. Senator McKellar now charges, and bolsters his allegations with correspondence, that

(1) T. V. A. (or Lilienthal) charged from $6 to $9 per ton more for fertilizer sold to farmers in Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, and Arkansas, than these farmers can buy it for independently, or that farmers elsewhere can buy their fertilizer for.

(2) T. V. A. has established a sort of Government trust in fertilizer. At Florence, Alabama, a cooperative selling agency disposes of T. V. A. fertilizer.

(3) Restrictions in effect establish monopoly areas, divided between the cooperatives and Canadian producers.

The documentation of Senator McKellar's charge contains some interesting revelations. It comes from P. H. Groggins, chief of the Chemicals and Fertilizers Branch of the War Food Administration, in the form of a letter, at the Senator's request. Parts of it are as follows:

"Ammonium nitrate, conditioned for use as fertilizer, contains 32 per cent nitrogen and is produced in considerable quantity by the Tennessee Valley Authority and by four Government-owned ordnance plants. Production of these various plants is marketed by Associated Cooperatives, Inc., of Sheffield, Ala. This organization was formed in the late autumn of 1943 by a group of farmer-owned cooperative fertilizer manufacturing organizations, most of whom were located in the Southern states."

The letter then cites the restrictions on sales of all types of chemical nitrogen, through allocation requirements, cross-hauling of materials banned by ODT, and other limitations. Furthermore, the letter continues:

"Since our requirements for chemical nitrogen have expanded materially during the war period, it would be impossible for Associated Cooperatives to supply the demands throughout the United States.

"A number of plants in Canada, constructed to provide insurance against damage to British facilities, make ammonium nitrate in excess of Canadian requirements and this excess tonnage is offered for sale in the United States.

"The great bulk of the tonnage handled by the Associated Cooperatives is distributed in Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Texas. Practically all the balance of the United States is served by Canadian production, with exception of the West Coast, and a portion of the requirements in that area are supplied by the Hercules Powder plant, in California.

"The price of ammonium nitrate manufactured in Canada is competitive with that of sulfate ammonia in the United States. . . ."

It now appears, from further reports in the same connection that TVA plans to reduce its fertilizer price by $5 a ton in the area mentioned.

Meanwhile the irate Tennessee Solon has found sufficient evidence, he feels, to charge that not only is fertilizer sales territory divided, as indicated above, thus constituting "the most perfect example of a Government trust," but, the Senator says, elaboration exists. First there is restriction of area; second no other fertilizer company can sell in that area, except the surplus material from the four war plants; and third there is price fixing by TVA. In the realm of its power operations, also according to the Senator, TVA follows the practice of dividing power sales areas with private competitors. The Senator is further aroused by what he believes are efforts of TVA to build phosphate plants outside of its territory.

Chemical Facilities Program

The chemical facilities program entered the current year with about $153,000,000 worth of plants under construction. However, new demands and anticipated contingencies may add an additional $100,000,000 of facilities, it is indicated in WPB Chemical Bureau requests for funds just placed before Congress.

The major expansions of the last year have been in connection with feed recovery from alcohol production, expansions in alcohol facilities themselves, chlorine, oxygen, and acetylene, fertilizers and drugs. Included under drugs came the $15,000,000 production program for penicillin. By March penicillin production had gone to about 40,000,000,000 units from about 9,000,000,000 in December. July production is anticipated at about 200,000,000,000 units, according to D. P. Morgan, chief of the Bureau.

New WPB Stockpiling Policy

A NEW STOCKPILING POLICY, under which strategic stockpiles will be shortened up in view of the changed shipping situation and the decreasing possibility that the United States might have to stand off an Axis siege, has just been adopted by the War Production Board after approval by the service Chiefs of Staff.

This is indicated to portend a more bullish WPB attitude on its strategic stockpiles henceforth, although it does not mean, as yet, a general policy of liquidation of such reserves.

Alien Property Custodian Seizes Stocks and Patents

STANDARD OIL COMPANY OF NEW JERSEY has just been compelled by Alien Property Custodian action to surrender 20 percent of outstanding stock of Standard Catalytic Company, 50 percent of outstanding stock of Jasco, Inc., and 25 percent of outstanding stock of Hydrocarbon Synthesis Corporation, alleged to be formerly the property of I. G. Farbenindustrie A. G., and which three American corporations were alleged to have been formed in the United States to operate certain patent pooling arrangements sponsored jointly by the Standard Oil Company, N. J., and I. G. Farben.

The APC order applies to approximately 675 patents and about 100 applications for patents, among which are some covering processes for refiniing and treatment of crude oil, making synthetic gasoline and lubricating oil from coal, peat, natural gas and other materials except crude oil, and for making special chemical products including rubber.

The patents will be available for licensing to American firms, it is said.

Postwar Synthetic Rubber Outlook

THE PROSPECT FOR SYNTHETIC RUBBER hinges largely on the things this product will do which the natural product will not, in the opinion of Rubber Director Bradley Dewey.

Buna-N, for illustration, is for all practical purposes immune to oil. Neoprene is almost immune. Shoe soles of such products for shoes worn around refineries would have an obvious value—similarly, for tires for such uses. Fire in a mine will burn rubber-covered metal; if it strikes neoprene the fire goes out. Possibly, in Col. Dewey's opinion, some 25 percent of the total post-war volume of synthetic rubber would fall into such category of uses.

Chemical Inventions Sought for War Use

AMONG THE THINGS NEEDED by the armed services which technically-minded men have been invited to consider are these:

A durable coating suitable for field application to reduce the glare from glass surfaces.

Protection against flame-throwers.

Means of controlling fires in combat tanks long enough to permit personnel to escape. The process, it is stated, should not be injurious to personnel and should be manually controlled and operated.

Cartels Again

THE RUBBER DIRECTOR, BRADLEY DEWEY, has just found it necessary to issue a denial that he had any knowledge of negotiations "on the part of anyone tending toward the establishment of an international cartel or anything similar to it in connection with rubber."

He stated that the policy of the Rubber Director has been, and still is, that no post-war international commitments as far as rubber is concerned, should be made by anyone prior to a free open discussion of the subject by all parties concerned in this country, including Congress. He revealed that the State Department keeps an eye open for any conferences pertaining to rubber, and advises him of any that come to light.

WPB Staffs Restricted on Use of Data

IN A RECENT ISSUE OF THIS MAGAZINE reference was made to the vast amount of industrial data that has been gathered as a part of the administration of war production. Much of this information has been necessarily dammed up, and only recently have moves been started to gradually feed it into private industrial channels for postwar use.

However, a very considerable volume of data gathered by the Government is restricted by law from general circulation, to protect private business from possible disclosure of trade information to a competitor.

Chairman Nelson of the War Production Board, has now acted to insure that the shifting tides of staff members to and from industry, shall not tear down any of this secrecy. In other words, if any person, knowingly or otherwise, thought to gain any undue advantage from this source by coming to Washington, Mr. Nelson intends to head him off.

An order has gone out privately to all WPB employees and officials, prohibiting them from collecting WPB information or statistics in "personal files" which they can use privately now or later. Statutory penalties, in fact, already are on the books to safeguard such information, but Mr. Nelson seeks to make doubly sure.

RAINBOW OF STEEL . . .

Symbol of the ties that bind Canada and the U. S. together in friendship is the new Rainbow Bridge recently erected across the gorge below Niagara Falls. Built in harmony with the rugged Niagara landscape, it is a promise of still greater cooperation between the two countries as well as a permanent answer to the challenge of the deep gorge and the swift currents that flow through it.

This bridge also epitomizes the growth of the Niagara region as one of America's most important industrial centers. With the Falls as a source of almost unlimited hydroelectric power, this area has become a fountainhead of strength for the nation at war. Out of its factories are pouring huge supplies of chemicals, chemurgical products and many other essential materials. And Niagara Alkali, pioneer chemical manufacturer in this district, is helping to set a new pace in speed of production and efficiency of service in meeting these vital needs.

CAUSTIC POTASH · CAUSTIC SODA · PARADICHLOROBENZENE
CARBONATE OF POTASH · LIQUID CHLORINE

Essential Part Of America's
Great Chemical Enterprise

ARMY E NAVY

Niagara ALKALI COMPAN

60 EAST 42nd STREET, NEW YORK 17, N.

THEY'VE stalked the enemy in his own waters . . . waited days for the prize, every minute tense with danger. At last the target has been sighted, its range, speed and course determined . . . the torpedo is on its way.

And now, more than 1,300 precision parts must function perfectly to steer the deadly charge to the target. The terrific blast against the enemy hull celebrates the courage of the heroes of the submarine service . . . and the perfect combination of American creative genius and craftsmanship.

In less spectacular but also important roles, this combination is at work for thousands of products essential in war and peace. As its share in peak production and high standards of many of them, Columbia supplies its customers with chemicals which always conform to exacting specifications.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING • PITTSBURGH 19, PA.

CHICAGO • • • BOSTON • • • ST. LOUIS • • • PITTSBURGH • • • NEW YORK • • • CINCINNATI
CLEVELAND • • • MINNEAPOLIS • • • PHILADELPHIA • • • CHARLOTTE

WATER, WATER—a veritable lake of it is required for the daily operation of Columbia plants. Visualize a body of water one mile long, over 500 feet wide and 10 feet deep. Within 24 hours it would be drained completely dry in order to keep Columbia plants in average production.

A THIRSTY CHEMICAL is Columbia Calcium Chloride. Its nature causes it to dissolve itself when exposed to relative humidities above 30-35%. Because of this, a fast-growing use is its employment as an economical dehumidifying agent in basements and other storage areas where dampness must be overcome. Its effectiveness can be gauged by the absorption capacities of one pound of 77-80% Calcium Chloride. At a relative humidity of 70, it absorbs two pounds of water . . . at a relative humidity of 90, it absorbs five pounds of water—or five times its own weight!

TOUGH GOING! In drilling the shafts for Columbia's limestone mine at Barberton, Ohio, 22.6 pounds of dynamite were required for each foot. As the total depth of the two shafts is 4,581 feet, approximately 52 tons of dynamite were used in preparing the way for what is now the world's deepest limestone mine—2,323 feet.

ONLY A V-MAIL letter is always certain to reach its destination overseas. For if the plane carrying your letter is lost, a record of its mail cargo quickly leads to the dispatch of a duplicate copy. Use V-Mail for fast, sure service . . . and to conserve valuable cargo space. One cargo plane can carry 400,000 V-Mail letters. 112 planes are required to transport the same number of standard size letters—an important factor in the handling of 34,000,000 pieces of overseas mail *each week!* And remember—V-Mail is the *only* mail that *always* flies.

COLUMBIA CHEMICALS include Soda Ash, Caustic Soda, Sodium Bicarbonate, Liquid Chlorine, Silene EF (Hydrated Calcium Silicate), Calcium Chloride, Soda Briquettes, Modified Sodas, Caustic Ash, Phosflake, Calcene T (Precipitated Calcium Carbonate), and Calcium Hypochlorite.

DRIOCEL says STOP!

to water molecules in the *FLOW STREAM*

FOR DRYING
- **Most gases, vapors and liquids.**
- **Process and instrument air.**
- **Feeds to catalytic processes.**
- **Synthetic rubber charge stocks.**

These are some of the uses to which DRIOCEL, the versatile, efficient, low-cost desiccant, is being put in the chemical and petro-chemical fields. There are many others, and additional uses are being developed continually — by our own Technical Service and by engineers in the field.

DRIOCEL is a hard and stable granular material, manufactured from selected ore under rigidly exact manufacturing conditions. A DRIOCEL unit once introduced into the flow stream stays in use day after day. The only attention it requires is simple regeneration to start doing its drying job all over again with continued high efficiency.

We'll be glad to send you a sample of DRIOCEL and complete data about its characteristics and uses. Just drop us a line.

POROCEL CORPORATION • BAUXITE ADSORBENTS AND CATALYSTS

260 SOUTH BROAD STREET, PHILADELPHIA 1, PA.

Shell Chemical stops 'em!

• Jeeps aren't always jumping. And when they must "stop on a dime" Shell Chemical's diacetone alcohol in their hydraulic brakes goes to work.

Shell's secondary butyl alcohol is helping recover precious copper from low-grade ore. Etc. . . . etc. . . . so it goes through our entire list.

Whether it's in a jeep, a concrete fuel barge, an army raincoat or a bullet-proof gas tank, products of SHELL CHEMICAL are helping pave the road to Victory.

Everything we make is on allocation for war. And we believe that is an excellent thing to remember in the peaceful future, when you're searching for answers to chemical problems. For after war is forgotten, and you're exploring new markets, we can promise you as complete cooperation as we are now giving the War effort.

PRODUCTS OF SHELL CHEMICAL

Diacetone Alcohol
Secondary Butyl Alcohol
Methyl Isobutyl Ketone
Acetone
Isopropyl Alcohol
Isopropyl Ether
Butadiene
Mesityl Oxide
Methyl Ethyl Ketone
Ammonia
Tertiary Butyl Alcohol
Allyl Alcohol
Allyl Chloride

ARMY E NAVY

Martinez and Dominguez, California, plants

SHELL CHEMICAL Division of SHELL UNION OIL CORPORATION
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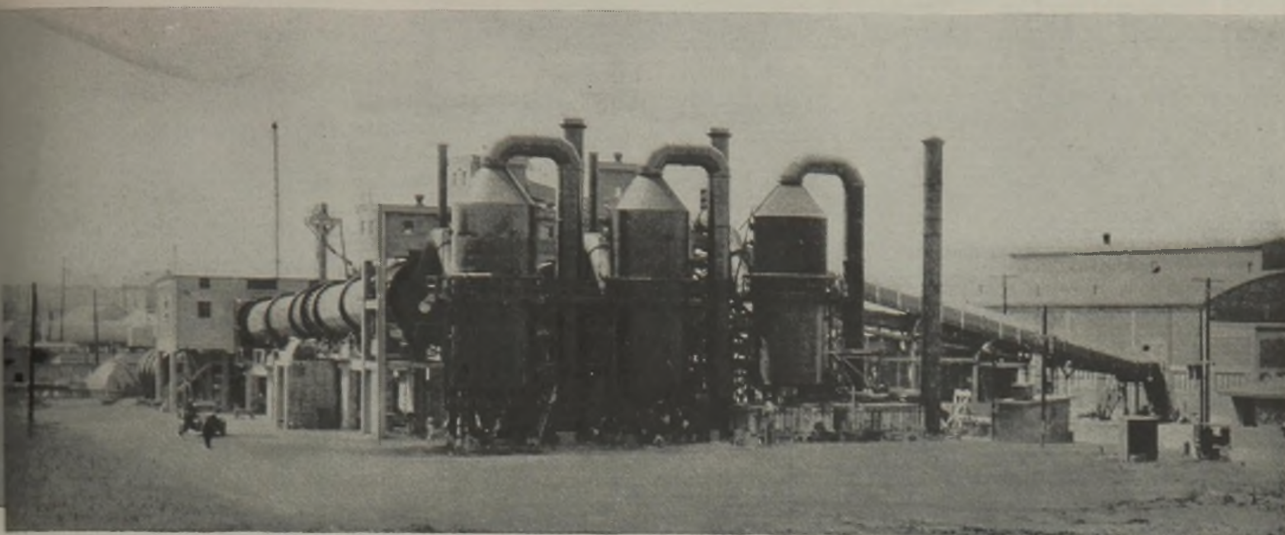
LIFE On The

(*Above*) **CHOICE OF FILLERS** for Cyanamid's MELMAC* plastics is determined by the properties desired in the finished molded product. The basic uncured resin is a colorless, glassy solid. When combined with a filler of chopped cotton cloth, the molded material has high flexural strength, good shock resistance, very low moisture absorption, arc resistance and general inertness with regard to odor and taste. With alpha cellulose pulp fiber, MELMAC has excellent moisture resistance, color, and resists staining, abrasion, acids and alkalies. Mineral-filled MELMAC is designed for applications where arc resistance, high dielectric strength and heat resistance are of primary importance. Complete information on Cyanamid plastics and resins—MELMAC, BEETLE*, URAC*, MELURAC*, and LAMINAC*—and their applications is available.

(*Left*) **A HOT WAX DIP TANK,** designed to fit the needs of paper bag manufacturers meeting Army-Navy specifications for export packaging, is built by the Aeroil Burner Company, Inc. The unit is particularly adaptable in the paper field where the "overslip" moistureproof paper bag, which is wax sealed at both ends, is a requirement for export packaging. The tank is equipped for both wax spraying and dipping. It is electrically heated, insulated and portable. A built-in thermostat provides for automatic temperature regulation from 100° to 550° F. Among the chemical staples and specialties included in Cyanamid's services to the paper industry, Cyanamid supplies a group of amorphous petroleum waxes known as BENOWAX* which are both effective and economical ingredients in hot melt dip coating. Cyanamid will supply full technical information on the use of BENOWAX and its applications.

The Chemical Newsfront



(above) **A NEW CYANAMID OPERATION IS PRODUCING** **(THETIC "FLUID" CRACKING CATALYST.** This new alyst is used to accelerate and improve the cracking petroleum for manufacture of 100-octane gasoline. e catalyst, made by a commercial manufacturing cess developed by cooperation between Cyanamid l a leader in the petroleum industry, has made sible the tremendous production of high-test avion gasoline. Its use has not only improved the cking process, but has made possible greater yields higher quality gasoline. The special feed stocks ded to make large quantities of butadiene, vital raw terial for synthetic rubber, are also obtained from es produced by this method of catalytic cracking.

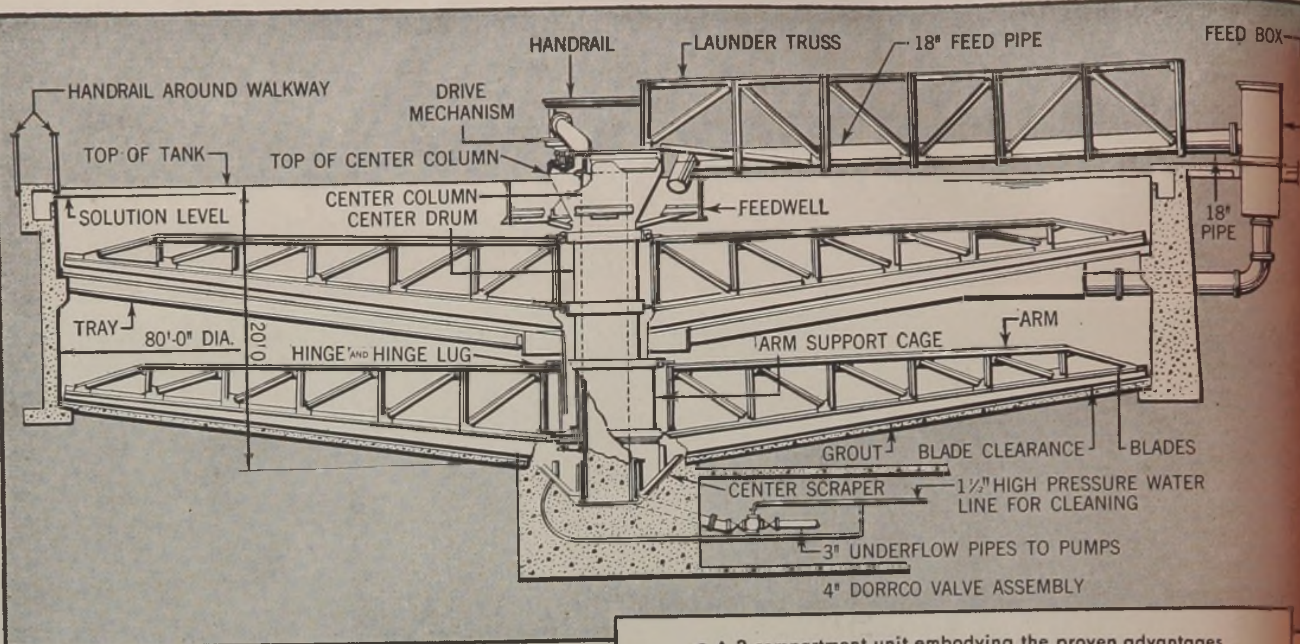
ht) **DISCOURAGING INSECTS** is a serious business in ny lands where our troops are stationed, for the ct's sting often carries deadly disease germs. One he most effective insect repellents ever developed is uethyl Phthalate, of which Cyanamid is one of the est producers. Used by our men stationed in areas nsect-borne disease, this chemical leaves a protec- film on the skin that is practically odorless and ost unnoticeable. Yet it is remarkably effective in elling insects of many kinds and is widely used listricts where such insects are a problem. Thus ethyl Phthalate is responsible not only for pre- ting sickness, but for increasing the efficiency and ale of our troops in many parts of the world.

*Reg. U. S. Pat. Off.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.



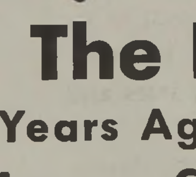
● A 2 compartment unit embodying the proven advantages of the centerpier construction and rugged Central Drive.

Tray SEDIMENTATION UNITS

The DORR Company Pioneered TRAY Unit[s] Years Ago in Small Sizes to Conserve Ground Space, Hea[d] Losses, Costs of Construction and Operation.

Now- Large TRAY Units Up to 95′ in Diameter Are Availabl[e]

● One 80′ TRAY unit possessing the same capacity as two 80′ singl[e] units or four 40′ TRAY units comprises only one foundation, one driv[e] mechanism, one pump—obvious savings.



● Send a statement of your sedimentation problem to our nearest office or ask a Dorr Engineer to call at your convenience—no obligation, of course.

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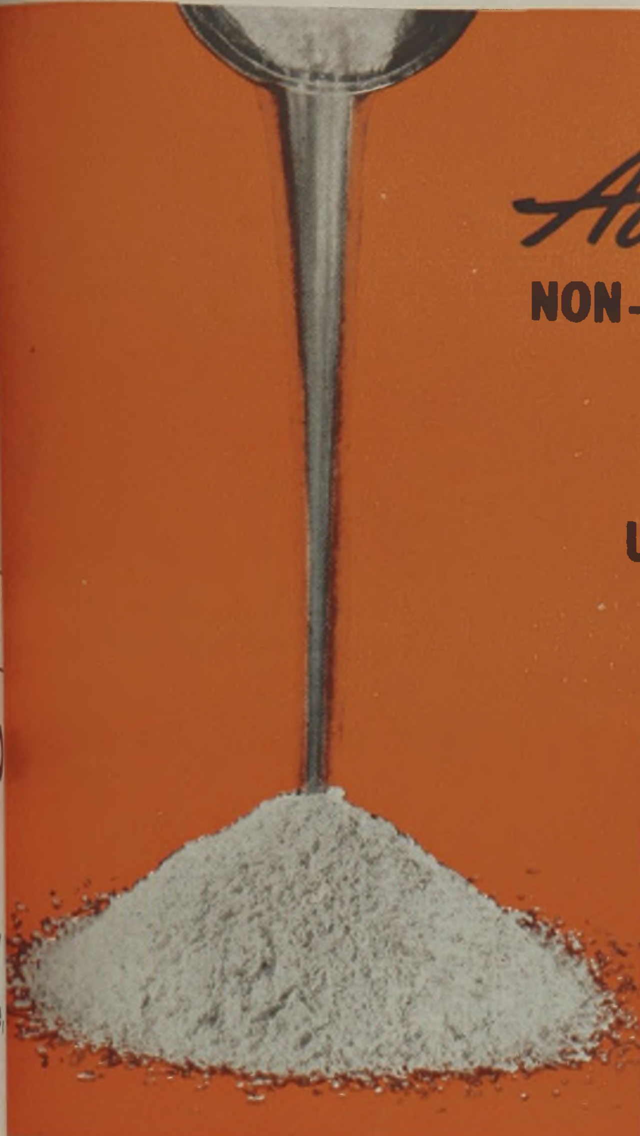

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HOOKER FLAKE SODIUM BENZOATE because of its non-dusting and high solubility is widely used as a preservative of foods, fruit juices and syrups; as an antiseptic in pharmaceuticals; in medicinal preparations; in tooth pastes and powders.

Shipments are made in fibre drums containing 25, 50 and 100 lbs.

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OKER BENZOIC ACID (U.S.P. & Tech.) — A ite, crystalline, odorless solid with a melting nt of 122.0° C. Is highly soluble in water, ohol and ether. Available in fibre drums con-ning 25, 50 and 100 lbs.

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For more information about these products, or a handy reference list of properties, uses, and shipping containers for many other HOOKER products, address

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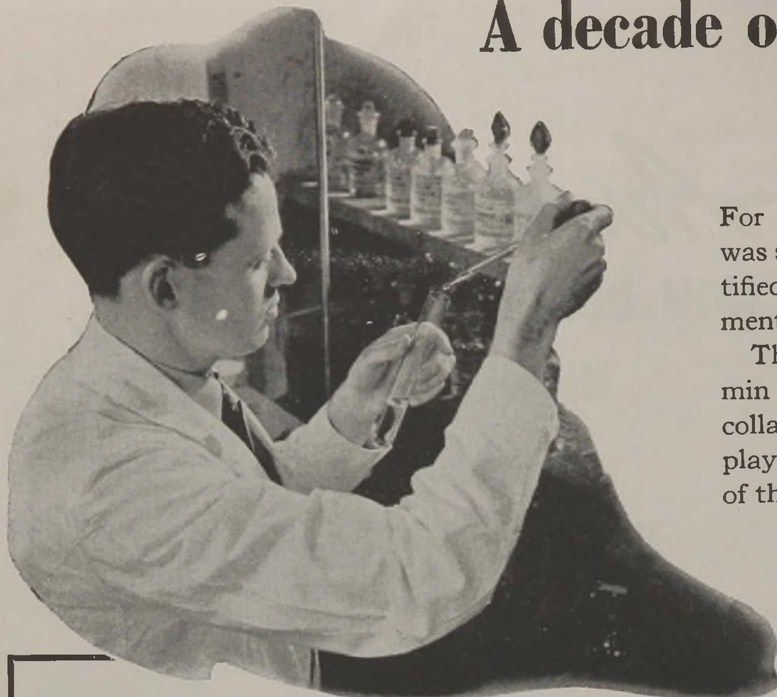
CHEMICALS

A decade of Vitamin Leadershi



For a decade—since 1934, when Ascorbic Ac was synthesized—the name Merck has been iden tified with leadership in the synthesis, develop ment, and large-scale production of pure vitamin

The following list of contributions in the vit min field made by Merck chemists and the collaborators emphasizes the outstanding rô played by Merck & Co., Inc. in the developmen of these vitally important substances.

1934

Ascorbic Acid Merck (U.S.P.) was made available by Merck & Co., Inc.

1936

Vitamin B_1 was synthesized in the Merck Research Laboratories.

1937

Thiamine Hydrochloride Merck (U.S.P.) was made available in commercial quantities.

1938

Nicotinic Acid Merck (U.S.P.) (Niacin) and Nicotinamide Merck (U.S.P.) (Niacinamide) were made commercially available.

1938

Riboflavin Merck (U.S.P.) was the second pure crystalline vitamin to reach commercial production during that year.

1938

Alpha-Tocopherol (Vitamin E) was identified and synthesized by Merck chemists and their collaborators in other laboratories.

1939

Vitamin B_6 was synthesized in the Merck Research Laboratories.

1940

Vitamin B_6 Hydrochloride Merck (Pyridoxine Hydrochloride) became available in commercial quantities.

1940

Alpha-Tocopherol Merck (Vitamin E) was made commercially available.

1940

Vitamin K_1 Merck (2-Methyl-3-Phytyl-1,4-Naphthoquinone) was made commercially available.

1940

Menadione Merck (U.S.P.) (2-Methyl-1,4-Naphthoquinone), a pure chemical having marked Vitamin K activity, became available in commercial quantities.

1940

Pantothenic Acid, member of the Vitamin B-Complex, was identified and synthesized by Merck chemists and their collaborators in other laboratories.

1940

Calcium Pantothenate Dextrorotatory, a biologically active form of Pantothenic Acid, was made commercially available by Merck & Co., Inc.

1943

Biotin, member of the Vitamin B-Complex, was synthesized in the Merck Research Laboratories.

1944

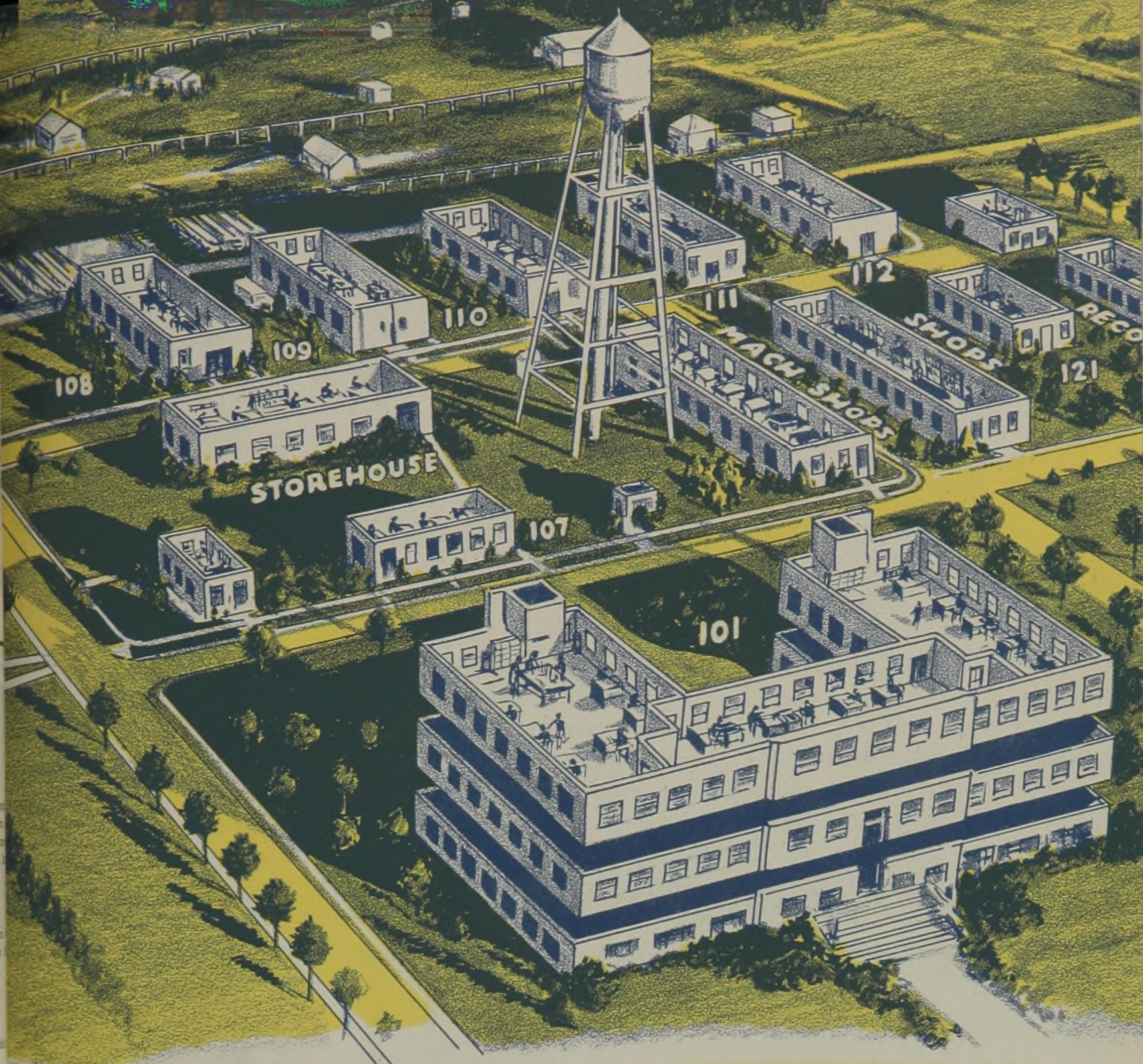
Biotin Merck was made available for investigative use.

Merck & Co., Inc. now manufactures all the vitamins commercially available in pure form, with the exception of vitamins A and D.

You are invited to write for literature

ARMY E NAVY
LET'S ALL BACK THE ATTACK WITH WAR BONDS

MERCK & CO., Inc. *Manufacturing Chemists* **RAHWAY, N.**



Plans of a planning H Q

101—General Laboratories
108—Fundamental Research
109—Resin Pilot Plant
110—Rubber Lab., Plastics Lab.
111—Plastics, Paper, Distillation, Testing
112—Foundry and Gen. Labs.
121—High Pressure Lab.
107—Physics Lab.
114—Launderometer, Flotation Lab.

In these twenty-one buildings of the Hercules Experiment Station—and in the field—work several hundred scientists, technicians, and their assistants.

Repeatedly they explore the fields of cellulose, resins, terpenes, synthetic resins, explosives, papermakers' chemicals. Frequently what is brought to light turns out to be of intense interest and ultimate profit to manufacturers.

We are always glad to share the results of our research. Perhaps we may be able to help solve problems connected with *your* product planning. Write Hercules Powder Company, Wilmington 99, Delaware.

"DUSTY ROAD" after 14 hours of rain

If you saw a car traveling over a rain-soaked road, and *dust* being turned up by the car's wheels as they splashed through the water, you might well doubt your eyes! Yet on a road under construction in Mississippi, engineers actually took a movie of just such an occurrence. The roadbed had just been treated with a Hercules soil-stabilizing resin when a deluge set in—and lasted for fourteen hours. But, as the movie dramatically shows, there was *no mud* to halt or slow the contractor's car which came upon the scene. The research of which this was a major phase has resulted in the new product—Stabinol.

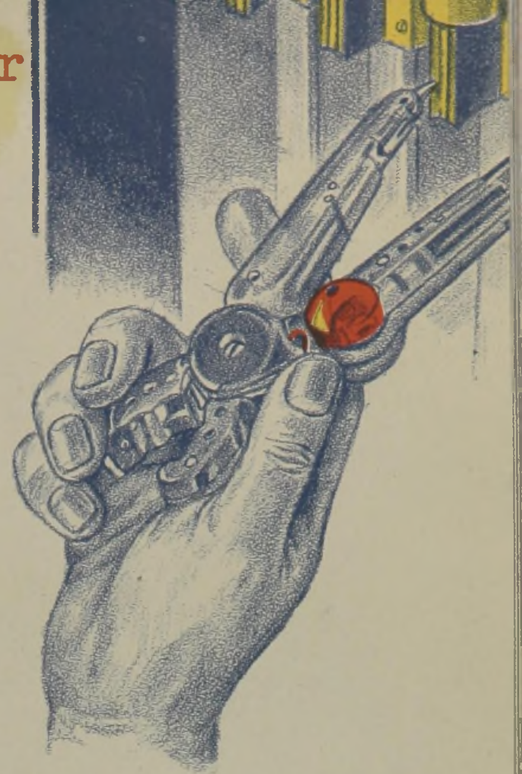
Seven years' development work lies behind this *new* Hercules product. Some present uses of Stabinol are military secrets, but we *can* reveal that this low-cost resin waterproofs many types of soil, mixes readily, produces stable, non-sinking soil bases for roads and runways, and permits application of wearing surfaces after unusually short curing. For full details write Naval Stores Department, Hercules.

New thermoplastic laminates are lighter, tougher

Flying rocks bounce off these new thermoplastic laminates without leaving a mark. Even a healthy hammer-blow fails to dent a sheet only ⅛″ in thickness. Because of this extraordinarily high shock resistance and light weight (about ½ the weight of aluminum) thermoplastic fabric laminates offer unusual possibilities for many airplane parts.

These thermoplastic laminates are made of alternate layers of fabric and either ethyl cellulose or cellulose acetate plastic. They have a hard, glossy surface, a permanent finish, and may be machined, punched, or drilled. Cellulose Products Depar[illegible]ny.

This pocket-size fuse puller can test circuits, too



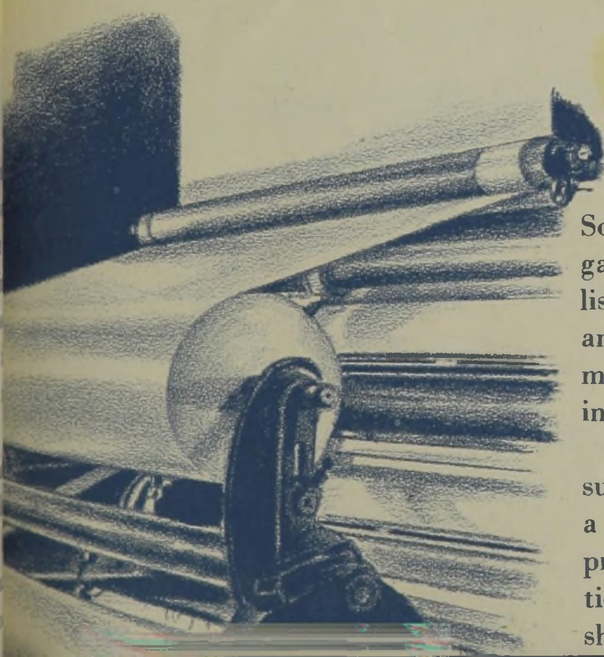
This little device—actually an electrical instrument—illustrates very well the excellent electrical properties of cellulose acetate. It weighs only 4 ounces, and is used to pull fuses and test circuits—a small light bulb glows to indicate "live" circuits. Its strength, light weight, great insulating value, and great dielectric strength were possible because these properties are *inherent* in cellulose acetate.

Such a *combination* of properties is why manufacturers so often choose cellulose acetate for portable radio housings, fluorescent tube holders, magnet coil spools, and wiring devices. The Cellulose Products Department at Hercules can probably help *you* select the best material for *your* planned electrical products.

Low-cost adhesive resins

As the name suggests, Staybelite* Esters are unusually *stable*. For instance, Staybelite Ester No. 10, held under oxygen at 300 lbs. to the square inch for 100 hours at room temperature, shows less than 0.1% oxygen absorption. Staybelite Esters are soluble in all commonly used solvents except water and alcohol. They have unusually wide compatibility with resins, waxes, plasticizers, and film formers. They are useful where stable tackifiers are required, and can increase lustre and adhesion, maintain pale colors in many other compositions. Staybelite Esters 10 and 1 are of particular interest as low-cost tackifiers with substitute rubber in pressure-sensitive adhesives. The Synthetics Department at Hercules will gladly supply further information.

*Reg. U. S. Pat. Off. by Hercules Powder Company



Charted: 36 resins for paper converting

Some idea of how complete is the Hercules line may be gained from the fact that thirty-six different resins are listed for use in paper converting. Many of these economical and versatile materials are derived from rosin, some from modified rosins, and the range is further broadened by including some which do not have a rosin base at all.

Every one of them, though, has back of it a record of successful application to specific problems. Hercules has a chart showing the properties of these 36 resins, their present commercial uses and also their projected applications, or "indicated uses." The data on these resins should be of interest to all those dealing with resins for

Non-oxidizing soldering flux made with Poly-pale resin

The Signal Corps needed a soldering flux in paste form, *non-oxidizing*, for use in all the extreme conditions of global war. The rigid requirements were met by a mixture of liquid petrolatum with Hercules Poly-pale* resin.

Non-crystalline in its chemical structure, Poly-pale resin eliminates completely one big fault of most soldering fluxes—crystallinity. Poly-pale can be used in all the rosin types of flux, including the wire type of solder with a rosin flux core. Contact Naval Stores Department at Hercules.

Self-plasticizing plastic

A new technical booklet is now available on Hercules Benzyl Cellulose. With this product little or no plasticizer is required for compounding, injecting, or extruding. Moisture absorption is extremely low. Other useful properties are its excellent electrical characteristics (including high arc resistance) . . . good resistance to chemicals . . . and a relatively low specific gravity, providing high coverage per pound.

Corrosion-resistant coatings, cable lacquers, insulating plastics, and other extruded and injected plastics may be advantageously made of benzyl cellulose. Cellulose Products Department, Hercules.

*Reg. U. S. Pat. Off. by Hercules Powder Company

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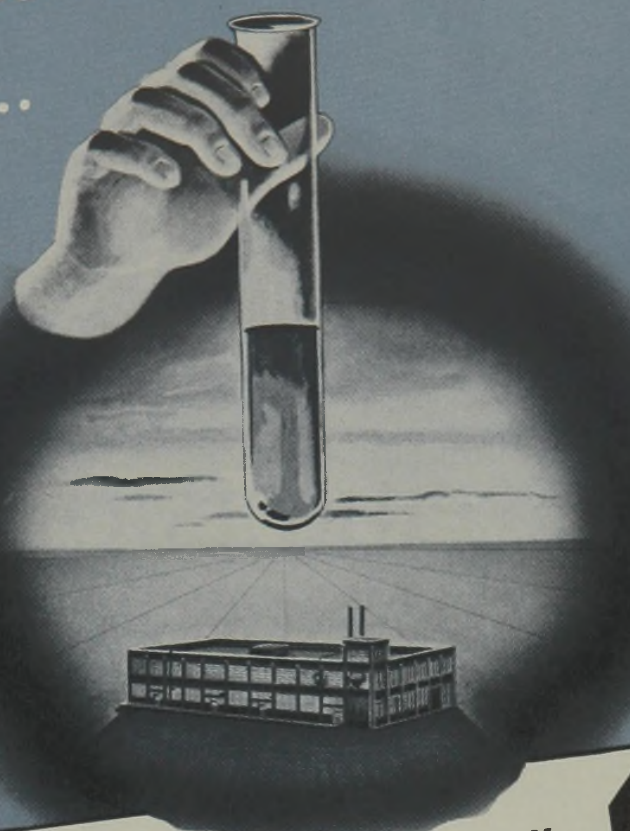

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Liquid Caustic Soda
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 70% NaOH
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Dry Cleaning Solvents
Laundry Soda
Cleaner and Cleanser
Textile Soda
Diamond Soda Crystals
Sesquicarbonate of Soda
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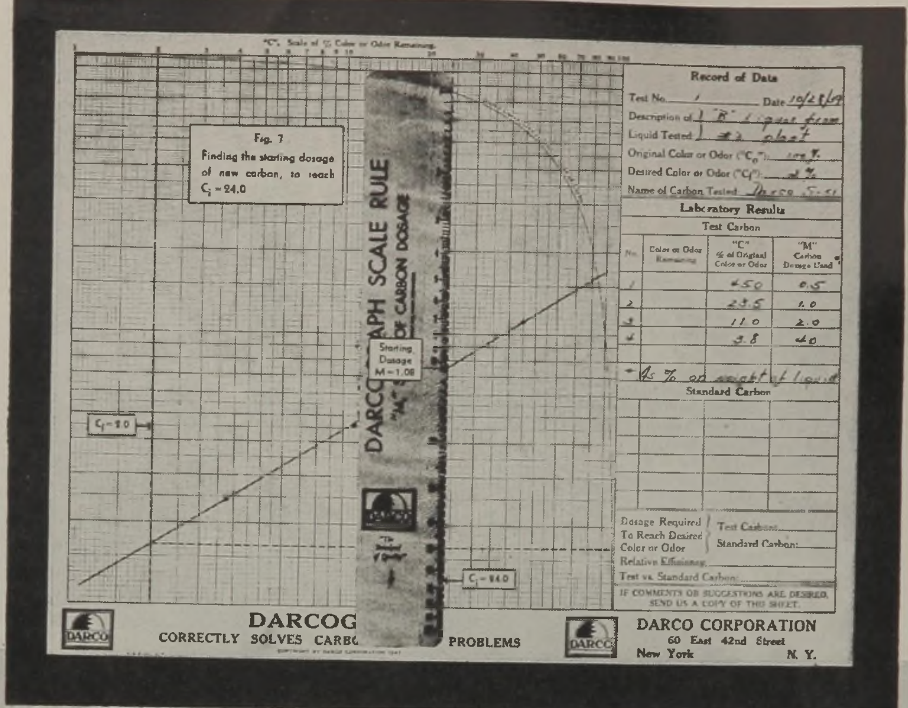

The Darcograph makes it easy to tell precisely how much Darco activated carbon will purify any given amount of liquid.

PRECISION PURITY

with DARCO *has a Double Meaning*

Precision purity, when you practice it the Darco way, has two meanings. This activated carbon, with its billions of adsorptive, sponge-like particles per pound, accomplishes two jobs in a single operation:

1. ***Speedy, complete removal of impurities from liquids.*** *This means savings in man-hours and materials.*
2. ***More efficient crystallization, evaporation or distillation,*** *since impurities no longer hamper processing. Consequently, you get higher yields—of a better product—at increased profit.*

Use the Darcograph. This effective charting method takes guesswork out of purification with Darco. Chemical engineers processing many organic and inorganic solutions—pharmaceuticals, foods, oils, fats, waxes, sugars, electroplating solutions and others—have found it economical and easy to banish impurities with Darco activated carbon, applied according to precision standards set up by the Darcograph for each specific job.

Your toughest liquid purification problem may have a surprisingly simple answer. Try the combination of Darco and the Darcograph. The Darcograph is yours for the asking.

DARCO—REG. U. S. PAT. OFF.

DARCO CORPORATION

60 East 42nd Street, New York 17, N.Y.

Fluorine Chemicals

YOUR FIGHTERS IN WAR . . . YOUR WORKERS IN POSTWAR

Fluorine chemicals are fighting chemicals in this war. Aluminum for planes is commercially made only with aid of a fluorine chemical —a second fluorine chemical is a catalyst in making the fuel that powers those planes. These are merely two examples. Actually, the development of the fluorine chemicals—in new forms and new applications for old forms —has been one of the chemical industry's principal contributions to the war program.

Original research and development work has established Penn Salt as the principal supplier of this increasingly important group of chemicals. Natural cryolite, processed and refined exclusively in the United States by Penn Salt, is one of the most important fluorine materials contributing to the war effort. Penn Salt is America's largest manufacturer of anhydrous hydrofluoric acid. Its Easton, Pennsylvania, plant (formerly Sterling Products) was the first commercial producer of that product and other important fluorine chemicals. It shipped commercial quantities of fluosulfonic acid in 1936.

Penn Salt believes that fluorine chemicals will have vastly expanded uses in postwar. Of course, its research and development activities in fluorine chemicals at present are concentrated in the war effort. Available fluorine chemicals are being supplied for such essential uses as—production of aviation fuel—electroplating operations—aluminum and magnesium manufacture—processing of stainless steels—insecticides—glass and ceramic manufacture—production of rare earth metals—metal soldering and welding operations—maintenance of military and civilian fabrics.

The diversified uses of fluorine chemicals in war work indicates the wisdom of investigating them in your postwar planning.

PSM FLUORINE CHEMICALS

Being Supplied in Commercial Quantities

- ANHYDROUS HYDROFLUORIC ACID
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- FLUOBORIC ACID
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- SODIUM BIFLUORIDE
- ALUMINUM FLUORIDE (86% AlF_3).
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- FLUORIDE FLUXES

At Present Available Only in Experimental Quantities . . .

- FLUOSULFONIC ACID
- MAGNESIUM FLUORIDE
- POTASSIUM BIFLUORIDE
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- COPPER AMMONIUM FLUORIDE (10% and 15% Cu).
- CALCIUM FLUOSILICATE
- IRON AND OTHER METALLIC FLUOSILICATES
- AMMONIUM FLUOBORATE
- POTASSIUM FLUOBORATE
- SODIUM FLUOBORATE
- TIN AND OTHER METALLIC FLUOBORATES

Inquiries on these materials are solicited.

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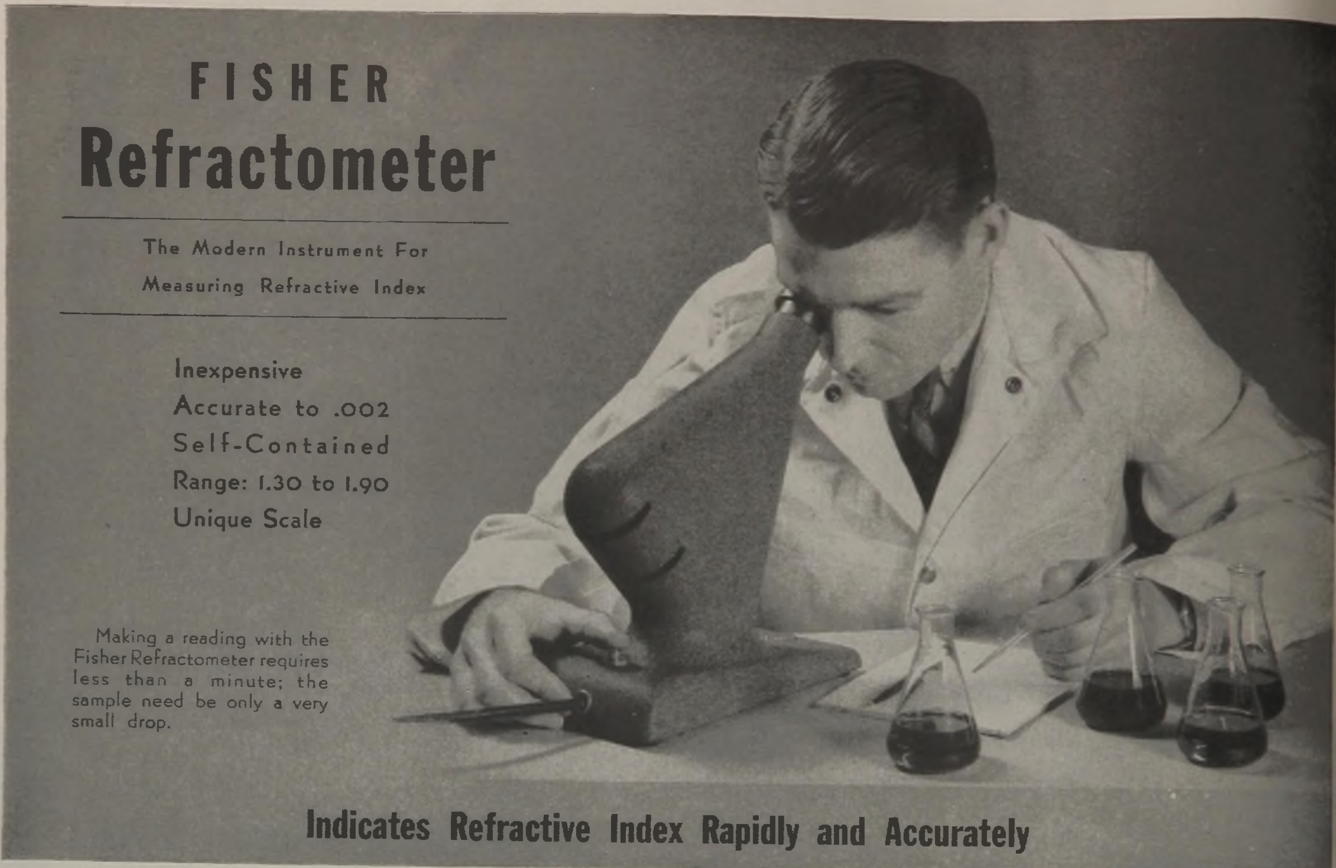
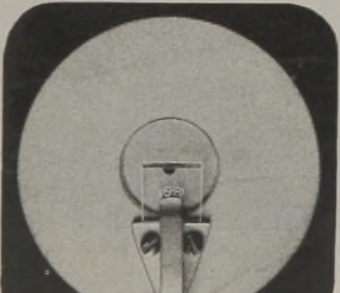


The Fisher Refractometer is an inexpensive instrument which measures the refractive index of liquids with an accuracy of ± .002 units. Its operation is so simple and its cost so low in comparison with that of other refractometers that its advantages can now be fully realized by educational laboratories.



The sample placed in the wedge-shape well at the eyepiece refracts light seen through the aperture.

The new instrument, developed and manufactured by Fisher, employs a unique, illuminated scale and sample holder by means of which direct readings of refractive indices can be made in the range of N = 1.30 to N = 1.90. A sample of 0.001 ml. is sufficient for a determination.

Applications of this instrument, in addition to its use as a teaching aid, include the identification of organic compounds, control of industrial products, determination of purity of substances, determination of the concentration of solutions, the study of molecular structure, etc.

The Fisher Refractometer is an attractive, portable instrument furnished with on-off switch, cord and plug. The instrument is designed so that it is very convenient to operate.

Fisher Refractometer, for 110 Volt A.C. or D.C. **$45.00**

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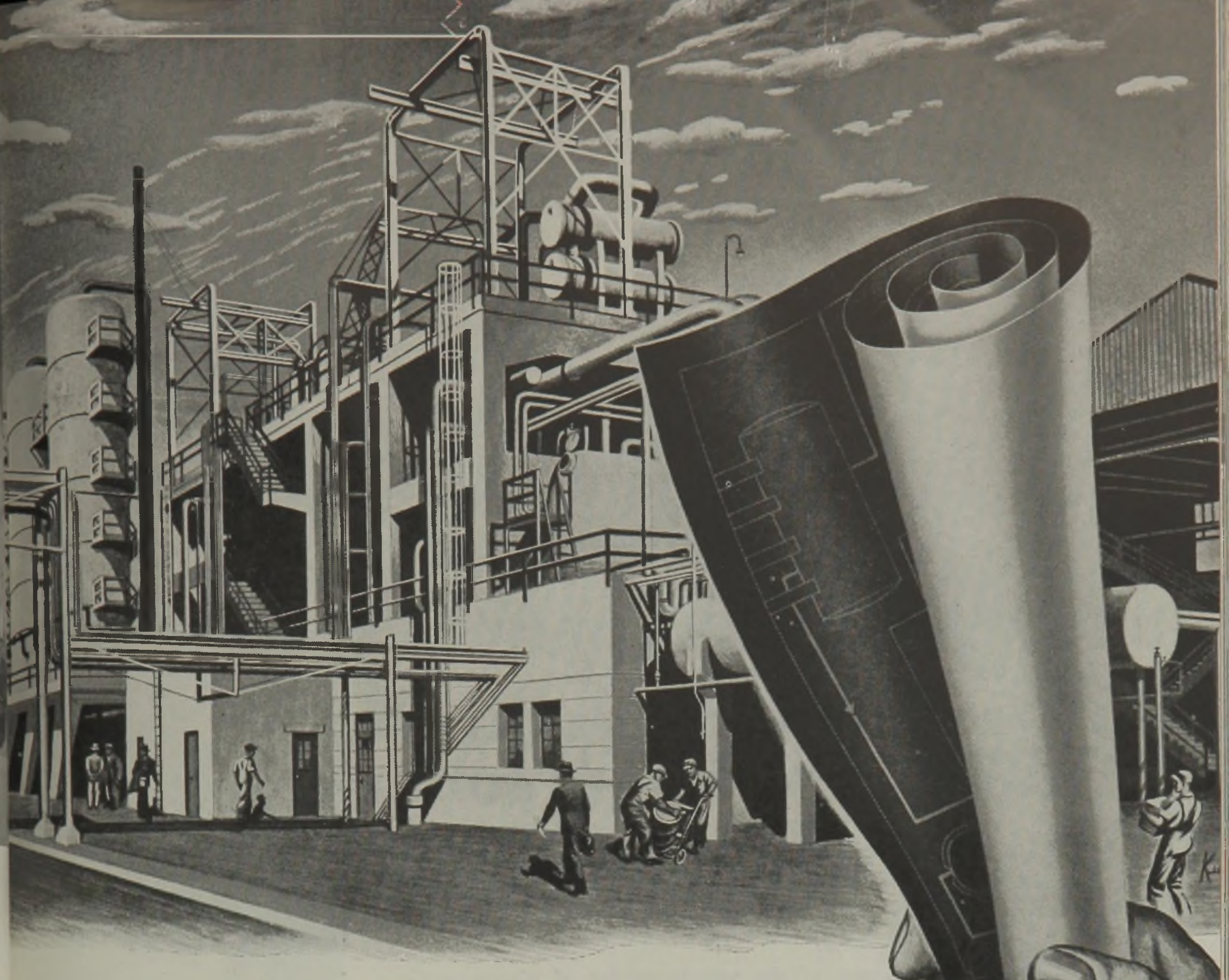

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Into the manufacture of the vast quantities of ointments, salves, lotions, creams and similar products needed by the Medical Corps go great quantities of Lanolin U.S.P.
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Some manufacturers have been asked to do without or with less Lanolin and Wool Grease so that it can be used for this and many other vital war purposes to help hasten the day of victory. The sooner it comes, the faster you can have all the Nimco Brand Lanolin, Degras and Wool Grease you want.
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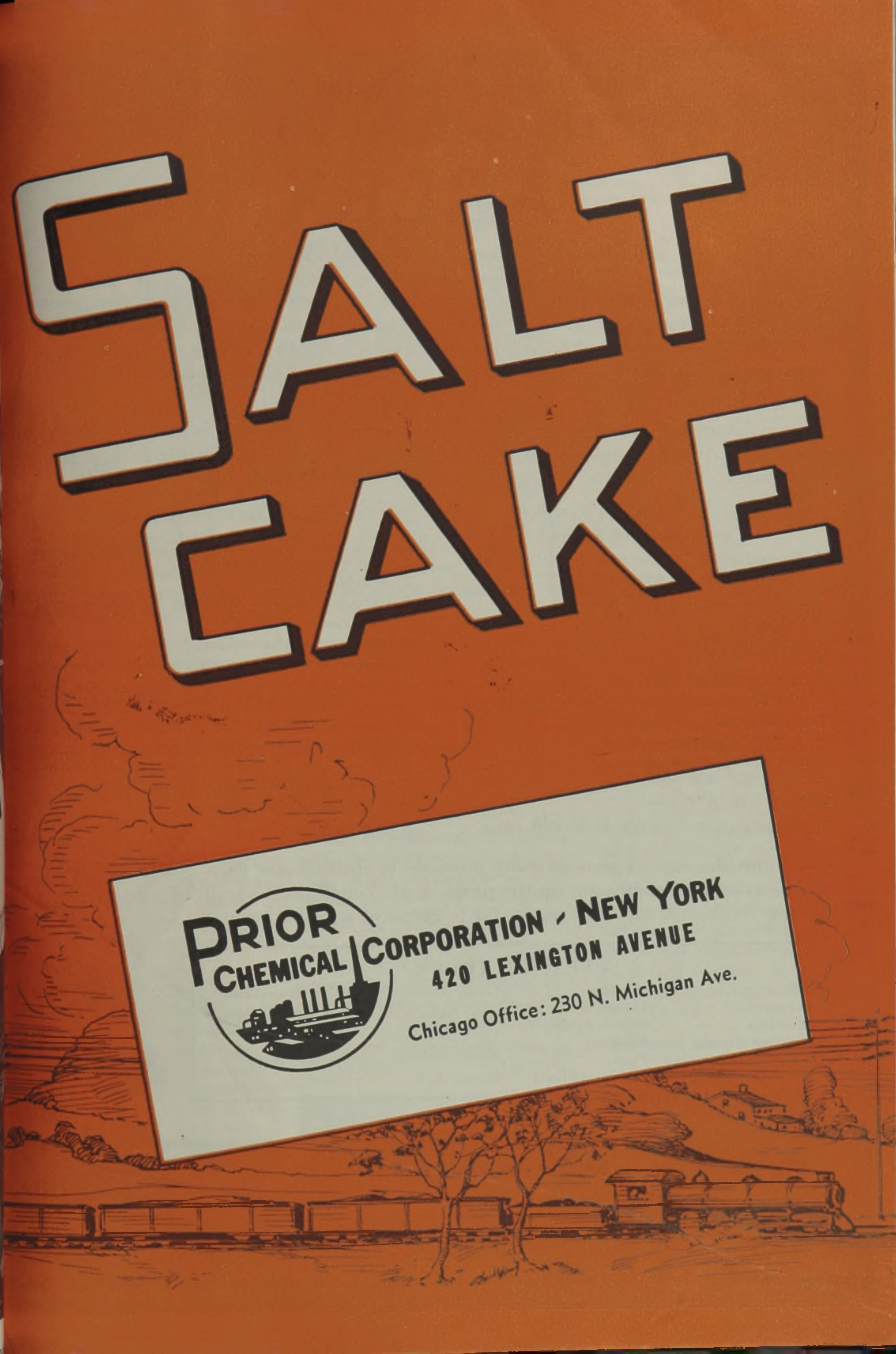
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There is NO Humectant* Like

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(Atlas Commercial Sorbitol Solution)

Due to lightening of Government demands and because of greater production at our plant, Arlex is now available for civilian use. The distribution of Arlex is still governed by WPB Allocation Order M-300, and the needs of war will continue to make commitments dependent on the current situation. At the present time Arlex can be secured for most civilian use.

Atlas Arlex is a *hexa*hydric alcohol—in non-crystallizing form. It is the *six* hydroxyls which give Arlex a combination of significant properties unobtainable in any other humectant:

Significant CONDITIONING *Properties of Arlex are*

1 Compatibility with textiles, leather, glues, dextrins, wood, paper, etc.
2 Permanence—zero volatility.
3 Clarity.
4 High viscosity.
5 High specific gravity.
6 Conditioning efficiency at high humidities.
7 Low organic solubility.
8 Permanent fluidity.
9 Low freezing point.
10 High refractive index.
11 Hygroscopicity—narrow humectant range.

Significant CHEMICAL *Properties of Arlex are*

1 Polyhydroxylic character.
2 Neutral reaction.
3 Virtual absence of reactive, instable reducing substances.
4 Stability to light and air.
5 Absence of acrolein upon thermal decomposition.

Significant PHYSIOLOGICAL *Properties of Arlex are*

1 Bland, sweetish taste and odor.
2 No irritation of mucous membranes of mouth.
3 Non-irritant softening action on the skin.
4 Moderate osmotic pressure.
5 Assimilability.

Arlex provides new answers to many problems of shelf-life and sales appeal. We would like to swap ideas with you on the problem of "condition." The intelligent exchange of ideas frequently produces results far in excess of anticipation.

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As a starter, send for your copy of the Arlex book, now.

*Humectants: moisture-content stabilizers for hydrophylic products. Variously called conditioners, plasticizers, softeners, flexibilizers.

Arlex: Reg. U. S. Pat. Off.

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Powerful, low-boiling chlorinated solvent

The stability, solvent power and relative non-flammability of Methylene Chloride are properties which have made this versatile product adaptable to many lines of work, and have stimulated development of many new processes and techniques.

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Boiling range (760mm, Hg)	39.3-40.1°C.
Viscosity, liquid, (760mm, Hg)	
−20°C	0.676
20°C	0.441
Vapor Density, 40°C	0.206 lb./cu. ft.
Pounds per gallon, 20°C	11.08
Critical Temperature	216°C.
Critical Pressure	708 psi.
Flammability—Underwriters' Laboratory Rating	Non-flammable
Freezing Point	−96.7°C.
Dielectric Constant, Vapor, 60-140°C.	1.17
Heat Conductivity, Liquid, 68°F.	0.099 BTU/sq. ft. (sq. ft.) (°F/ft.)
Surface Tension, Against Air	26.52 dynes/cm. (18°C.)
Color	water-white
Odor	pleasant
Solubility, (20°C.),	
in water	2.000 gm./100 gm.
water in	0.162 gm./100 gm.
bromine in	1.96 gm./100 gm.
paraffin (m.p. 50.5°C.) (15°C.) in	1.0 gm./100 gm.
alcohol in	infinite
ether in	infinite
chloroform in	infinite

Methylene Chloride is extremely stable, even in the vapor phase, and can be economically recovered from extracted residues by simple, low-temperature distillation. It mixes well with other common organic solvents, but only slightly with water; hence it can be employed in many preparations where the use of mixed solvents is desirable. The chlorine atoms can be replaced by a variety of radicals, making possible numerous syntheses.

USES

SOLVENT for—nitrocellulose, cellulose acetate and other cellulose esters; polyvinyl acetate and other resins; photographic film; waxes, fats, oils, greases, rubber, bitumen, pitch, alkaloids, and many other organic compounds.

EXTRACTANT for—animal fats; leather scraps; wool; caffeine; vegetable and mineral oils; cocoa butter; perfumes and flavors; dyes, lactic, acetic, propionic and stearic acids; and such materials as hops, rice bran, rolled oats, grape seeds.

REFRIGERANT for—heat transfer equipment; refrigeration and air conditioning systems.

DEGREASING AGENT for—use with various metals, including aluminum foil where rapid drying is essential.

PROCESS AGENT and REAGENT for—the preparation of various compounds, further esterification of cellulose esters. Reacts with ethylene mercaptans, alkali organometallic compounds, diphenyl, and many others.

GENERAL for—removing paint from wood, metal and wool waste; de-inking newsprint; raising the flash-point of lacquers; adhesives; de-waxing petroleum oils; solvent for quick drying lacquers and varnishes; recovery of phenol from water; in pharmaceuticals; disintegrating fibrous materials such as paper; and as a biological preservative, parasiticide, fire-extinguisher medium with carbon tetrachloride, cementing medium for Cellophane and other products; manufacture of artificial leathers, patent leather finishes, motion picture film, etc.

★ ★ ★

Consult us now on how Du Pont Methylene Chloride can assist you in your work. At present, its use is restricted to war production, with a few exceptions. Limited amounts, however, are available for research work. For further details just write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

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DU PONT
REG. U. S. PAT. OFF.

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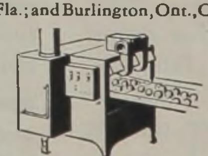
Anderson-Barngrover Division Complete line of machinery for canning foods. San Jose, Calif.

Sprague-Sells Division. . . . A complete line of machinery for canning foods. Hoopeston, Ill.

Niagara Sprayer & Chemical Co. . . . Insecticides for protecting crops from insects and disease. Middleport, N.Y.; Jacksonville, Fla.; and Burlington, Ont., Can.

Bean-Cutler Division. Sprayers, Dusters and Packing House Equipment for Fruits & Vegetables, Fog Fire Fighters, Turbine Pumps. San Jose, California.



Texas Division . . . Protective Processes, Canning Machinery, Fruit and Vegetable Packing Equipment. Harlingen, Texas.

Florida Division . . . Citrus and Vegetable Packing Equipment, and Food Protective Processes. Dunedin and Lakeland, Florida.

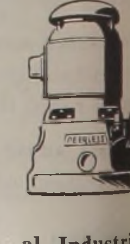
John Bean Mfg. Co. Fog Fire Fighters, Bean Royal Spray Pumps, Automotive Service Station Equipment. Lansing, Mich.

Riverside Division. Citrus Packing Equipment, Automatic Box Making and Lidding Machinery, Fruit and Vegetable Protective Processes. Riverside, Calif.

THE FMC *Original* Fog Fire Fighter, originated and developed by Food Machinery Corporation, produces a dense fog which extinguishes the hottest fires as if by magic! This *different* fire fighting machine, delivering 600 pounds pressure at the nozzle, is a self-contained unit one man can operate single-handed! • The remarkable engineering skill and manufacturing resourcefulness that builds these Fire Fighters also created and manufactures FMC "Water Buffalo" amphibious tanks—weapons now helping the Army, the Navy and Marines smash the Japs on land and sea.

At right are shown a few representative products of Food Machinery Corporation, world's leading makers of food processing and packing equipment.

PEERLESS PUMP DIVISION. Deep well turbines, hi-lifts and pumps handling water for every purpose. Los Angeles and Fresno, California; and Canton, Ohio.



FOOD MACHINERY CORPORATION

EXECUTIVE OFFICES: SAN JOSE, CALIFORNIA

Superior raw materials insure superior finished products

USE MALLINCKRODT CHEMICALS

UNIFORM • STANDARDIZED • DEPENDABLE

TO SIMPLIFY PRODUCTION CONTROL . . . USE MALLINCKRODT MERCURIALS

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Precipitated (Impalpable powd.)
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Crystals
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MERCURY BISULFATE

MERCURY CYANIDE N.N.R.

MERCURY IODIDE N.F.
Red
Yellow

MERCURY NITRATE

W.P.B. Conservation Order M-78 restricting the use of Mercury and Mercury Salts has been revoked and these compounds may now be used without restriction

MERCURY OLEATE U.S.P.

MERCURY OXIDE RED
N.F.
Tech'l.

MERCURY OXIDE YELLOW
U.S.P.
Tech'l.

MERCURY SALICYLATE U.S.P.

MERCURY WITH CHALK U.S.P.

MERCURIAL OINTMENT U.S.P.
Strong
Mild

MIXTURES
Corrosive Sublimate & Citric Acid
Corrosive Sublimate & Ammonium Chloride

PYRIDYL MERCURIC CHLORIDE*
Medicinal
Industrial

*Pyridyl Mercuric Chloride is now in experimental production. Samples are available for experimental use. Product data available.

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Mallinckrodt
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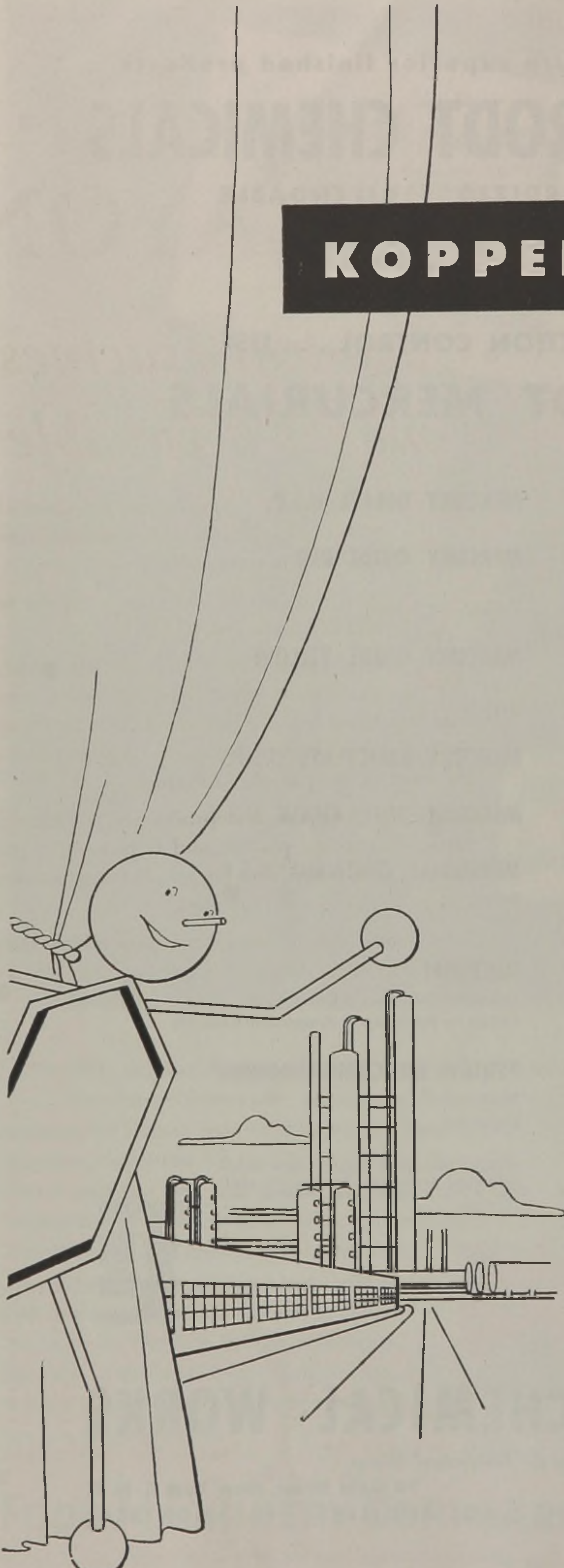


KOPPERS *announces*

increased facilities

for the production of

Pyridine bases

(TAR BASES)

New plant facilities will make possible the production of increased quantities of pyridine bases, including alpha picoline; mixtures of beta picoline, gamma picoline and 2,6 lutidine; 2,4 lutidine; close boiling fractions boiling within the range 160-200°C.; quinoline and mixed quinaldines.

Pyridine bases are used in the production of pharmaceuticals including the sulfa-drugs, nicotinic acid and nicotinic acid amide; as solvents; as sources of copolymerizing materials for synthetic rubber; in the manufacture of textile waterproofing compounds and in compounding pickling inhibitors.

The greater availability of these pyridine bases should encourage the development of many other uses for them. Koppers will be glad to furnish samples of these bases and will assist in the selection of suitable grades for specific purposes. Request samples from Koppers Co., Tar and Chemical Division, Pittsburgh 19, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

Double duty for RAYON

Chemical exactness makes it possible

Giant colored parachutes drop their supplies of food, medicine, water and ammunition to waiting soldiers—

And thus rayon serves on both the war and the home front!

It is rayon fabric there in the floating canopies—a rayon stronger and tougher than that used for ordinary fabrics—a rayon specially engineered to withstand the sudden shock of the load as the parachute snaps open.

In the development and production of war-time rayon, Baker has played, and is playing, a part. Baker supplies uniform chemicals for processing, and to exacting specifications.

This is only one of many instances where Baker Chemicals are contributing to our nation's war effort.

Baker's Chemicals have been supplied to many manufacturing concerns for the manufacture or processing of various products.

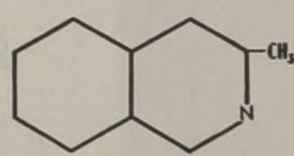
If you have special chemical requirements involving purity to the decimal for war-production products, or for the anticipated post-war reconversion program, we invite you to discuss your needs in confidence with Baker.

J. T. Baker Chemical Co., ***Executive Offices and Plant:*** **Phillipsburg, N. J.** ***Branch Offices:*** **New York, Philadelphia and Chicago.**

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

Reilly COAL TAR Chemicals



3-METHYLISOQUINOLINE

PURITY: Ninety-five per cent minimum.

DISTILLATION RANGE: Ninety-five per cent shall distill within a range of 2 °C including the temperature of 252.5 °C.

FREEZING POINT: 60.5 °C minimum.

SOLUBILITY: Sparingly soluble in cold water. Soluble in dilute mineral acids and in most common organic solvents, including alcohols, ethers, esters, ketones, aliphatic and aromatic hydrocarbons.

USES: Manufacture of pharmaceuticals, dyes, insecticides, rubber accelerators, and in organic syntheses.

SHIPPING CONTAINERS: 325-lb. open-head drums; 25-lb. cans.

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A Dependable Source OF SUPPLY FOR ALL COAL TAR PRODUCTS

☆ With unusual production and delivery facilities, plants in 17 strategic locations, and offices in major cities, Reilly offers a complete line of coal tar bases, acids, oils, chemicals and intermediates. Booklet describing all of these products will be mailed on request.

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PLEASE EXPEDITE RETURN OF OUR USED TANK CARS, DRUMS and CARBOYS

Your cooperation will help us give better service to all

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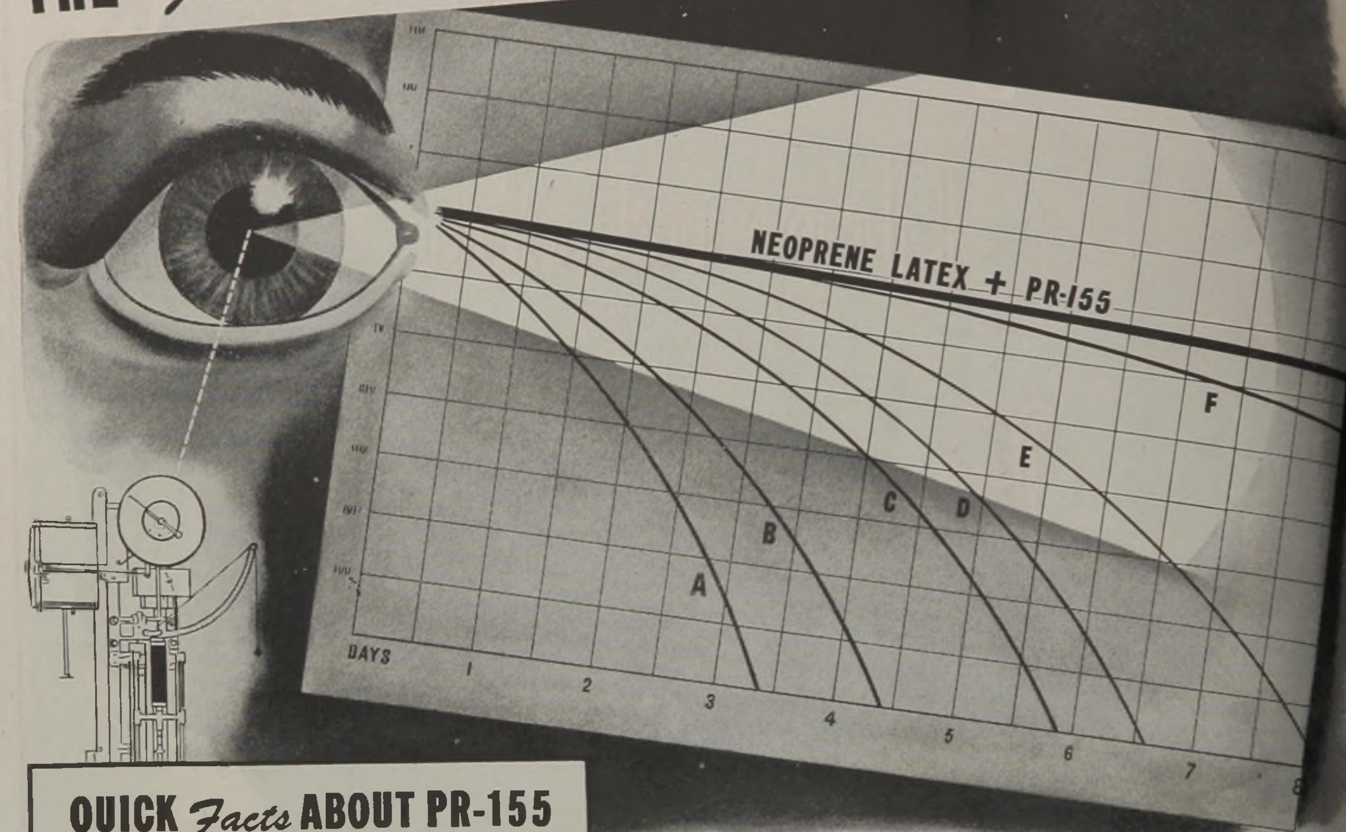
THE *Facts* ABOUT COMPOUNDING NEOPRENE LATEX



QUICK *Facts* ABOUT PR-155

1. Is a resinous dispersion that is completely compatible with Neoprene latex — blends with it intimately.
2. Produces Neoprene latex adhesives suitable for almost all former natural latex uses and possessing all the added advantages of oil resistance, etc. characteristic of Neoprene.
3. **Provides Neoprene latex adhesives which have pressure-sensitivity (dry tack) from a few hours up to 4 or 5 days, as desired.**
4. Contains necessary anti-oxidants and protective agents to insure proper ageing of the compounded adhesives.
5. Enables extension of Neoprene latex at substantial over-all savings. (Due to the unusually high strength of Neoprene, greater extension is possible in proportion to true rubber-like characteristics desired.)
6. Can be compounded with Neoprene latex in your own equipment, or UBS will compound and ship the desired finished adhesive to you.

Field Tests show UBS formulation PR-155 to be a most satisfactory Neoprene Latex Compound Base . . .

As the above graph illustrates, many dispersions, when compounded with Neoprene Latex, show definitely unsatisfactory ageing qualities. That's why users are so pleased with the bonding strength and lack of deterioration actual field tests show that PR-155 provides. The result of many years of practical experience compounding Neoprene, PR-155 is an original development of the UBS Laboratories. Write today for further information. Address your inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

For masking the basic odor of Neoprene Latex, we suggest using UBS Masking Perfume — Formula D6.

UBS

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COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

PYREX PIPING adds VERSATILITY to this portable heat exchanger

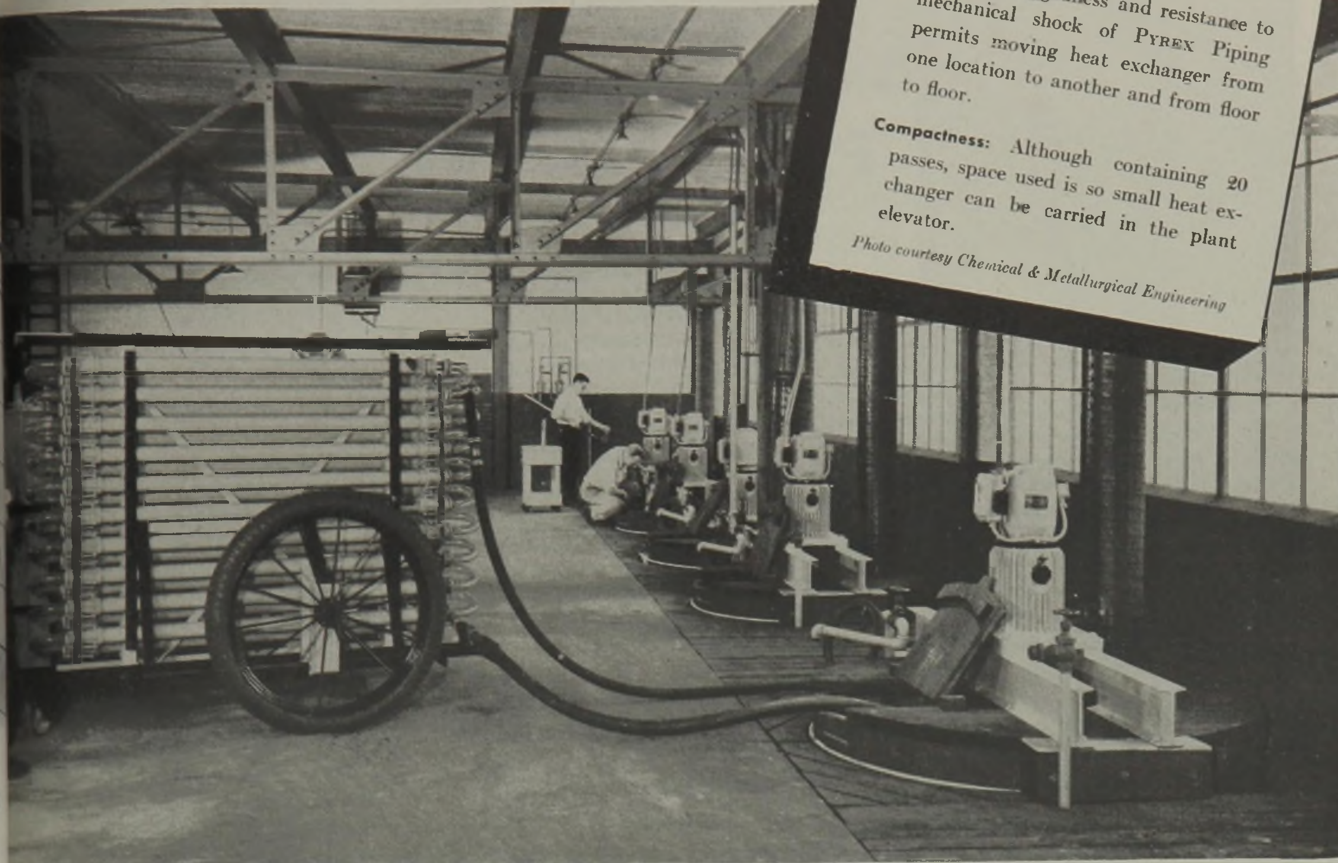
FEATURES OF HEAT EXCHANGER BUILT OF PYREX BRAND PIPING

Versatility: Can be used as liquid cooler, liquid heater, reflux condenser or through-put condenser for a wide range of products. Water cooling can be used on all passes, or on lower half with brine cooling on upper half.

Portability: Ruggedness and resistance to mechanical shock of PYREX Piping permits moving heat exchanger from one location to another and from floor to floor.

Compactness: Although containing 20 passes, space used is so small heat exchanger can be carried in the plant elevator.

Photo courtesy Chemical & Metallurgical Engineering



Modern plant designers are recognizing the advantages of PYREX brand Glass Piping. This portable heat exchanger designed by the Althouse Chemical Co. of Reading, Pa., is just one example.

Out of all the possible materials of construction, PYREX Piping was selected for this heat exchanger—because only with PYREX Piping could this combination of characteristics be obtained:

Corrosion Resistance: Remarkable resistance to all acids (except HF) and moderate alkalies affords protection against corrosion and contamination of product.

Dependable Heat Transfer Rate: Heat transfer rates are uniform because of freedom from scaling and pitting.

Visibility: Unjacketed U-bends of transparent PYREX Piping permit visual checks on operations.

Ruggedness: This heat exchanger which is moved from one location to another, from floor to floor, gets hard use. Yet it stands up.

You too can benefit from the advantages of PYREX Piping. It is versatile enough for every type of installation. Full line of accessories and fittings makes it adaptable for use in connection with other materials as well.

For information on how PYREX Piping can solve your particular problems consult Corning Engineers.

Corning Glass Works, *Industrial Div.*, Dept. CI6
Corning, New York.

I would like glass piping information immediately on the subjects I have checked below. I understand there is no obligation.

☐ Installation Manual ☐ Valves ☐ Adaptors
☐ PYREX Piping and Heat Exchangers

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"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING Glass Works **Pyrex Industrial Glass**


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ANOTHER ZIRCON REFRACTORY APPLICATION MAKES GOOD
A Zircon lining has successfully withstood temperatures, chemical reaction and mechanical abrasion for 14 months in this Ceramic Materials sintering furnace.
The lining is in perfect condition and should continue to withstand these conditions for many more months.
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With strict allocations and extreme shortages in many important components, manufacturers were at their wits end trying to obtain sufficient raw materials to keep their plants running. But thanks to American ingenuity shutdowns were rare. HARDESTY Special Fatty Acids filled the bill as a replacement material in more than one instance. Now, manufacturers accustomed to the use of Fatty Acids in their process are thus freed from dependence on imports or normally scarce items and are able to take advantage of the availability and economies offered by Fatty Acids. These new consumers are planning to continue the use of Fatty Acids during peace times because they have found that in addition to their availability and comparative low cost HARDESTY Special Fatty Acids have characteristics that offer unusual advantages over other materials.

Through advanced manufacturing methods, HARDESTY produces many specialized products with unusual chemical characteristics. Send for your samples today.

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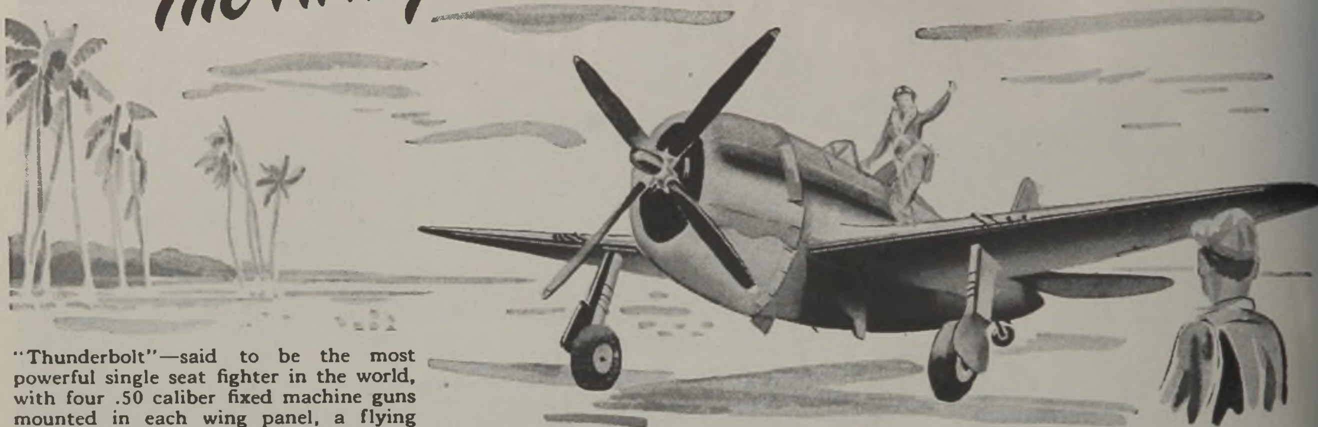
The Army's Answer to a "MUST!"



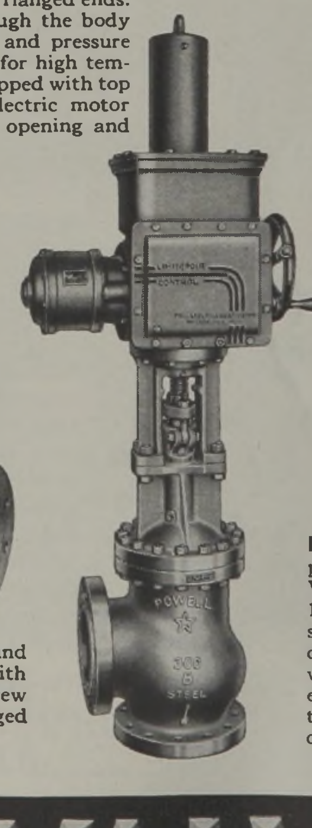
"Thunderbolt"—said to be the most powerful single seat fighter in the world, with four .50 caliber fixed machine guns mounted in each wing panel, a flying speed of 400 m. p. h. plus—and a diving speed greater than the speed of sound.

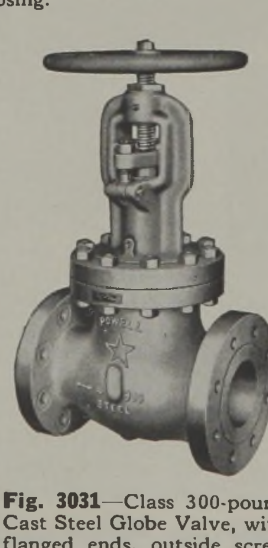
To be victorious in modern warfare, an army must not only have enough planes but they must be planes of many types. Each of these must satisfy all functional requirements peculiar to the service in which it will be used.

"Musts" are constant in industrial, as in military achievements. And the only "stock-bin" out of which "musts" are solved is the stock-bin of experience and specialized application. POWELL, for nearly one hundred years, has made valves, and *only* valves . . . valves for all flow control requirements... valves for the "must" requirements in all fields of industry. Our experience in producing *the* valve to do *the* specific job—"to meet the must"—is yours on request.

POWELL Engineers have perfected valves especially adapted for catalytic cracking, where very high temperatures are frequently encountered—for example, in the handling of flue gases and hydrocarbons on transfer lines. These valves, in all sizes and pressure classes from 150 pounds to 2500 pounds, are available in special alloys, which tests have proven are not subject to embrittlement—so often the cause of fracture and failure. They are designed to provide the best possible flow characteristics with least amount of wear and tear on internal parts.

Fig. 3053 (right)—Class 300-pound Cast Alloy Steel Angle Valve with flanged ends. Streamlined flow areas through the body assure minimum restriction and pressure drop. This valve is adapted for high temperatures up to 1400 F. Equipped with top mounted, explosion proof electric motor operator for quick, positive opening and closing.





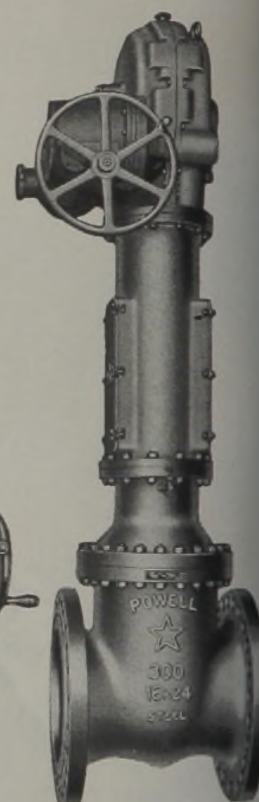


Fig. 3031—Class 300-pound Cast Steel Globe Valve, with flanged ends, outside screw rising stem and bolted flanged yoke bonnet.

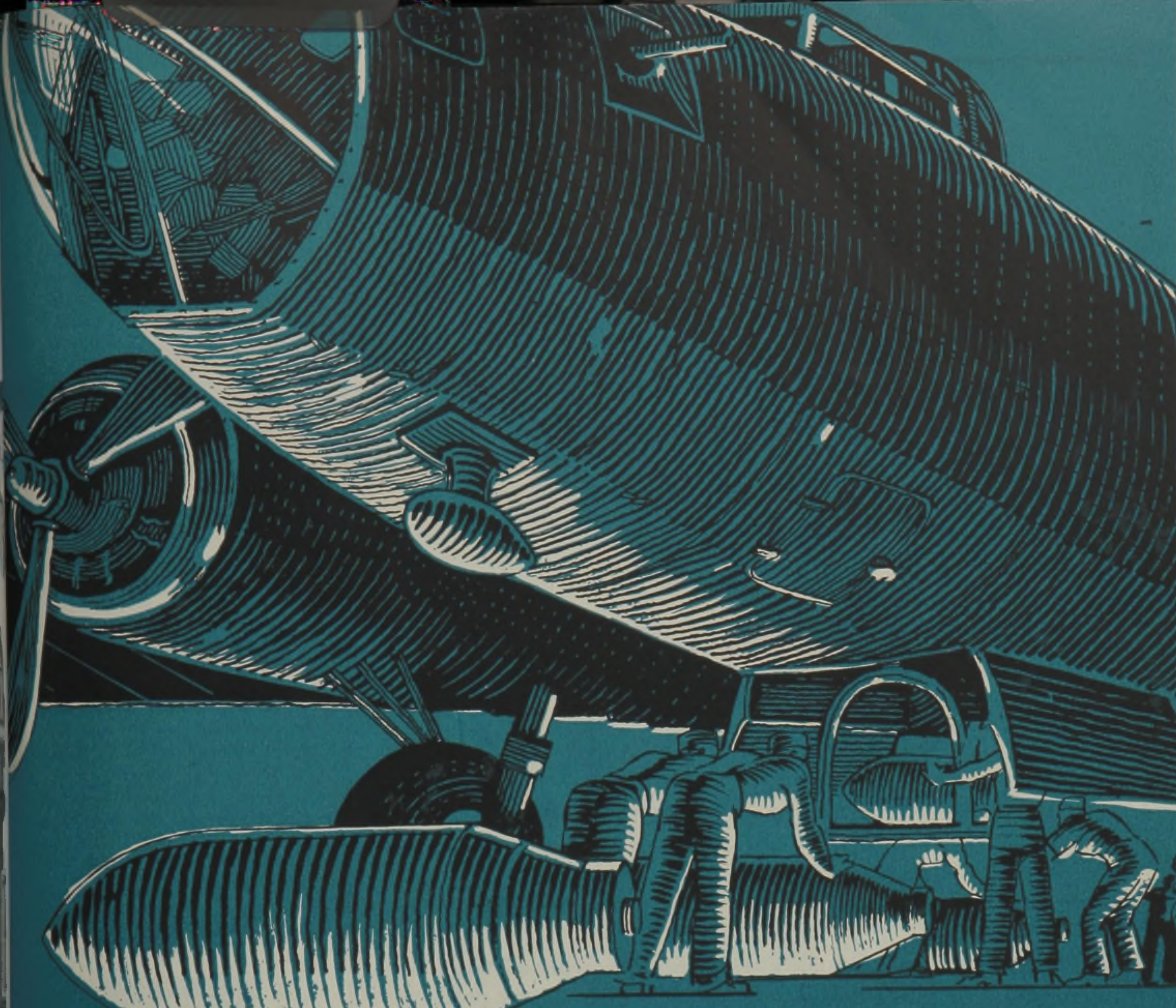
Fig. 3023 Mod.—Class 300-pound Cast Alloy Steel Gate Valve with flanged ends. Has 16" port size venturied to 24" size end flanges to accommodate insulated pipe. Equipped with top mounted, totally enclosed, explosion proof electric motor for quick, positive operation.

The Wm. Powell Co.

Dependable Valves Since 1846

Cincinnati 22, Ohio

POWELL VALVES



CHEMICALS for *Bombs and Bombers*

Stauffer's Industrial Chemicals are being consumed in large quantities by essential industries for the production of the machines of War; for ammunition, equipment and supplies. These basic heavy chemicals and raw materials are used to produce aviation fuel and innumerable plane parts—motors, tires. Yes, and to add potency to its bomb load. Stauffer also produces chemicals for medical supplies and for use in agriculture, to increase crop yields that will provide adequately for America and our allies.

Stauffer Chemicals Since 1885

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Silicon Tetrachloride
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Stripper, Textile
Sulphur
Sulphuric Acid

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*Superphosphate
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(*Items marked with star are sold on West Coast only.)

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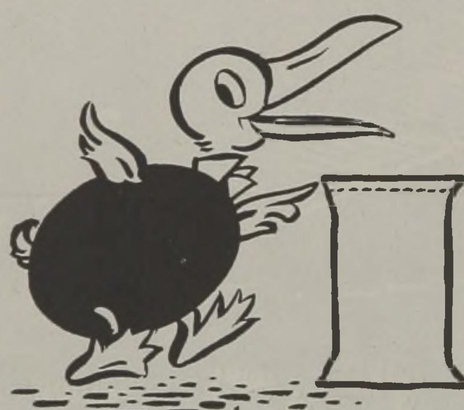
STAUFFER
CHEMICAL COMPANY

FIVE GOOD REASONS WHY

BEMIS WATERPROOF BAGS

are replacing other containers for many products



Manufacturers of powdered, granular, crystal and lump form products have learned that Bemis Waterproof Bags are not only equal to other types of containers in many important points — such as ease of handling and filling, protection against contamination, dirt and sifting — but also provide these five special advantages:

1. First cost is less.
2. They save valuable storage space, whether empty or filled.
3. They reduce shipping costs.
4. They give full protection against absorption or loss of moisture or odors.
5. They release other essential materials for military and industrial use.

If Bemis Waterproof Bags are adaptable to any of your products, you, too, can enjoy these advantages. It's certainly worth looking into.

Mail the coupon today for the interesting booklet—"A Guide to More Efficient Shipping." Further, if you wish, one of our representatives will, without obligation, call on you to discuss your packaging requirements.

Here's How You Know What They'll Do

The performance of Bemis Waterproof Bags in actual use is pretty well guaranteed in advance by the work of the Bemis Shipping Research Laboratory which . . .

1. Determines the proper bag structure for your job, considering the commodity, the packing, shipping and handling conditions, etc. It specifies what paper or combination of papers should be bonded to the tough, closely woven outer fabric, and also what type of adhesive should be used.

2. Keeps a constant check on the materials from which Bemis Waterproof Bags are constructed to make sure they match the specifications.

You can rely on the Bemis Shipping Research Laboratory's OK.

WATERPROOF DEPARTMENT

BEMIS BRO. BAG CO.

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5122 Second Ave., Brooklyn, N. Y.

Please send your special booklet, "A Guide to More Efficient Shipping," and details about use of Bemis Waterproof Bags for____________
(PRODUCT)

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*Street Address*____________

*City*____________ *State*____________

*Mark for the attention of*____________

Tergitol Penetrants Do These Jobs Well

—Have You Tried Them in Your Processes?

Making Gliders—Tergitol Penetrants are used to assure penetration of glue in plywood sections and panels.

Hat-Making—Wool felts need only a single run through water baths when Tergitol Penetrants are used.

Dry Cleaning—Tergitol Penetrants are emulsifying agents for naphtha and water stain removers.

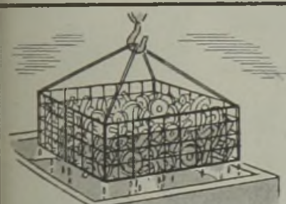
Camouflage Painting—Improved spreading for asphalt-base paints results from Tergitol Penetrants.

Printing—Tergitol Penetrants are used in non-flammable plate and type-cleaners replacing toxic solvents.

Insecticide Spreading—Tergitol Penetrants increase the spreading and step up the efficiency of pyrethrum.

Making Cosmetics—Tergitol Penetrants are useful as "soapless soaps" and foaming agents in hair shampoos.

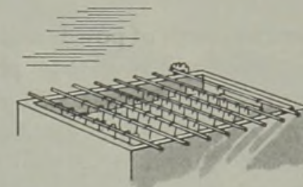
Antisepsis—Tergitol Penetrants increase the activity of a number of antiseptics and bactericides.



Metal Cleaning—Tergitol Penetrants depress the surface tension of cleaning solutions for metal parts.

Sealing—Tergitol Penetrants improve the spreading of adhesives for paper, cloth, and leather.

Wetting Textiles—Tergitol Penetrants speed kier-boiling, mercerizing, bleaching, and dyeing operations.



Metal Plating—The use of Tergitol Penetrants in plating baths reduces pitting due to gas bubbles and impurities.

● Tergitol Penetrants are powerful wetting, penetrating, and emulsifying agents even at high dilutions. They are stable in the presence of acids, alkalies, salts, and hard water. These sulphates of higher synthetic alcohols are made entirely from domestic raw materials. Our technical representative can help you pick the particular Tergitol Penetrant best suited for your process.

For information concerning the use of Tergitol Penetrants write:

CARBIDE AND CARBON CHEMICALS CORPORATION

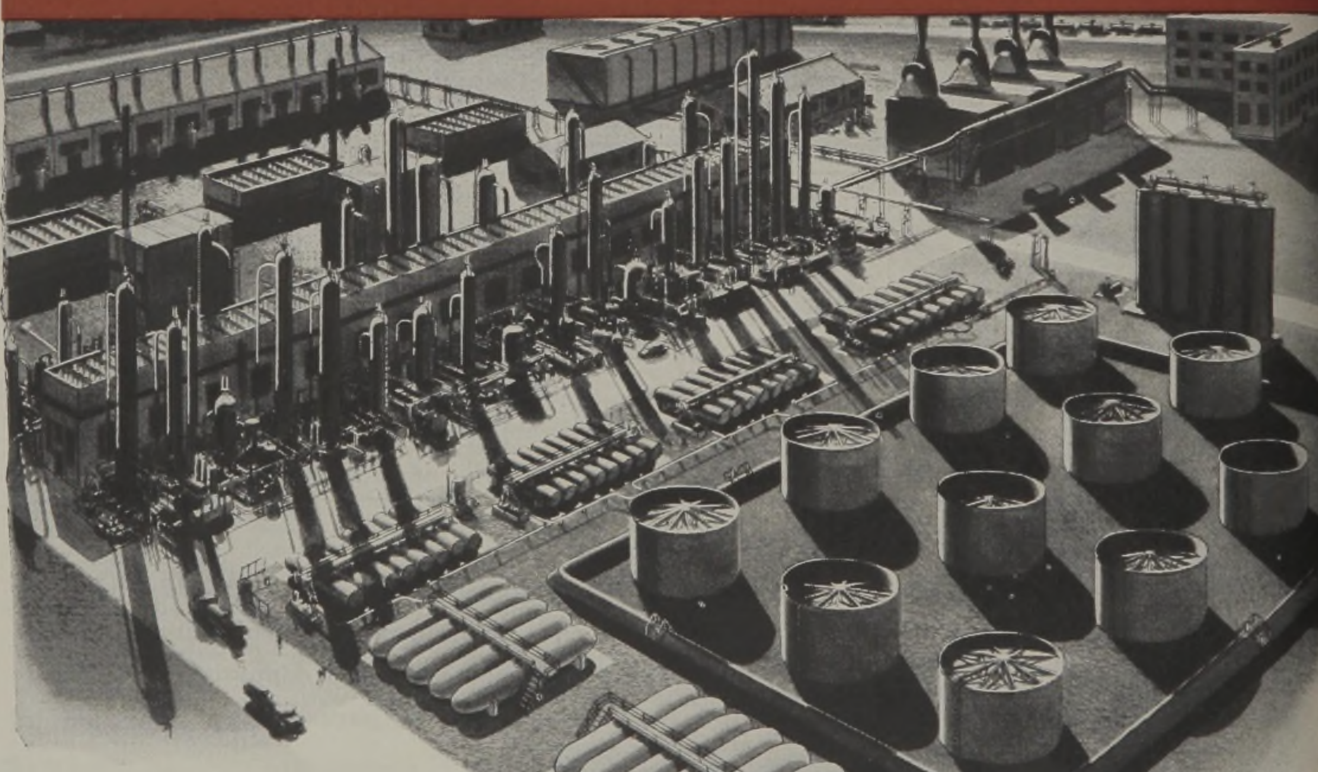
Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC **New York 17, N. Y.**

"Tergitol" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

CELANESE CHEMICAL CORPORATION



Completion of a new Celanese chemical plant near Bishop, Texas, will be another important step in increasing the availability and range of Celanese Chemicals. This plant, in addition to embodying the latest construction features and production equipment, will have convenient access to raw materials, especially those derived from petroleum.

CELANESE CORPORATION OF AMERICA

...Its Policies
...Its Operations
...Its Products

On march 6, 1944, Celanese Corporation of America announced the formation of *Celanese Chemical Corporation* to serve its many customers in the Chemical field.

The object was to provide a convenient, centralized sales organization and to make all Celanese Chemicals and all phases of Celanese research and technical service available through a single source.

The three basic divisions of Celanese—chemicals, synthetic textiles, and plastics—continue to supplement each other through research and product development. Indeed, this broad and interrelated background has long been an important asset of the Celanese organization, for it results in combining and sharing accumulated experience in three great fields of modern synthetic chemistry.

Add to this background a research attitude and an approach to product problems that work in sympathy with the customers' point of view—and you have another advantage of doing business with Celanese.

Celanese Chemical Corporation believes in fitting the material to the needs rather than adjusting the needs to the material. Often it involves only a small variation in a given formula to achieve just the desired properties. Sometimes it necessitates an entirely new approach. In all cases, it means flexible research constantly striving to exceed yesterday's standards.

Through these methods, Celanese has played a leadership role in the development of organic phosphates, modern lubricant additives, plasticizers, dye-stuffs, as well as many intermediates.

Celanese Chemical Corporation has a single goal of service: The development and production for industry of chemicals whose standard is precision—not adequacy. Celanese Chemical Corporation, a division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

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ORGANIC PHOSPHATES

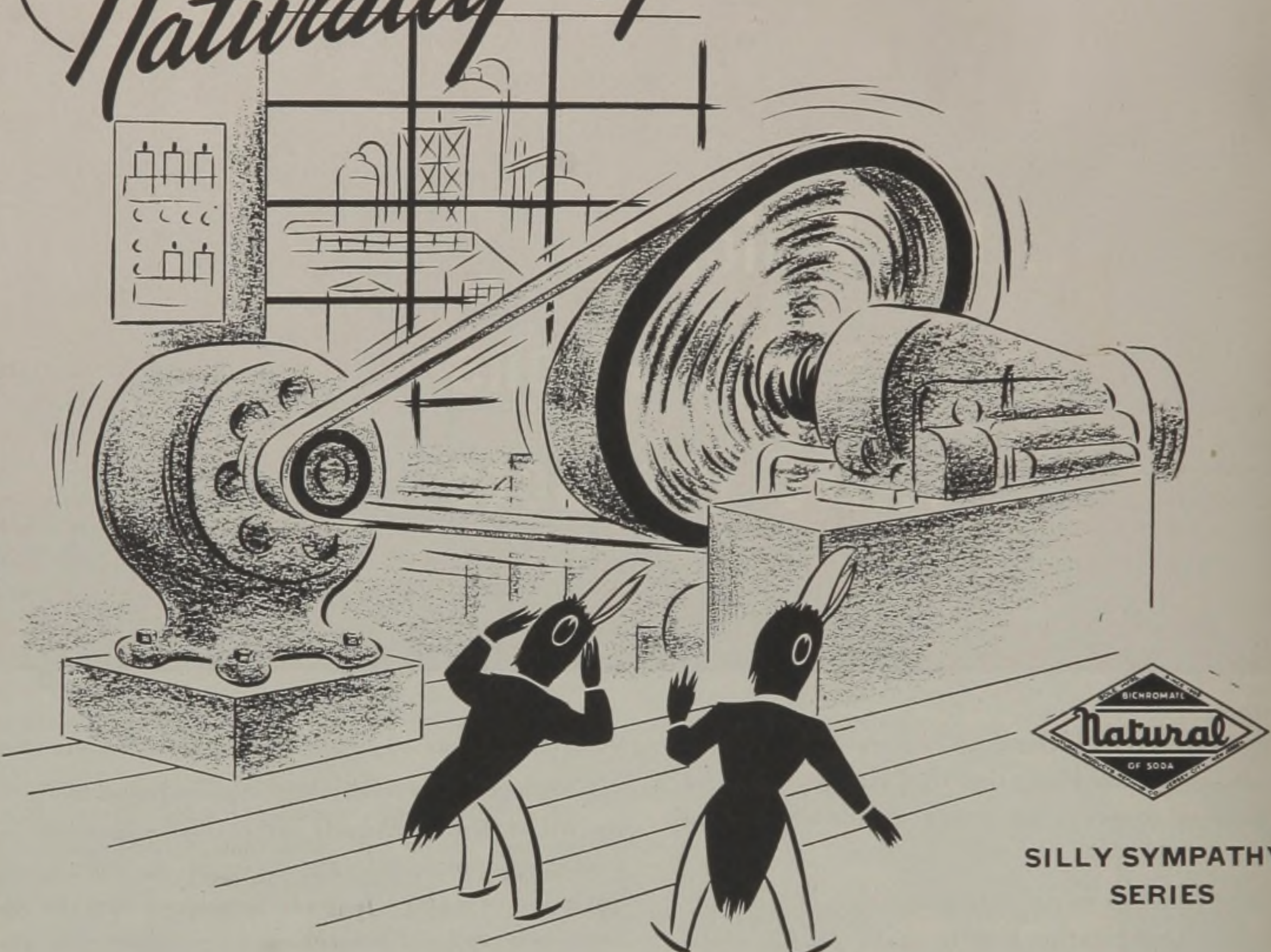
LUBRICANT ADDITIVES

INTERMEDIATES

DYE-STUFFS

TEXTILES • PLASTICS • CHEMICALS

"Naturally" Yours



SILLY SYMPATHY SERIES

No. 4 *Grunts and Groans for Victory*

They say you can push or pull a heavier load if you grunt loudly in the process. Be that as it may, we've been carrying peak loads night and day for so long that life for us has become one uninterrupted series of grunts and groans.

Naturally, we are glad to stretch our facilities to the breaking point of man and machine, to help bring Victory nearer. We appreciate the wonderful cooperation of our customers and believe you will be interested in our plans for post war development of products and service.

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A healthy TREND

Editorial

by ROBERT L. TAYLOR, editor

It is not unknown, nor is it looked upon as unusual, that chemical industry today should be undergoing a phenomenon called change. Indeed, technological change—or perhaps we should say progress—has come to be regarded as the shining symbol of the industry that makes rubber out of rock and rainbow colors out of coal. Change, in the accepted sense of a flow of new products and processes, has long been regarded as merely one of the requirements of staying in the chemical business, something to be provided for in every organization just as provision is made for manufacturing and selling the product.

But there is another kind of change taking place in the chemical industry today, a change that involves in many respects the very shape and character of the industry. Chemical industry is broadening out; it is evolving from a closely knit group of manufacturers of industrial chemicals into a vast sprawling network that includes the names of many of the nation's leading industrial concerns. Several large electrical manufacturers, mining companies and meat packers, for example, now have chemical divisions. In some cases their purpose is to make something useful out of by-products obtained from the company's main operations. In others, they were started to supply chemicals needed as raw materials or processing materials.

Textile makers, auto makers, steel makers, paper makers, oil refiners, coal miners, farmers, distillers, food processors, drug compounders, and even government, are becoming makers of chemicals for their own use or to sell. And as other manufacturers are becoming chemical minded, chemical companies, too, are getting into such fields as textiles, packaging materials, paints, lubricants, fuels and building materials. There is a merging of manufacturing interests, of materials, processes and products, that is erasing the old boundaries of chemical industry as determined by "those companies engaged in the manufacture of chemicals." New boundaries are being established which in most cases are not very clearly defined.

This trend in the direction of a spreading out of chemical manufacturing activities to include many companies whose primary interests lie in other directions, is not new in the sense that it is something that has come about all of a sudden. A perfectly natural and logical development in most cases, it has gradually been taking form over a period of years, but like many other things it has been given added impetus by the war. And the chances are that it will keep on after the return to peace. When the government contracts stop, chemical companies are going to find themselves up against "outsiders" as well as old rivals from within the strictly chemical field. There will be an increase in interproduct competition in addition to competition between manufacturers of the same product.

By a few among the chemical Old Guard these infiltration tactics by "outsiders" are being regarded with some amount of consternation and resentment. It is probably only natural to see goblins under the bed at such times. It is always easy to envision sales declining and expenses going up whenever new producers enter a field.

Those who so view the situation, however, overlook an important aspect that would seem to have a much more significant bearing on the outlook for the industry than would the matter of new competition. In all cases the "outsider" producers' main interest lies in some field other than chemicals. Usually he is a large factor in this field. Is it not logical, then, that the chemically trained men he brings in to take charge of his chemical operations should exert an influence in the direction of greater appreciation of what chemistry and chemicals can contribute to the rest of his business? Could there be any more effective way of instilling appreciation of chemical methods—and hence chemicals—in general industrial fields than by exposure from within? Perhaps more companies and more industries thus enlightened will see the value of doing chemical application research on their own instead of always waiting for the chemical producer to do it, handicapped as he frequently is by lack of knowledge of the application problems involved. Any chemical sales representative will acknowledge that it is easier to sell chemicals to someone who knows something about them than to someone who regards them with awe or distrust.

There would seem to be every reason to believe, therefore, that any activity on the part of chemical consuming industries—which means all industry—that will bring more chemists and chemical engineers into their operations will eventually lead to larger industrial markets for chemicals. As long as chemical companies are alert to technical progress and the demands of their customers, there not only seems to be nothing to fear from the activities of outsiders, but the net result of such activities should be acceleration of the acceptance of chemicals and larger markets for all producers.

Research in Russia

THE INCREASING INFLUENCE OF RUSSIA in the scientific world has been evident for some time. It is known that an important element in the Soviets' national planning has been emphasis on research, both in the schools and in government laboratories. The flow of Russian contributions to the chemical literature had increased markedly up until the war. A prominent research director in this country when asked recently by a high school student what foreign language would likely be of most help in pursuing a career in chemistry, recommended Russian.

Last month there appeared some estimates of the amount of scientific research carried on in Russia in comparison with some of the other nations. C. J. Mackenzie, acting president of the National Research Council of Canada, in an address before the Engineering Institute of Canada said that per capita research expenditures for various countries during the mid-thirties are estimated as follows: Russia, $1.80 to $3; United States, $2.40; Britain, 70 cents; Canada, 22 to 29 cents.

If these figures are anywhere near correct they would portend a still larger role for Russia in the postwar scientific world. What makes them particularly significant is the large population of Russia, which means that actual expenditures for research must have been enormous. If the Russian program is to continue at this rate or better, and if effort can be taken as any advance indication of results, perhaps all of us in the chemical industry had better begin brushing up on our Russian.

Synthetic Rubber Will Live

TO THOSE WHO HAVE BEEN WONDERING about what will happen to synthetic rubber after the war, Rubber Director Bradley Dewey this month gave assurance that it will be very much in evidence and will in all probability be standing on its own feet without benefit of crutches. Speaking at the commencement exercises of the University of Akron after receiving the honorary degree of doctor of science, Col. Dewey said:

"We have already made some Buna-S at a cost, before depreciation and profit, of less than 13 cents. Therefore, it requires only the simplest 'grass root' reasoning to show us that the rubber industry is free to develop new products without fear of having to discard them, as it was forced to do in the past, because of runaway rubber prices. To me it is equally obvious that the inevitable industrialization of South America, Russia, China, India and parts of North Africa, and the East Indies that will follow this war, will mean a world demand for rubber far beyond the capacity of the plantations that existed before the war. With the chemists forging ahead as they now are, I cannot envision capitalists risking much new money to clear jungles, plant rubber trees, graft and cross-fertilize them, and then wait seven years for a crop which must be harvested by men who surely after the war will not be willing to work for a few pennies a day. The synthetic rubber industry will live."

If Col. Dewey's prophecy turns out to be correct—and he cites some very good reasons why it should—it will turn an already brilliant chemical achievement into one of the great milestones of industrial progress in America. Synthetic rubber will rank with synthetic dyestuffs, synthetic drugs, and plastics as a major new industry created by chemistry.

War Weariness

THE RESPONSIBILITY FOR KEEPING workers' spirits up is weighing heavier on management as war weariness increases on the production front. That workers are getting tired is being manifested daily in many small ways, such as more accidents, irritability, horseplay, magnification of little grievances, spontaneous work holidays.

Management cannot close its eyes to the problem on the ground that recognition of it would give aid and comfort to the enemy. Although it has not yet reached serious proportions, there will be a tendency for it to grow as the war drags out and the manpower shortage worsens. It is something that must be dealt with constantly, a task that isn't easy because management also is human and is subject to the same influences and conditions that cause war weariness among others. Effective handling of the situation will require all of the abilities of the executive and will constitute a real test of mental fortitude and leadership.

Now Is the Time To Get On Schedule

IN THE LAST FEW MONTHS the nation's war production program has greatly stabilized so that planning is now possible on some products. This means that attention can again be given to the matter of balancing inventories and work-in-process.

If production on war orders is behind schedule, every effort should be made to catch up. If production is ahead of schedule, care should be taken not to let inventories build up too far because of possible complications in case of sudden contract termination.

A review and adjustment of flow of all materials into the plant in relation to processing and delivery schedules may also uncover any operating economies that were overlooked earlier when all attention was focused on "getting the stuff through."

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SHOULD GOVERNMENT FUNDS be used to acquire plant-scale know-how on processes economically uninteresting to industry but of possible value to the nation in an emergency? Dr. Keyes says "yes," provided the decisions are made by chemists and engineers and not politicians or industrialists.

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INSURANCE PLANTS for the Chemical Industry

by DONALD B. KEYES
Office of Production Research and Development, War Production Board

POSTWAR PLANNING is a phrase that is on everyone's lips today. Official agencies, industries and individuals are beginning to think of the days to come when this war, too, is over. Foremost of the problems which confront us is that of protecting ourselves against future wars. World politics and military plans for security are uppermost in the public press. It is with the supply of essential products for military and civilian purposes that chemists and chemical engineers are concerned. Let us consider the problems involved in the construction and operation of what may be called insurance plants.

In times of war, the Office of Production Research and Development has taken the position that it is highly essential to have the know-how in this country of all major developments that may be of use during the war, even though there is no reasonable assurance that plants based on these developments can operate economically after the war is ended. Examples of such developments are: wood waste hydrolysis to produce sugar which in turn is fermented to produce ethyl alcohol; the production and recovery of glycerine by the fermentation of black strap molasses; the production of liquid fuels from coal by hydrogenation, from shale oil by distillation, from waste hydrocarbon gases by the Fischer-Tropsch process; the production of aluminum oxide from clay; and the synthesis of certain raw materials for the manufacture of Buna S synthetic rubber. Although these examples are entirely in the chemical field, the same sort of thing might be quoted in the metallurgical field, and even in the fabrication field.

It should be pointed out that the O.P.R.D. is confined to the field of materials and final products that are not implements of warfare, but the same argument can be applied to the development of new weapons of war. The engineering know-how can only be obtained if the development is carried through the pilot plant stage and a sample commercial plant is built and operated. It is not necessary to build more than one sample plant unless the economics of the situation justify it.

Wood Hydrolysis an Example

To illustrate with a specific example, here is a brief history of the Scholler process for the manufacture of fermentable sugar from wood waste. This process has been extensively developed in Germany in preference to the Bergius and other processes, and may produce either alcohol or yeast and protein feed material for cattle. Very briefly, it comprises the hydrolysis of wood waste by a relatively simple sulfuric acid treatment without the use of complicated equipment. This is followed by the recovery of lignin and a fermentable sugar solution. It is our understanding that the lignin produced by this process is utilized to a certain extent in various ways by the Germans. It is quite possible that this material will later be utilized as a source of chemicals perhaps by destructive distillation in a manner similar to wood distillation. Such plants will never be successful in this country until this particular lignin material, or its derivatives, can be sold at a profit.

About a year ago serious consideration was given by the O.P.R.D. to a study of this process in this country in view of a possible future grain shortage. Detailed facts concerning this process were not available here and no thorough study utilizing our particular raw materials had been made. Contracts were made by the O.P.R.D. with the Cliffs-Dow Company, which had already built a pilot plant, and with the Forest Products Laboratory of the Department of Agriculture Forest Service to operate this plant in order to obtain certain fundamental data. This research has now been completed. The Vulcan Copper and Supply Company has made a study of these data and reported on the technical feasibility of the process and the fundamental characteristics of a commercial-scale plant.

It is hoped that the War Production Board will authorize the erection of such a plant in order to make further studies regarding the practicability of the process on a commercial scale. The present plans are to burn the lignin and operate the plant solely to produce alcohol. As has been pointed out, this is not economically feasible in peacetime. Once such a plant has been built and operated, this lignin will be available in large quantities for further development. It is hoped that the results of further study and development will be such that the whole process may be operated under peacetime conditions at a profit.

If these plans go through and satisfactory results are obtained, it does not necessarily mean that we will have many Scholler plants throughout the United

States. It is quite possible that only one of these plants can be justified because of the lack of demand in a peacetime economy for alcohol from non-grain sources and the possible chemical products made from lignin. The important feature, however, is that once this plant is built and operated satisfactorily, we will have the necessary know-how to build duplicate commercial plants without delay. This will mean that from an insurance standpoint, we will be well protected in any future emergency as far as alcohol from non-grain sources is concerned. Such an emergency may occur even before this war is over. If we had a bad drought and our grain stockpile dwindled and we were still unable to obtain sufficient synthetic rubber from petroleum waste gases, we might be in a position where we would find that it would be faster and more expedient to construct and operate Scholler plants than to construct and operate synthetic alcohol plants based on a petroleum raw material. At the moment, because we have not the actual know-how, we are not in a position to consider this solution.

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What do readers of Chemical Industries think of the "insurance plants" proposal? Both Dr. Keyes and the editors would be glad to have your comments—whether for, against or neutral.—Editors.

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Catastrophe Protection

It is hoped that after this war we will be able to supply all of the necessary alcohol for our major industries, but who would have thought prior to Pearl Harbor that there really was a chance of our natural rubber supply being cut off? World catastrophes occur without warning, and it behooves us to have insurance plants against the economic catastrophes of war and peace.

The proposal was made in the summer of 1940 that the United States Government build a 50,000 ton synthetic rubber plant purely for insurance purposes. If that plant had been built by the summer of 1942, we would have been able to design and construct ten of these plants quickly and to produce a synthetic rubber, not the best perhaps, but one that would have been more or less satisfactory. By the spring of 1943 we would have had in operation plants with a capacity of at least 500,000 tons of rubber. Such a capacity would have undoubtedly speeded the war supply program and no one would have ever questioned the wisdom of the original expenditure.

In the last war we had an even more perfect example of the lack of insurance plants, in the synthetic organic industry. Fortunately, that war was a short one as far as we were concerned and we never felt the worst effects of our inadequate supply of synthetic organic materials. Fortunately also, that industry was a profitable one in peacetime so the huge development of synthetic organic chemicals occurred in this country after the last world war without material Government aid.

On the other hand, it has been noticed in this war, time and time again, due to the enormous demand for certain organic chemicals such as formaldehyde, acetic acid and aromatics, that in spite of our huge synthetic organic chemical industry we are poorly equipped to meet the emergencies. Perhaps the outstanding example in this field is the synthetic materials necessary for the modern 100-octane gasoline. This lack has a marked effect on the war supply program and has materially cut down our speed of action on the fighting fronts.

Lack of Know-How

It has been reported by some people that it has been entirely the lack of metals and actual material for plant construction which caused the delay in these particular cases of synthetic organic materials vitally necessary for the operation of the war. This is incorrect. The lack of know-how has been the important factor in holding up the program. The lack of know-how means not only time consumption but the inefficient utilization of critical materials.

It is not necessary to criticize any particular group or to try to find an alibi, because we are all to blame. It is not that someone fell down on the job; it is a human weakness to wait until a catastrophe occurs before we do anything about it. The technical men of this country should be congratulated on their truly marvelous success in overcoming this basic handicap. We can be proud of our scientists and engineers who, after all, have been a most important factor in the manufacture of war materials and second only to our fighting forces in the protection of the United States of America.

It is true a company must operate at a profit if it wishes to exist—it is an old-time custom. It is also true that a government should not dispose of federal funds foolishly. Industry is only asked to take a gamble that seems justified after careful appraisal and Government is asked to help where the end justifies the expenditure of the people's money.

It is a relatively simple matter to convince industry or Government to put up funds for developments that seem essential in wartime, but once peace is declared, are we going to revert to our old-time attitude? Is industry going to be very cautious and think a long time before it spends company funds on some new venture? Will Congress in times of peace appropriate money for a development that may at some future time be of distinct value to this country? Will the pendulum of public opinion swing to what might be called the conservative side and will only the technical people appreciate the value of insurance plants? If so, the next question is what can the technical people do about the matter.

Decision by Group Appraisal

It is recognized that as a voting group they represent an infinitely small minority. They are, on the other hand, or can be, quite vocal. There is only one suggestion that has been made so far that may be worthy of further consideration. If the chemists and chemical engineers, as represented in their societies, not one but all, agree that a certain major development would be highly advantageous to the United States from the insurance standpoint, though of such a long-term nature that it would be uneconomic for industry to handle, they might by publicity demonstrate to the Administration and Congress the desirability of supplying funds for this purpose.

They should not stop there, however. It is all very well to start an idea but if it is never finished and nothing is really done about it, the whole effort comes to naught. In other words, the chemists and chemical engineers, for example, should continue to cooperate and as a group see to it that the development is carried to its logical conclusion. Again, they can operate through publicity and actually aid. This does not mean the setting up of a new governmental organization with extensive powers and vast funds, but merely a cooperation between industrial concerns and existing government agencies. This is not regimentation, but just the opposite.

It should be remembered that this cooperation to build and operate insurance plants in this country can be started in a very humble and modest way and should automatically grow, depending on the effectiveness of the results in particular cases. It is the technical world, however, not industry and not government, that should promote this idea and be responsible for its success, because only the technical men will appreciate the significance of such an undertaking.

Presented before the 36th annual meeting of the American Institute of Chemical Engineers, Cleveland, May 15, 1944.

Survey of Working Conditions in the CHEMICAL INDUSTRY--Part II

by PAUL W. HARDY, Chief, Field Staff, Management Division, Labor Relations Institute

THIS IS THE SECOND and concluding part of a joint survey of labor relations in the chemical industry by the Labor Relations Institute and Chemical Industries. Last month's report dealt principally with employee relations, training and promotion, and absenteeism and turnover. This installment consists of questions primarily concerned with safety and health provisions.

THERE IS NO BETTER INDEX of progress in the field of labor relations than the provisions in a plant for the protection of the safety and health of its workers. For that reason, 35 of the 70 questions asked of manufacturers in the Joint Survey of Working Conditions in the chemical industries, conducted by CHEMICAL INDUSTRIES and the Labor Relations Institute, deal with such important aspects as safety rules and safety personnel, medical care, physical examinations, relaxation and in-plant eating facilities, equipment and time for washing up. These combine with plant housekeeping and protection against fumes, noise and excessive heat to provide a measurable, tangible structure which can be objectively appraised.

Six basic questions probe into the safety factor, and the responses give us a clear impression that, on the whole, the chemical industry has reason to be proud of its record on this score. These questions are: Do you have a safety committee? Do you have a full-time or part-time safety engineer? Do you have printed safety rules for distribution to all employees? Do you hold periodic safety conferences? How do you enforce safety rules? Who pays for safety accessories?

Of the plants responding, 97 percent of those employing 500 or more people have a safety committee, and 80 percent of the 100-500 group do likewise. In the below-100 class, the figure drops to 30. It is significant that all large units in the inorganic, organic and fine chemical branches of the industry have such committees, and that the score for the specialties plants in the over-500 group is 82 percent. The median groups, 100-500 workers, show a splendid score throughout three of the four industry branches; inorganic, 84 percent; organic, 75 percent; fine, 91 percent. The specialty group in this plant-size bracket falls behind with a response of 69 percent. But all scores are praiseworthy as revealing cooperation between management and labor to keep the plants safe.

Fewer plants have safety engineers, either full or part-time, than have safety committees. Surveying the industry as a whole, on the basis of the responses, 78 percent of the plants employing 500 or more have either a full-time or part-time safety engineer. This figure compares with only 26 percent of the 100-500 responses, and as low as 9 percent of those under 100 employees. These low figures for the smaller plants would naturally be expected, as their ability to devote a man exclusively to safety problems naturally is not the same as the larger plants.

The downward progression is not so marked in regard to printed safety rules, which are distributed by 72 percent of the over-500 group, 57 percent of the median bracket, and 32 percent of the plants with less than 100 workers. An almost uniform response—80 percent small, 84 percent median and 87 percent

As an aid to employee health and well-being plants are now being equipped with modern sanitary facilities.
Courtesy Bradley Washfountain Co.

PERSONNEL POLICIES AND WORKING

NOTE: All figures are percentages.

Example: Of plants making principally heavy inorganic chemicals and employing under 100 persons, 14% answered "Full-time" to Question No. 29; 17% answered "Part-time"; and 72% answered "None." In some questions some plants answered more than one part of the question and in others some plants left the question blank, therefore in such cases the total is more or less than 100%.

		Plants in which mfr. of Heavy Inorganic Chemicals predominates			Plants in which mfr. of Heavy Organic Chemicals predominates			Plants in which mfr. of Fine Chemicals predominates			Plants in which mfr. of Chemical Specialties predominates			All Chemicals		
	No. Employees	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500

V. SAFETY AND HEALTH

Question	Answer	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500
29. Do you have a safety engineer?	Full-time	14	37	95	19	25	77	17	32	50	3	11	73	9	26	78
	Part-time	17	31	0	25	58	12	22	27	20	13	40	9	17	37	9
	None	72	31	5	56	17	8	61	41	30	82	49	18	74	38	12
30. Do you have a Safety Committee?	Yes	41	84	100	50	75	100	39	91	100	18	69	82	30	80	97
	No	59	16	0	50	25	0	61	9	0	81	29	18	70	19	3
31. Do you have printed safety rules for distribution to all employees?	Yes	51	62	70	25	67	73	33	59	80	25	46	64	32	57	72
	No	59	38	6	75	33	27	67	41	20	73	54	36	70	43	27
32. Do you hold periodic safety conferences among supervisors?	Frequent	17	41	75	25	58	85	22	32	30	9	29	55	15	37	69
	Occasional	59	41	20	25	17	12	39	50	50	34	51	36	39	43	24
	None	34	16	5	50	25	0	39	18	10	54	17	9	47	18	4
33. How do you enforce safety rules?	Reprimand	90	84	85	75	75	89	94	86	70	73	86	100	80	84	87
	Layoff	7	16	20	13	17	31	6	5	10	7	11	36	8	12	25
	Discharge	17	12	15	0	17	31	0	0	20	6	9	36	7	9	25
34. Who pays for safety accessories, such as gloves, masks, etc.?	Company	97	94	100	88	100	100	100	100	100	90	100	100	93	98	100
	Employees	3	9	15	19	18	0	0	0	0	2	3	0	4	5	4
35. Do you teach first aid to your employees?	Yes	40	62	85	6	50	85	39	50	80	24	29	55	29	47	79
	No	62	38	15	94	50	15	56	50	20	73	66	45	71	52	21
36. Do you have a physician in your plant?	Full-time	0	12	25	0	0	27	6	18	40	0	3	9	1	9	25
	Part-time	10	31	60	0	42	50	17	36	50	13	14	55	12	28	54
	None	96	60	10	100	58	15	77	41	10	85	80	36	112	62	16
37. Do you have a registered nurse?	Full-time	3	41	80	0	25	85	11	36	70	2	23	82	3	32	81
	Part-time	0	6	5	0	0	4	0	0	0	2	0	0	1	2	3
	None	97	50	15	100	75	12	89	64	20	94	77	9	95	65	13
38. Do you maintain a visiting nurse system?	Yes	10	16	45	0	17	31	11	18	30	2	3	18	5	12	33
	No	90	84	55	100	83	69	89	77	60	96	92	64	94	85	63
39. Do you have a medical room for emergency treatment?	Yes	48	85	100	44	50	89	33	68	100	16	66	100	29	70	95
	No	52	6	0	56	50	4	67	32	0	82	40	0	70	29	2
40. Do you give pre-employment physical examination?	Yes	48	85	95	44	92	92	33	86	100	37	69	91	40	80	94
	No	52	13	5	56	8	4	61	14	0	60	31	9	58	19	4
41. Do you provide periodic physical check-ups?	Yes	21	69	90	13	50	73	28	36	70	15	46	36	18	52	72
	No	83	31	10	75	50	23	56	64	30	84	57	55	78	50	25
42. Do you have a relaxation room for women workers?	Yes	55	69	80	56	67	81	39	86	70	48	74	64	49	74	76
	No	28	25	20	31	33	15	50	9	30	40	20	27	38	21	21
43 Do you have a relaxation room for male workers?	Yes	45	31	30	56	25	38	45	73	40	38	37	45	43	42	37
	No	55	69	65	44	75	54	50	27	60	60	60	55	55	57	58
44. What provision do you make for lockers?	Individual lockers	62	91	95	100	83	58	66	90	80	67	89	64	70	89	73
	Group locker	27	3	0	0	0	4	17	5	20	13	6	18	15	4	6
	None	21	3	5	0	17	0	17	5	0	15	3	27	15	5	6

large—shows that most plants consider a reprimand sufficient punishment for infraction of a safety rule. Wrath in such situations no doubt is tempered by the manpower situation! It would be interesting to re-check this point when manpower is not so scarce.

Apparently it is standard practice among chemical plants to pay for safety accessories, such as gloves, masks, etc. The highest affirmative responses of all were received to this question, the three groups scoring 93, 98 and 100, respectively, beginning with the lowest in number of employees.

Health Provisions

So far as health is concerned, one of the prime considerations is the provision for medical care, including a plant physician or nurse, first aid training, an emergency room for medical treatment, pre-employment physical examinations and periodic physical check-ups.

In this category of responses it is again natural that the larger plants reveal a higher percentage of special personnel and facilities. Of those above 500 workers, 79 percent of the chemical plants responding employ a physician, either full-time or part-time, as compared with 37 percent of the 100-500 group, and 13 percent in the group below 100. Similarly, on nurses, 84 percent of the 500-plus group, 34 percent of the middle group, and 4 percent of the under-100 bracket employ a full-time or part-time nurse. Five percent of the small plants have a

CONDITIONS IN THE CHEMICAL INDUSTRY

NOTE: All figures are percentages.

Example: Of plants making principally heavy inorganic chemicals and employing under 100 persons, 14% answered "Full-time" to Question No. 29; 17% answered "Part-time"; and 72% answered "None." In some questions some plants answered more than one part of the question and in others some plants left the question blank, therefore in such cases the total is more or less than 100%.

Question	Answer	Plants in which mfr. of Heavy Inorganic Chemicals predominates — No. Employees			Plants in which mfr. of Heavy Organic Chemicals predominates — No. Employees			Plants in which mfr. of Fine Chemicals predominates — No. Employees			Plants in which mfr. of Chemical Specialties predominates — No. Employees			All Chemicals — No. Employees		
		Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500
45. Are separate lockers provided for work clothes, shoes, etc.?	Yes	62	41	50	75	42	62	45	59	70	43	46	27	52	47	54
	No	38	56	45	25	58	38	45	32	30	48	54	55	42	51	42
46. Where are the lockers?	In separate rooms	76	78	75	100	83	92	61	90	90	67	83	64	72	83	84
	In the shop	17	13	15	0	0	4	17	5	10	18	14	9	15	10	10
47. Do you have showers for employees?	Yes	69	94	85	94	92	92	50	86	90	57	86	73	63	89	87
	No	34	6	10	6	8	4	50	14	10	40	14	27	36	11	10
48. Do you provide antiseptic foot baths?	Yes	31	59	50	31	58	66	11	14	50	9	40	36	17	43	54
	No	69	37	45	69	42	31	89	82	50	88	60	64	74	56	43
49. Do employees get wash-up time?	Yes	59	53	55	63	67	62	56	59	60	70	54	82	65	56	63
	No	41	47	45	31	25	31	44	41	30	25	40	18	32	41	33
50. Do you have separate smoking areas?	Yes	62	62	75	75	83	89	39	68	60	60	54	73	59	63	78
	No	38	38	25	25	17	12	56	32	30	33	43	27	36	36	21
51. Do you maintain in-plant eating facilities?	Yes	10	34	60	0	25	73	6	36	100	10	23	64	8	30	72
	No	90	59	40	100	75	19	94	64	10	87	71	27	90	67	26
52. Do you provide between-meal snacks for workers?	Yes	3	13	10	0	8	19	11	14	20	9	11	27	92	12	18
	No	97	87	80	100	92	81	83	86	80	90	86	73	7	87	79
53. Have you soft drink and candy dispensers?	Yes	34	69	60	56	58	62	28	64	80	33	69	73	35	66	66
	No	66	28	40	37	33	38	66	36	10	66	29	0	62	31	28
54. Do you provide rest periods?	Yes	28	22	5	63	17	31	23	50	20	18	34	64	26	32	27
	Certain Groups	7	16	30	0	17	27	66	9	60	15	17	18	11	15	31
	No	72	50	60	38	62	42	11	41	30	63	49	18	62	50	42
55. If YES, how many per day?	Two	20	41	20	13	8	15	11	50	50	25	43	64	22	40	30
	Three or more	3	3	5	31	0	8	6	0	0	2	0	0	5	1	4
56. Is your plant air conditioned?	Yes	3	0	0	13	8	12	11	18	10	0	9	18	4	8	9
	No	81	84	65	87	92	77	83	55	70	96	85	55	93	79	69
	Partially	3	13	30	0	0	12	0	27	20	3	6	27	2	12	21
57. Are adequate safeguards employed against noise, dust, fumes, excessive heat?	Yes	76	72	60	81	92	85	72	68	100	73	57	91	75	68	81
	No	21	22	10	13	8	8	17	18	10	22	23	9	20	20	9
58. Do you have an established methods procedure for each task?	Yes	59	37	35	56	67	69	56	41	60	44	43	55	51	43	55
	No	41	47	60	31	33	23	33	36	40	40	40	36	39	41	39
59. Do you have an established housekeeping program?	Yes	66	75	95	44	67	92	56	59	80	46	70	91	52	68	91
	No	34	22	5	44	17	4	39	32	20	44	30	9	42	26	7
60. Do you maintain a special staff responsible for maintenance, repair and replacement?	Yes	69	97	90	94	62	96	50	100	100	48	92	91	59	92	94
	No	45	3	20	6	8	0	6	0	0	7	3	0	44	5	6
61. Have you a scheduled routine for keeping floors free of oil, scrap and obstructions?	Yes	76	72	95	94	62	81	66	73	90	69	69	82	73	70	87
	No	24	25	5	0	25	15	23	18	0	28	31	18	23	26	10
62. How many toilets do you have per 100 workers?	Over 8	45	3	5	6	25	27	50	32	10	41	43	18	46	30	12
	6 to 8	7	19	15	13	17	19	6	23	20	13	23	9	11	25	16
	Less than 6	38	19	25	63	33	15	17	27	0	19	26	18	22	29	21

visiting nurse set-up for their employers.

The score for the provision of a separate room for emergency treatment, is 95, 70 and 29 for the three groups, beginning with the larger plants and progressing downward. Both the large and median plants are strong for pre-employment physicals, the first group registering 94 percent, the second 80 percent, and the smaller plants 40 percent. The score for periodic check-ups, in the same order, is 72, 52, and 18. Seventy-nine percent of the larger plants teach their employees first aid; 47 percent of the group between 100 and 500, and 29 percent of those in the lowest bracket.

Another area of working conditions which portrays the relative standing of a plant is its provisions for relaxation, washing up, individual lockers, etc. Viewing the industry as a whole, women workers get a better break in the matter of relaxation rooms than do the men. However, there is an interesting contrast between the two in terms of size of plant. The score for women workers follows the familiar pattern of 76 percent of the over-500 group, 74 percent of the median and 49 percent for those under 100. But for men, the trend is reversed: the largest returns on this point came from the smallest plants—43 percent of the under-100 responses, 42 percent of those with 100 to 500 employees, and only 37 percent from the 500-plus grouping.

The middle group comes off best on individual lockers—89 percent 100 to 500, 73 percent over 500 and 70 percent under 100. In only one branch of the industry

—inorganic—do the largest plants lead in this respect, where the tally is 95 percent for the 500-plus group, 91 for the plants with 100 to 500 employees, and 62 percent for those below 100. All told, this is an excellent score, both for the branch mentioned and for the chemical industry as a whole.

The middle-size plants, according to responses, lead in the provision of showers for workers, where the overall tally is 89 percent for the 100-500 grouping, 87 percent for the 500-and-over bracket and 63 percent under 100. By industry subgroupings, the 100-500 group leads in both the inorganic and specialty fields, and ties with the larger plants in the inorganic and organic fields—enough to give this size-group a 2-point lead in the overall tally, which stands at 65 percent under 100, 63 percent in the over-500, and 56 percent for those plants with 100 to 500 workers.

Separate smoking areas and in-plant eating facilities are two more hooks on which to hang an appraisal of working conditions. In both respects, the largest plants appear to have a substantial lead. Separate smoking areas are more the rule in the 500-plus group than elsewhere. Returns of 78 percent were registered by this group, on an industry-wide basis, falling to 63 percent in the 100-500 category, and down to 59 percent—still a substanial score—in the smallest plants. The rates are about the same throughout the separate branches of the industry.

The old saying that an army travels on its stomach is equally true for our modern production army. Many plants are now providing good eating-in facilities.

organic division—where, however, the plants with fewer than 100 workers lead, the showing being 94-92-92. In the fine chemical branch of the industry the 500-plus group is ahead—90 percent as compared with 86 in the median and 50 percent in the smaller plants.

As might be expected, the plants which provide showers appear to be those which provide foot baths, as the same groups lead in this respect as in the matter of showers, although the percentages are lower. The high score registered by the 500-plus group in the heavy organic branch puts that group first in the overall averages—54, 43, 17.

On the question of wash-up time, the returns are fairly even over all size-groups and industry branches, with the under-100's having a slight lead in the

Eating Facilities

A much larger variation shows up in the tally of separate eating facilities, where the final score for the industry as a whole is 72 percent for the 500-plus plants, only 30 percent for the median group, and as low as 8 percent for plants with less than 100 workers. In fact, the under-100 group in the organic division scored a zero on this question, as compared with 25 percent for the median group and 73 percent for the organic chemical plants employing more than 500 workers. All the 500-plus plants in the fine chemical division reported having such facilities. When it is realized that all a plant needs to give a "yes" answer is a separate room where workers may eat lunches brought from home, it is difficult to see why the overall returns were not larger. Eating by one's bench or machine, or in a mixing room, does not contribute to better labor relations.

On the whole, adequate safeguards against noise, dust, fumes and excessive heat are reflected in the returns; the best single score—100 percent—being registered by the 500-plus plants in the fine chemical field, followed by a 92 for the 100-500 group in organic and a 91 in the 500-plus class of specialty plants. As a group, the inorganic came out lowest in this matter, with the under-100's reporting 76 percent, the 100-500's 72 percent, and the plus-500's 60 percent. In the overall tallies, the larger plants scored 81 percent, the median group 68 percent and the smallest ones 75 percent. The returns prove that air conditioning is not a factor. The highest return is in the specialty field, where 18 percent of the plus-500's report having such systems. But the overall score is 4, 8 and 9 percent for small, middle-size and large plants, respectively.

Plant Cleanliness

Plant housekeeping is being regarded with growing favor by management as a "must" in maintaining good working conditions and a satisfied personnel. More than casual mopping up is involved in the modern meaning of the term, which implies the presence of an establishd housekeeping *program*. That the chemical industries are striding forward in this respect is proved by the survey, more than half of all the returns answering affirmatively on this question.

The majority of plants responding have a scheduled routine for keeping floors free of oil, scrap and obstructions, scores above 90 percent being registered by the plus-500's in inorganic (95) and the under-100's in the organic division (94). The overall tally for the size-groups, beginning with the smallest plants, is 73, 70, 87.

Almost all the median and largest plants maintain special staffs for maintenance, repair and replacement, the overall tally being 94 percent for the plus-500, 92 for the 100-500, and 59 for the small.

In the absence of similar surveys covering other industries, it is impossible to give the chemical industry a comparative rating. But on the whole, it is felt that plant for plant the chemical field would rank among the more progressive in the matter of labor relations. Regardless of such a comparison with other industries however, this survey makes it evident that there is still much room in certain categories for improvement in the creation of better working conditions and a happier existence for both management and labor.

ACRYLONITRILE
Little Giant of the Rubber Program

EDITORIAL STAFF

THOUGH SMALL IN TONNAGE relative to butadiene and styrene, acrylonitrile is playing an indispensable war role as an ingredient of oil-resistant Buna N. Here is a description of its manufacture in Rohm & Haas' new plant at Bristol, Pa., and a quick glance at some of its postwar possibilities both in polymerization reactions and as an intermediate for chemical synthesis.

BUNA N has been one of the little brothers in the synthetic rubber development in this country. It has usually been pushed into the background whenever the bright light of publicity has been focused on war-time elastomeric achievements. Big Buna S has invariably monopolized the show.

From a quantitative standpoint this probably is justified. When it comes to tons turned out, Buna S *is* the show. Rubber Director Bradley Dewey's latest estimate (March 1944) of production for this year is:

	Long tons
Buna S	765,000
Neoprene	53,200
Butyl	26,200
Buna N	24,500
	868,900

But it would hardly be justice to say that Buna N's stature in the synthetic rubber picture is accurately reflected by the tonnage figures. Buna N is what is known as a specialty rubber. Its chief claim to fame is its unusually good resistance to hydrocarbons, such as gasoline and oils, long-standing foes of natural rubber and most of the other synthetics. For this reason the 24,500 tons of Buna N to be produced this year will be used for special jobs that other rubbers can't do so well. Probably the most dramatic and outstanding of these applications is the self-sealing linings for airplane gas tanks. How many lives of airmen will be saved by this one development will never be known. Another is rubber pipelines for quick unloading of fuel tankers in battle areas. By eliminating the necessity of transporting gasoline cargoes in cans, shipping capacity has been increased and unloading time and hazard decreased. Other uses are for oil-resistant engine mountings, gaskets, gloves, aprons and shoe soles and heels.

The ingredient responsible for these valuable oil-resistant properties of Buna N is acrylonitrile. Aside from the fact that in Buna N acrylonitrile rather than styrene is co-polymerized with butadiene, the two Bunas—N and S—are quite similar in their chemical structure. They even contain butadiene in about the same proportions—about three parts to one of the other ingredient, although in Buna N the ratio may be cut to two parts butadiene to one of acrylonitrile, or even to 1 to 1 if extreme oil-resistance is required. As a matter of fact, Buna N and Buna S are so similar in all respects other than oil-resistance, and especially as tire stocks, that serious consideration was given at the outset of the rubber program to making Buna N the principal synthetic instead of Buna S. The stumbling block for Buna N, however, was the cost of acrylonitrile. After a few preliminary estimates it soon became apparent that the required capacity for styrene could be built considerably more quickly and cheaply than could that for acrylonitrile, and Buna S got the vote. Today acrylonitrile is being quoted at 40¢ a pound as against a reported price of 18¢ for styrene.

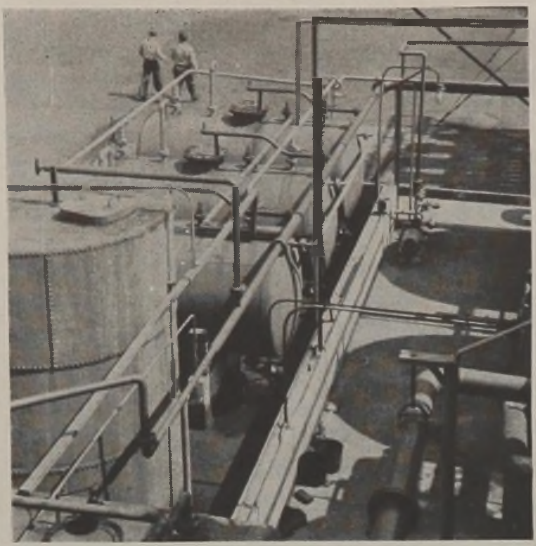
But that has by no means eliminated Buna N and acrylonitrile. There are two American producers of acrylonitrile today —Rohm & Haas Company and American Cyanamid Company—and most of the combined output of their three plants is going into Buna N for the government. Acrylonitrile was a logical avenue of development for American Cyanamid since it requires cyanide, a Cyanamid product of long standing. Rohm & Haas' interest, on the other hand, lay in putting to further use its experience gained in the production of other acrylic monomers for transparent plastics and leather and textile finishes.

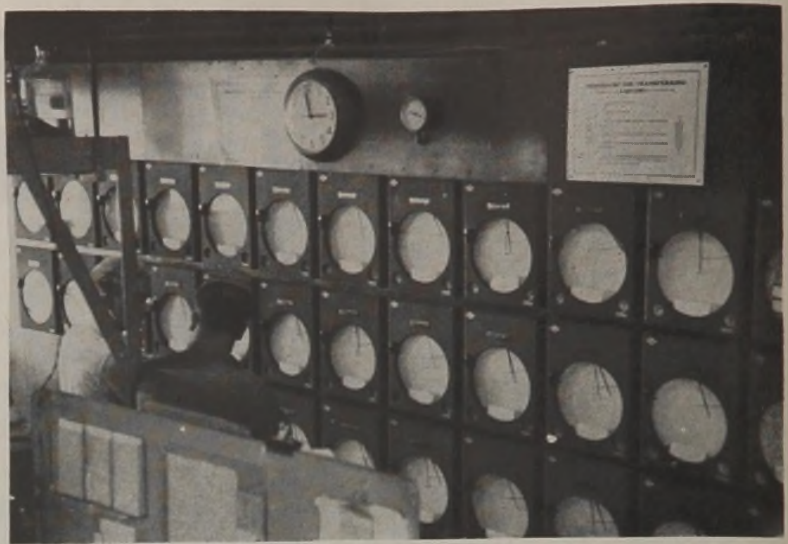
American Cyanamid was the first to appear with a commercial acrylonitrile plant early in 1940. This plant has since been enlarged several times. Rohm & Haas entered the field with a large-scale unit in 1940. Shortly after the United States entered the war in 1941—several months before it was officially decided which one of the synthetic rubbers would be developed on a large scale—Rohm & Haas presented plans to the government for expanding its production of acrylonitrile. These did not find a very receptive audience at the time, but they saved many vital months when the company was later permitted to build a second plant to meet synthetic rubber requirements. This second plant, at Bristol, Pa., was completed in the middle of 1943 at a cost of close to a half million dollars.

Manufacturing Process

Chemically, acrylonitrile is simply ethylene ($CH_2{=}CH_2$) with one of the hydrogen atoms replaced by a cyanide radical ($-CN$). Its commercial manufacture is not quite so easy as this would indicate, however. The process at the new Rohm & Haas plant at Bristol starts with ethylene oxide, which is reacted with hydrogen cyanide to give ethylene cyanohydrin. This, in turn, is dehydrated to acryloni-

W. B. McCluer (center), assistant manager of Rohm & Haas' Bristol plant and in charge of acrylonitrile operations. With him are Philip B. Taft and F. J. Myers of the Rubber Chemicals Department.





Acrylonitrile storage at Bristol plant, and interior of control room.

trile: $CH_2OCH_2 + HCN \rightarrow$
$CH_2OHCH_2CN \rightarrow CH_2CHCN$

The Bristol plant is designed to turn out several million pounds of pure acrylonitrile per year. As shown by the views in the picture flowsheet to the right, it is erected out-of-doors in the manner of oil refinery construction, only the control room being enclosed. Instrumentation and automatic control have been used unsparingly throughout the entire process. Automatic recorders keep constant checks on temperatures, pressures, liquid levels and rates of flow. The plant may be kept running night and day with only three men per shift.

In the operation of the plant, hydrogen cyanide is introduced into a large mixer where it reacts with a stream of ethylene oxide to form ethylene cyanohydrin. Unreacted gases are picked up in a scrubbing tower that is hooked up in cycle with the mixer. The reaction is exothermic, so that it is necessary to keep the temperature under control by a system of heat exchangers.

The reaction mixture is transferred to intermediate storage tanks from which it is fed to a distillation unit. The pure ethylene cyanohydrin is distilled over, under vacuum, leaving a small amount of residue which is discarded. A molecule of water is then split off each molecule of ethylene cyanohydrin, to yield a mixture of crude acrylonitrile and water.

The mixed vapor is condensed and the components are separated by gravity. The water layer is discarded and the crude acrylonitrile goes to a distillation column, where a heart cut of pure acrylonitrile is taken. The overhead is recycled and the bottoms, containing high-boiling impurities, are discarded. Shipments to the synthetic rubber plants are customarily made in tank cars, and storage has been provided for accumulation of tank car quantities. Extensive laboratory tests are made to insure compliance with established standards.

Acylonitrile is a volatile liquid, water white and water thin, that boils at about 78 deg. C. and smells like phosphorus. It is a toxic chemical, a factor which complicates its manufacture and use. The manufacturers and users of acrylonitrile, however, have taken adequate precautions to insure its safe handling, and no cases of serious injury are known.

The material is one of the most important acrylic monomers produced at present, particularly from the standpoint of volume of production. Aside from its major use in Buna N type synthetic rubbers, it finds applications in a variety of polymerization reactions. One of the preferred polymerization catalysts is benzoyl peroxide, but a variety of other catalysts may be used, the choice depending on the effects desired. As with the other acrylic monomers, the type of polymer obtained varies widely depending on the polymerization conditions employed. The monomer itself is relatively stable, and it is not necessary to inhibit it for normal handling.

Chemical Uses of Acrylonitrile

Acrylonitrile differs from most of the other acrylic monomers in that the polymer is insoluble in the monomer. Thus on polymerization the polymer precipitates as a very finely divided solid, a characteristic which virtually eliminates it as a material for making continuous films or large homogenous castings. With this serious limitation, polymers in which acrylonitrile is the sole component have so far found little practical use.

Acrylonitrile finds its widest use at present as a modifier for other polymerizable materials. As already mentioned, its use in acrylonitrile-butadiene co-polymers is very extensive. Typical of these Buna N type synthetics are Hycar OR, Perbunan, and Chemigum. Varying degrees of oil resistance can be obtained by controlling the acrylonitrile content of the polymer.

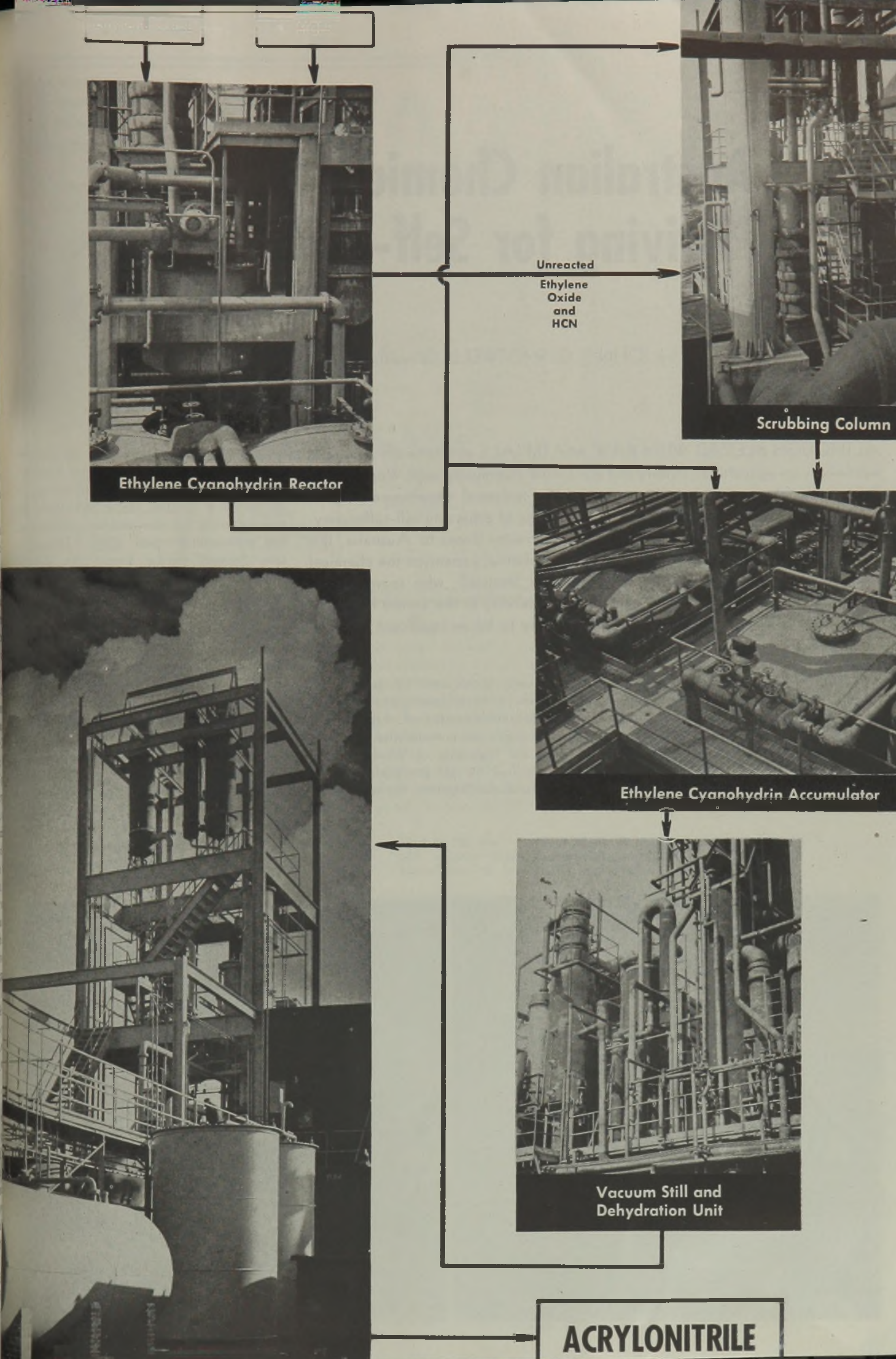
Emulsions of acrylonitrile and other ingredients greatly resemble milky white natural rubber latex and in certain processes have been substituted for the natural product.

Recent laboratory investigations have indicated that acrylonitrile offers a variety of possibilities as an intermediate for chemical syntheses, in which applications its unique chemical reactivity is utilized rather than its polymerizing properties. The double bond in its molecular structure is so active that the compound is a very effective reagent for introducing the cyanoethyl group into compounds at a point or points where active hydrogen appears. An adjacent carbonyl group is one arrangement that activates the CH_2 group for cyanoethylation. Work has been done on the cyanoethylation of phenols, resorcinol, indene, anthrone, cyclopentadiene, acetone, malonic esters, acetacetic esters, water, glycols, oximes, cellulose and carbohydrates. Most of the products obtained were crystalline materials, usually quite stable to heat, and obtained with yields of 90 to 95 per cent. The lowest yield when reaction was obtained at all was 70 per cent. In the case of acetone, it was impossible to obtain derivatives with less than three cyanoethyl groups.

With reactive ketones, acrylonitrile undergoes a condensation reaction to provide a simple method for preparing a wide variety of ketonic polynitriles and polycarboxylic acids.

Future Outlook

Rohm & Haas believes that the postwar market for acrylonitrile will be good despite the anticipated falling off of demand for self-sealing gasoline tanks. It foresees large requirements for Buna N in the automotive and mechanical goods industries where a rubber with good oil resistance is needed. The availability of acrylonitrile as a pure chemical at low cost is anticipated to open up some of the possibilities in the chemical synthesis field. Altogether, it believes that the "little giant" has only started to grow.


Ethylene Cyanohydrin Reactor
Unreacted
Ethylene
Oxide
and
HCN
Scrubbing Column
Ethylene Cyanohydrin Accumulator
Vacuum Still and
Dehydration Unit
ACRYLONITRILE

Australian Chemical Industry Striving for Self-Sufficiency

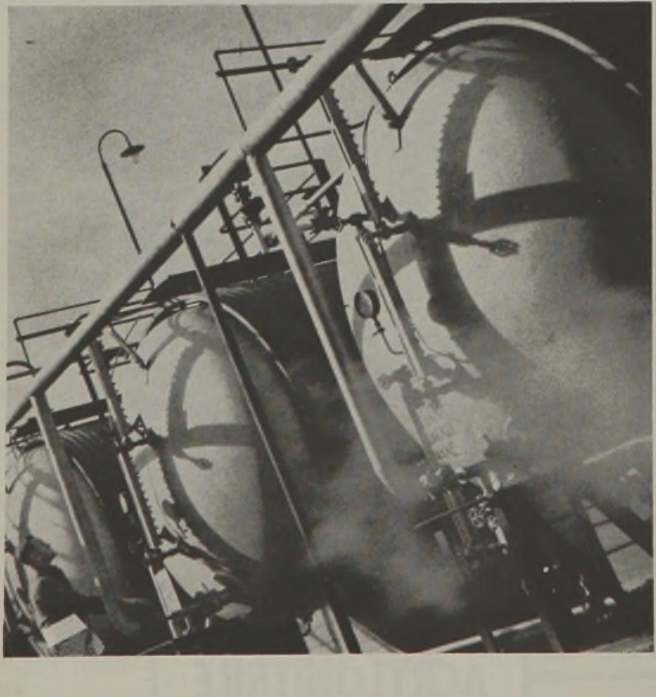
by JOHN S. G. SHOTWELL, Consulting Chemical Engineer

ALTHOUGH BLESSED WITH RAW MATERIALS and minerals Australia was largely an agricultural, mining and mercantile community until World War I. This picture changed during that war, and the industrial development which was initiated then continued to grow with the idea of achieving self-sufficiency. With the advent of World War II and the imminent threat to Australia, this tendency was again greatly stimulated. In this industrial expansion the chemical industry has fared well and, according to Mr. Shotwell, who spent several months in intimate contact with industry while serving in the armed forces on the "Island Continent" during 1942-43, is likely to be an important factor in post-war Far East markets.

THE POPULAR CONCEPTION, on this continent, that the chemical industries in Australia are very small is erroneous. The people of the "Island Continent" have for over twenty years been striving to become self sufficient in all classes of industry. This tendency has been greatly accelerated by the war in the Pacific with the consequent threat to Australia and the cutting off of the sources of many important commodities.

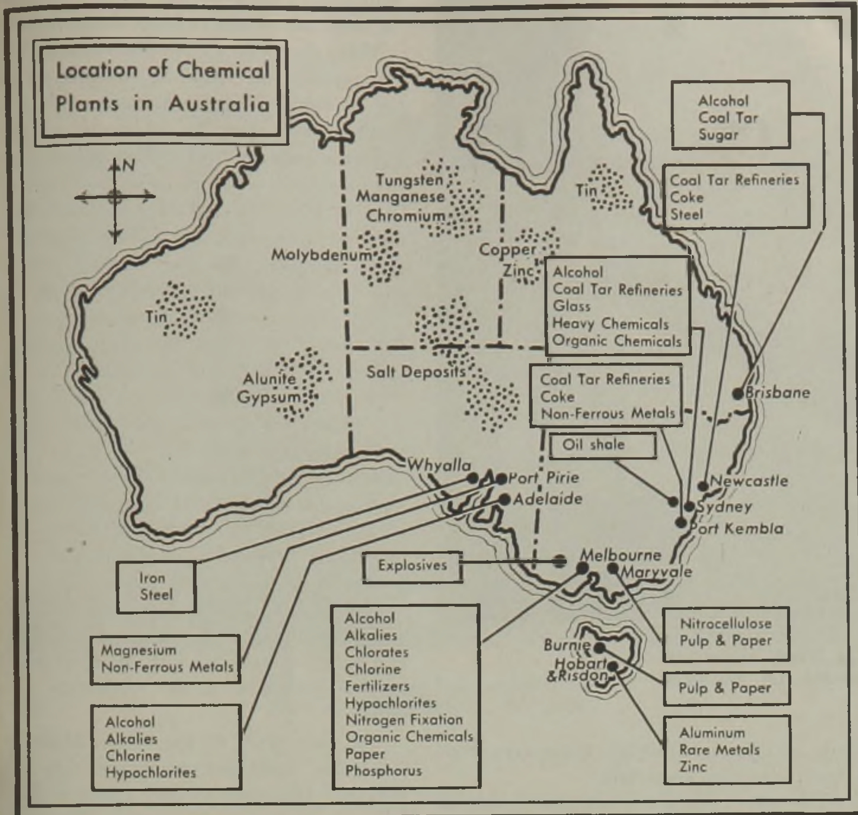
Until the beginning of World War I Australia had for all practical purposes no industrial development, but was purely an agricultural, mining, and mercantile community. The small industrial development then in existence was carried on as an ancillary to the above activities by making some of the smaller equipment and maintaining repair shops. This picture changed during those first World War years, largely due to the large steel industry and the subsidiary fabrication works. Gold, silver, copper, lead and zinc refineries were also in operation, and plants to utilize these metals were erected and came into production.

The fermentation, distillation and coking industries were the earliest of the industrial chemical family to be established in Australia; if we exclude ore dressing and metallurgy. These two latter industries are not being considered in this article except for some of the newer proc-



Liquid ammonia is stored in these tanks at new plant at Melbourne for production of nitric acid and ammonium nitrate.

Wood pulp and cotton are used as source of cellulose for the manufacture of nitrocellulose at Melbourne munitions plant.



esses and products and the effect on the chemical industries of the older processes by their demand for heavy chemicals.

The growth of the chemical industries can best be shown by the consolidated figures from Australian government statistics. In 1930 there were approximately one hundred and fifty factories which had a total output worth twelve million dollars. By 1942 the number of factories had increased to over seven hundred employing more than twenty-four thousand workers and turning out products valued at nearly two hundred million dollars.

Abundant Raw Materials

Australia is a country exceptionally well supplied with the raw materials necessary for complete self sufficiency. There are large and rich deposits of coal, iron, copper, zinc, and the alkalies, good but not fully surveyed and developed deposits of the ores of manganese, molybdenum, vanadium, tungsten, tin, chromium, magnesium, aluminum and many of the other industrial minerals. It is lacking in petroleum but has deposits of very rich oil shales; there is no native sulphur but many sulphide ores and while there is apparently no nickel, the rich deposits in the French island of New Caledonia a few hundred miles off the East Coast are available.

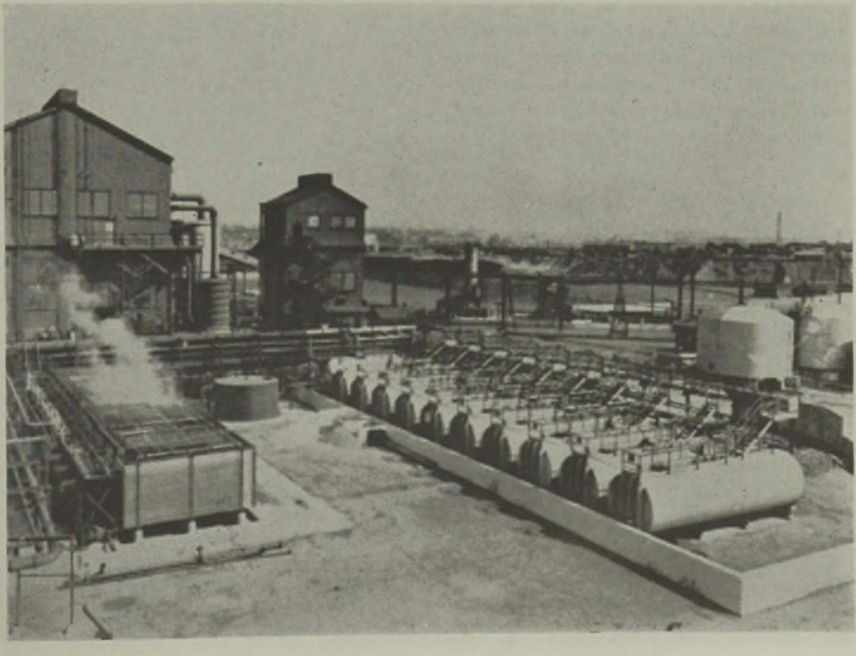
Within the last year Australian industry has opened plants for the fixation of atmospheric nitrogen, the production of metallic magnesium, and an aluminum alloying and fabricating plant, with a large aluminum refinery or ingot plant about to be constructed in Tasmania; this latter using Australian ores, both bauxite and alunite for its raw materials. It is expected that when the war is over Australia will be able not only to supply its own needs in aluminum articles, but will also be able to enter the export market in this field.

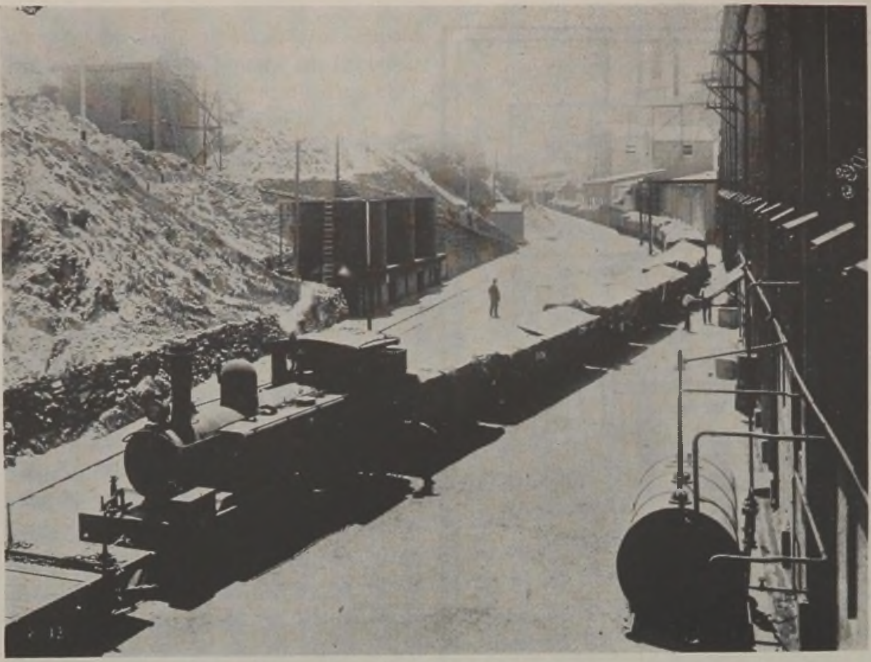
The Council for Scientific and Industrial Research was established as an independent group by the Federal Government to investigate problems affecting the people of the whole Commonwealth. Until 1938 agriculture was its main field but in that year a large and well equipped industrial research laboratory was established and a long term program of cooperative research with industry was inaugurated. This laboratory has since been greatly enlarged and the work has already borne fruit in many ways.

One example of this was the working out of methods of making optical glass from Australian raw materials. The research was carried out under the joint auspices of the Council, The University of Melbourne and the Glass Industry by world famous scientists, both Australians and some who had sought refuge in Australia from the persecutions in Europe and elsewhere. A three million dollar plant was built and has been put into operation for the production of a whole range of military optical instruments. There had already been a glass industry making the ordinary grades, together with structural, heat resistant and scientific glasses, but this was an entirely new field.

Prior to the war in the Pacific, Australia was totally dependent on outside sources for motor fuel. Petroleum came principally from the nearby Netherland East Indies and Borneo. The cutting off of these sources necessitated the procuring of the supplies either refined or crude, from America, or the Persian Gulf Area, both of which localities necessitated long ship hauls. These factors greatly revitalized the work on the New South Wales oil shale deposits so that during the winter of 1942-43 the production had reached four million gallons (U. S.) per year, but it is expected to reach a maximum of

Steel is the main source of Australia's armament production and also supplies chemical byproducts. Here is a section of the benzol plant at Broken Hill Proprietary's Newcastle Steel Works.





Superphosphate works at North Freemantle helps supply great demand for fertilizer.

twenty-five million gallons per year, shortly, when structural alteration to retorts and ancillary plant are completed. The shale is very rich, giving a yield of 100 gallons of high grade gasoline per ton. These shale deposits are exceedingly large and will be a factor in post-war Australian economy, especially as many other fields await development. The sugar industry has also cooperated with the Government and fermentation industry, and is producing over ten million gallons of alcohol for fuel purposes.

The coal distillation industry is important as one of the producers of many raw materials for other chemical industries. Tar refineries are in operation at the two big metallurgical centers of Newcastle and Port Kembla. The total production of coal tar is something in excess of fourteen million gallons per year, from which over six million gallons of benzol are recovered at the two refineries, together with corresponding quantities of toluene, xylene and other related products.

Organic Chemicals

The organic chemical field is the newest member of the Australian family, starting in a small way with the manufacture of some drugs. But since the outbreak of war the leading Australian company arranged with Monsanto for the erection of a plant, now in operation, for the manufacture of a wide range of organic chemicals reaching from acetic acid, phenol, aniline and the higher distillation products of coal tar to various synthetic resins and plastics.

The dye and explosive industries, so closely related to the above, have made rapid strides, and thanks to the newly developed pulp industry is able to manufacture all grades of military explosives from Australian raw materials.

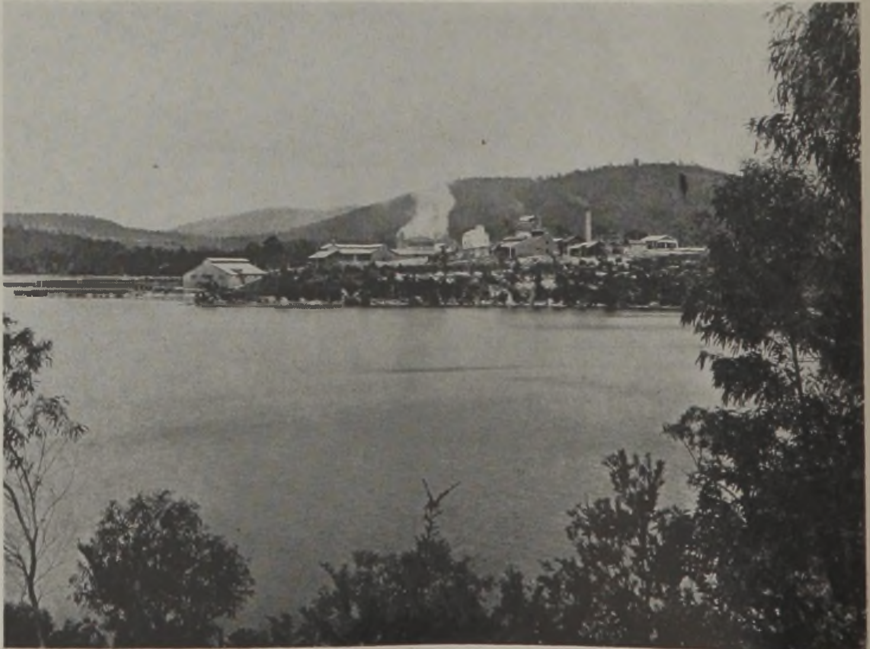
The pulp industry is also concerned in making artificial silk and other cellulosic films in commercial quantities. Unfortunately most of these are being made for military purposes and the output has not been divulged but has been grouped in with other products. But it is probably at least sufficient for Australia's domestic needs.

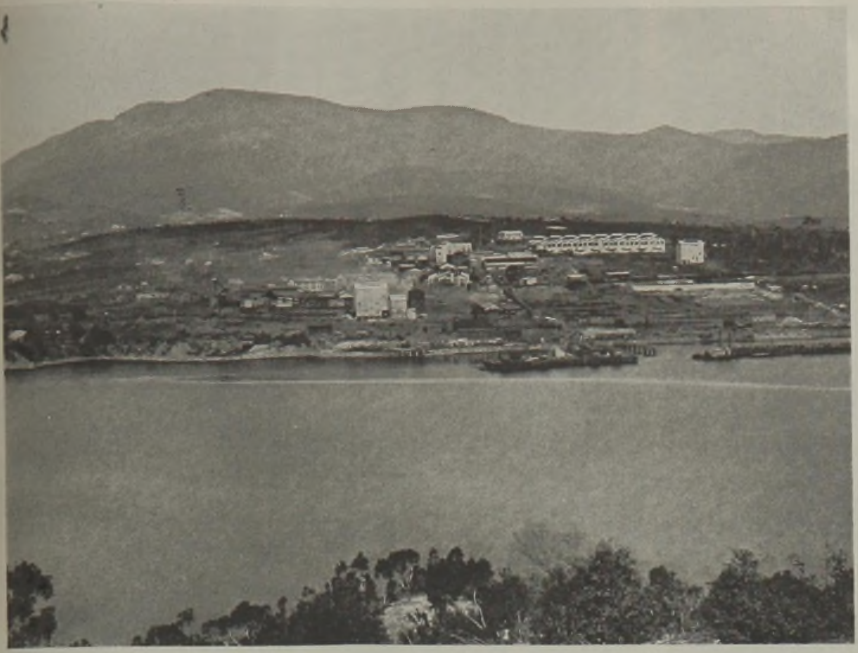
The chemical fertilizer industry is exceedingly important in Australia with her great demand for superphosphates. These plants were built on the whole to manufacture their products from Mediterranean sulphur, phosphates from Nauru, and Chilean nitrate, but with the shutting off of the first two of these sources of supply, methods were worked out to use sulphur from the sulphide ores and phosphate from the mineral phosphates from the Northern Territories. It is doubtful whether the use of these raw materials will be continued when the better foreign sources become available again, but in the meantime one of the granaries and gardens of the Allies has been kept operating at an ever increasing tempo. The industry has, even with these setbacks, grown rapidly until the value of its products exceeds sixteen million dollars annually.

The heavy chemical industry has also made rapid strides. As mentioned above, several nitrogen fixation and nitric acid plants are operating. Sulphuric acid is made from the waste fumes from the smelters of Tasmania, New South Wales and Queensland, while some plants that had been designed to burn Mediterranean sulphur are now using Australian sulphides.

The vast areas of the "Dead Heart of Australia" have become increasingly important to the wartime and post-war economy of the "Island Continent." The maps show large lakes, but these lakes are largely the halucinations of the cartographers. They may exist for exceedingly short periods just after the rains, but between rains, sometimes for a period of years, they are simply dry glistening beds of salt. They have formed an almost limitless supply of raw materials for the great plant of the Imperial Chemical Industries on the shores of St. Vincent's Gulf, South Australia. This plant pro-

Carbide works at New Bay, near Hobart supplies basic chemical products.





Zinc is electrolytically refined in plant at Risdon-Hobart, Tasmania.

duces chlorine, calcium chloride, sodium bicarbonate, caustic soda and hydrochloric acid.

A second plant of this company located near Melbourne, on Port Phillip Bay, produces the same products as the one in South Australia, but also chloride of lime, stannic chloride, copper oxychloride, ferric chloride and sodium hypochlorite. Other plants are in operation and additional ones have been proposed.

A war baby, that is associated with the above, but which may not survive the war is the manufacture of potassium chloride. In normal times Australia's whole supply was imported from Europe, where it was manufactured at a lower cost than it is probable can be met in Australia. This chemical, important both in the industrial and the drug field increased over tenfold in price until the last available supplies in Japan were used up. The match manufacturers, the largest single users of potassium chlorate, arranged with the Imperial Chemical Industries, the owners of the chlorine plant, to build a chlorate plant as part of their Port Phillip works. Here sodium chlorate is produced electrolytically from Australian raw materials and then converted into the potassium salt by double decomposition, using native potassium salts.

Phosphorus and many of its products are now being made in Victoria by electrolytic processes using native phosphate rocks as raw materials. The phosphoric acid and phosphates so derived are being produced in commercial, pharmaceutical and food grades. This is a most significant development considering the extremely small number of phosphorus plants there are in operation elsewhere.

The manufacture of calcium carbide, calcium cyanamide, acetylene and their derivatives is another contribution to the self sufficiency of the Island Continent by the larger chemical firms such as Broken Hill Proprietary and Imperial Chemical Industries. These and others also manufacture acetic acid, acetone, methanol, carbon tetrachloride, butanol, and various sulphates, fluorides and cyanides.

The Electrolytic Zinc Company, Ltd., of Risdon, Tasmania, and many other places in Australia is now producing cobalt powder. Indium and selenium are being produced by a Sydney firm.

Research and Development

Most of these plants have been well designed with a flow sheet and layout so arranged that they are low cost plants. They form a well balanced whole, drawing principally on local sources for their raw materials and on the whole can be expected to continue in operation after the cessation of hostilities. The Federal and State Governments are joining with the Universities and industries in many long range research and development programs. These together with the ones carried on by such large rich and exceedingly progressive corporations as Broken Hill Proprietary, Ltd., Imperial Chemical Industries, Australia and New Zealand, Ltd., Electrolytic Zinc Company, Ltd., The Zinc Corporation, Ltd., (the company that took the former President H. H. Hoover to Australia) and Monsanto (Australia) Pty, Ltd., to mention only a few, will insure that Australian Industry maintains its technical development.

With the reputation that the Australians have made in developing the resources and industries during the last two decades, to say nothing of what their "cobbers" in the services have done in the Middle East and in the Southwest Pacific, Australian industry will probably be an exceedingly potent factor in the settling of Pacific Affairs.

China and India are only beginning in their industrial development and they with the East Indies and other countries in the Far East will be eager markets for the goods from nearby Australia, carried on the many ships that Australia has launched and manned.

Salt is scraped into heaps at Lake Fowler in Southern Australia.

NEW CHEMICALS

Extraction of RUBBER from MILKWEED in Canada

by N. H. GRACE, J. KLASSEN AND R. W. WATSON
National Research Council of Canada, Ottawa, Canada

Bags of milkweed leaves collected by Canadian school children.

A COOPERATIVE RESEARCH PROGRAM, involving various government departments and universities, on the extraction of resin-rubber gum from the common milkweed has been under way in Canada since 1942. Based on a series of batch operations worked out in the laboratory, a pilot plant has been built that is capable of rapid extraction of substantial amounts of gum. The design includes provision for ultimate integration to continuous operation.

IN NATIVE rubber production, Canadian interest, like that of the other members of the United Nations, dates back to events in the Far East following Pearl Harbor. While it was abvious that the great deficiency in the supply of natural rubber could only be met by an extensive synthetic program, it was considered desirable to investigate the possibilities of production of rubber which could be grown in Canada. This involved a survey of native plants for rubber content, the possible cultivation of more promising species, the introduction and study of exotics such as the Russian dandelion, and the technological problems of extraction and rubber quality.

Work during the summer of 1942 indicated that only two species seemed to be of particular Canadian interest, namely, the common milkweed and the Russian dandelion. Obviously Canadian climatic limitations preclude plants such as guayule and cryptostegia which have been investigated in the United States. Likewise, native goldenrods do not develop much rubber under Canadian conditions. Consequently, since appreciable supplies of Russian dandelion, kok-saghyz, were not available, most of the work on extraction was directed to a study of the common milkweed.

The resin and rubber fractions of milkweed as judged by acetone and benzene solubility vary markedly with the stage of development. Dried young leaves have rubber contents of around 1 per cent; this value increases to a period just prior to natural leaf fall when the content is of the order of 4 to 4.5 per cent in wild stands. The gross resin fraction also varies somewhat but ranges around 15 per cent. Milkweed stems have little rubber, in amount about 0.4 per cent; the resin content is, however, as high or higher than in the leaves. Extraction studies, therefore, dealt with leaf tissue.

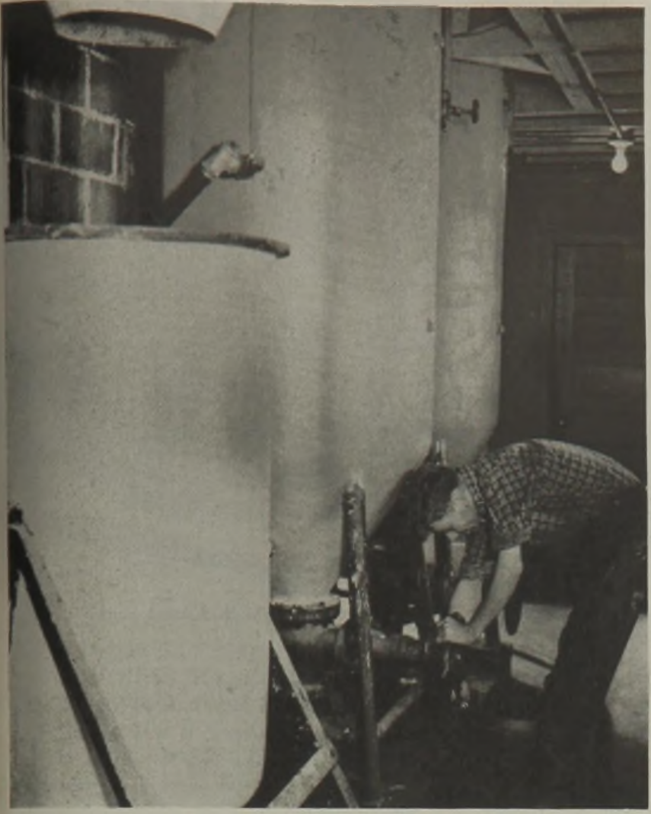
Laboratory Extraction

A laboratory method for extraction of a resin-rubber fraction from milkweed leaves was developed. This involved cooking the leaves in dilute alkali, washing out dissolved materials, and finally agglomerating a resin-rubber fraction in a pebble mill. This yielded a soft tacky material containing 25 to 40 per cent rubber hydrocarbon, 35 to 45 per cent resin, and 30 to 35 per cent detritus. The detritus, residue insoluble in acetone and benzene, comprised about 40 per cent inorganic material (ash); the organic portion consisted of plant debris.

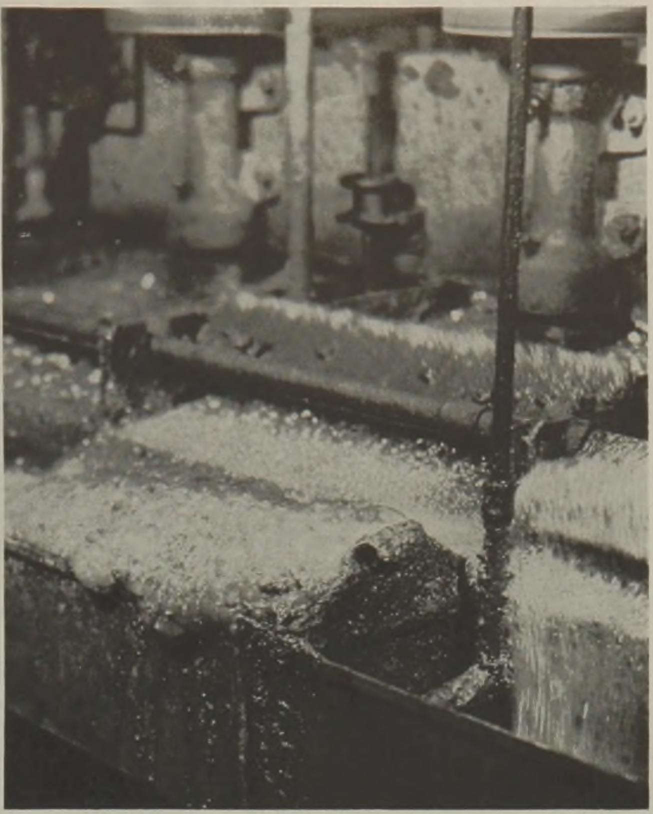
Upwards of 90 per cent of the rubber hydrocarbon was recovered. However, the resin extracted in the gum was usually somewhat less than half that calculated from acetone solubility of the original leaves, for the alkali cook dissolves a substantial part of the acetone-soluble fraction. Losses are associated with cooking and washing rather than with the pebble milling operation. This procedure also effects extraction of gums from seed pod hulls and stems.

The resin-rubber fraction was concentrated by froth flotation. Cooked, washed leaves were pebble-milled to break down tissue and free resin-rubber. The ground leaves were floated at 1.2 per cent solids, natural frothers being present in adequate amounts. The concentrates were thickened by settling and the resin-rubber agglomerated by final pebble-milling.

Solvent extraction studies paralleled the experimental work on development of a mechanical method for extraction of resin-rubber from milkweed tissue. Originally, successive acetone and benzene extractions provided resin and rubber from ground plant tissue. Subsequently the



Open cooker and two pressure cookers. First step is to charge these with dried milkweed leaves and water.



The finely divided resin-rubber agglomerate is separated from the mill slurry by flotation.

gum obtained by the mechanical procedure described was dried and subjected to similar solvent separation. The benzene extract from both the leaf tissue and the mechanically extracted gum was very tacky and obviously contained a low polymer rubber. The separate resin and rubber fractions, as well as the crude gum, were subjected to a series of blending tests in the rubber laboratory.

Blending With GR-S*

A 15-85 milkweed gum-GR-S mixture in a tire tread compound resulted in an improvement in tack, an increase in the tear resistance, a drop in both tensile strength and modulus, an increase in elongation notably at overcure, a drop in resilience but an improvement in the heat embrittlement figure and a considerable improvement in flex life. Resin and rubber hydrocarbon were each blended separately with GR-S. It was indicated that an additional 0.6 parts of sulphur over and above that required by GR-S should be added for each 15 parts of hydrocarbon to equalize rate of cure. Similarly an addition of 0.25 part of sulphur above that required by the GR-S was needed for each 10 parts of resin added in order to equalize the rate of cure. The resin appears to improve heat embrittlement and elongation at break after overcure. These are merely laboratory results. It was considered desirable that adequate quantities of milkweed* gum be made available for actual plant scale compounding tests and production of tires. These then could be tested under conditions of practical operation. The extraction of several tons of milkweed gum was the initial goal of the pilot plant.

Gums From Other Plants

Resin-rubber gums have been extracted from a number of plants by procedures developed for the common milkweed. Included among these plants are sow thistle, lactucas, dogbanes and tragopogon. While the yield of rubber hydrocarbon from such plants is low, a substantial resin fraction is obtained. The milkweed pilot plant can make substantial extractions on the above and similar plants. Further, these facilities with only minor adaptations in procedure, should permit the satisfactory extraction of rubber from kok-saghyz.

Pilot Plant

The pilot plant was planned and equipped in such a way as to permit rapid extraction of substantial amounts of gum by the series of batch operations worked out in the laboratory. However in the plans, provision was made for ultimate integration to continuous operation.

The unit processes in the plant consist of cooling, filtering, washing, pebblemilling, floating, thickening, agglomerating, and drying. The order of processing may be clearly seen on the accompanying flow sheet. It must be stated, however, that in spite of the fact that this flow sheet appears to be almost identical with the procedure worked out in the laboratory a great deal of additional information had to be collected before any rubber at all was extracted. The unit processes will, for purposes of clarity, be given step by step as outlined in the flow sheet. Integration to continuous operation has not yet been completed.

Cooking: The plant has two pressure cookers 32″ dia. x 64″ tall with a 45° conical bottom and a 6-inch gate valve in the bottom. The cooker is heated by direct injection of steam through a 1½″ pipe in the conical bottom and has been tested for a steam pressure of 50 lbs. In order to reduce the implosions a small quantity of air may be fed in with the steam.

Each cooker is charged with 80-90 lbs. of air-dried leaves. Water is added until the cooker is three-quarters full. Steam is injected until the boiling point is reached and then turned off until the mass just boils gently. The leaves are well mixed by the bubbling action and thoroughly wetted. After 15 minutes the liquid is drained off through a screen placed above the gate valve. The gate valve is then shut and the screen removed. The cooker is again ¾ filled with water, commercial NaOH (14 lbs.) is added to make a 1 per cent solution, and steam is

* Rubber tests were made by J. R. Sheppard, T. R. Griffith and G. C. Wanless.

* Milkweed leaves were collected by school children through a campaign organized by the Department of Agriculture.

admitted until a pressure of 10-15 lbs. is attained. After standing for 1½ hours the cook is blown into the surge tank. The whole process requires about three hours.

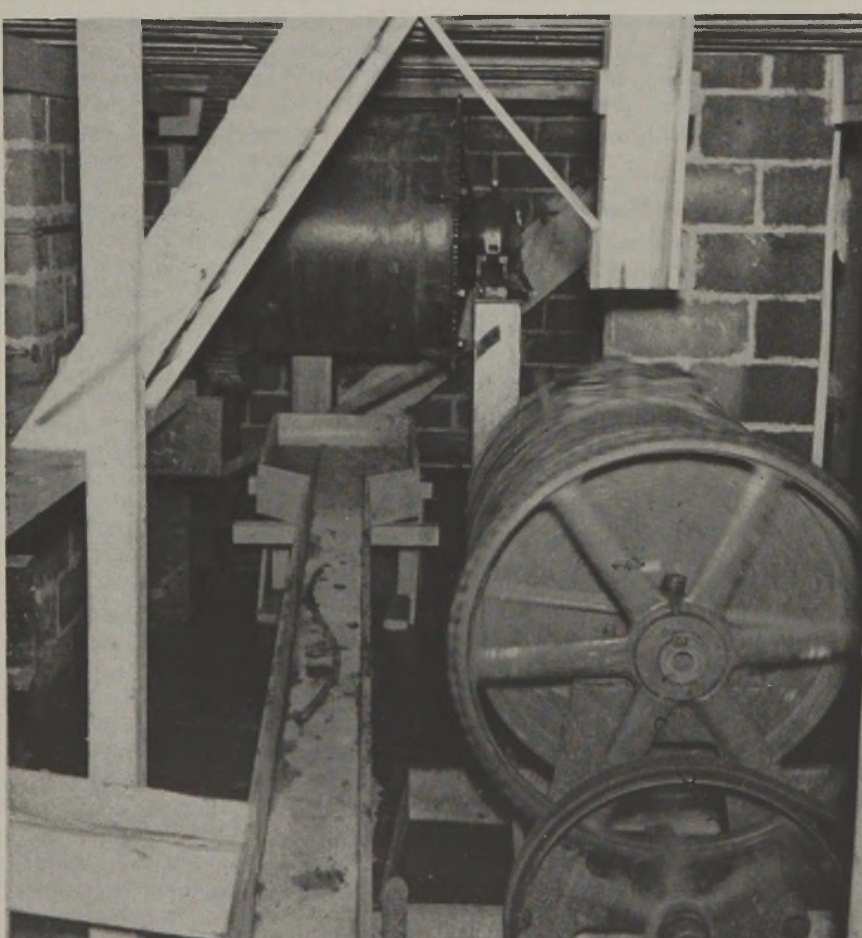
The water extraction dissolves 40-50 per cent of the dry weight of leaves, the extract having a marked brownish color. This water extraction reduces the subsequent alkali requirements and results in better gum recovery. Alkali treatment then dissolves another 10-20 per cent of the dry weight of the leaves. The dissolved materials consist mainly of sugars, fats, proteins, hemicellulose, lignin, lignocellulose, and inorganic salts.

Filtering and Washing: Filtering and washing are actually two separate steps but in the plant they are done together and for that reason they will be discussed together. In the pilot plant, gum has not been agglomerated from the leaves unless they have been properly filtered and washed. Substances are present which tend to emulsify the gum; these must first be washed out. Hot filtration is necessary as this substance or substances will precipitate if the cook is allowed to cool. It is therefore immediately fed at a uniform rate from the surge tank into the trommel filter. The trommel filter is provided with a water spray in its central third portion; therefore passage through the screen will filter, wash, and filter.

Crude lump resin-rubber gum out of the ball mill and sheeted dried gum.

Technical difficulties were encountered in operation of the first unit. An improved unit 2 ft. dia. x 8 ft. long is being constructed. In this way a product is obtained containing about 90 per cent water and with a pH of 11.2-11.8., resembling cooked and drained spinach. It has been found that it is well to keep the pH lower than 11.5; leaves with a higher pH require a second pass. This material has presented a great deal of difficulty in filtering as it very rapidly binds filtering cloths and screens. The most satisfactory medium has been a covering of six layers of cheesecloth and if a sharp spray of water is directed on the reverse side of the cloth, clogging is largely eliminated.

Ball mills are used to break up the cooked leaves and agglomerate the gum.



Milling: The gum in its natural form is minutely dispersed throughout the leaf as resin-rubber. It is necessary to free the resin-rubber from the cells by a grinding operation which is readily performed by a pebble mill. For this purpose two batch pebble mills are used; one a Vulcan amalgam barrel 36" dia. x 48" long and the other a Straub mill 36" dia. x 36" long. Both of these mills have been lined with porcelain brick. The larger mill is charged with 30 gals. of leaves (10 per cent solids) and 30 gals. of water; the smaller 21 gals. of leaves and 21 gals. of water. Both mills are half filled with Saskatchewan flint pebbles. The r.p.m. of the larger mill is 32.5 and of the smaller 37.5.

In the milling there are two factors to be taken into consideration: in the first instance the action of the pebbles tends to comminute finely the cooked leaves; in the second, the gum is caused to agglomerate. At the beginning of the milling there are very few free resin-rubber particles, but milling liberates more and more of them. Therefore, while the grinding action is first rapid and then becomes slower and slower the agglomerating action is at first nil and becomes faster and faster. However these mills have only rolled the gum up to a particle size of a few mm. in diameter, and then only after excessive milling. Yet these particles are too large for good flotation. Obviously then, milling must be stopped at a point which ensures absence of an appreciable number of the larger particles. It has been found that a 3½ hour milling gives the best results. The milled slurry is passed over a 60 mesh Dillon vibrating screen and the oversize (1/7 of the bulk) goes back to the mill while the undersize goes to flotation.

Flotation: Actual froth and not gravity flotation is used, for the specific gravity of the gum is about 1.1. The flotation machine is a 6-cell Denver Sub-A Unit. The pulp has an approximate solid content of 1.2-1.5 per cent. The milkweed slurry has its own natural frother and no flotation reagents need be used. The frothing properties are dependent on the pH to which the cooked leaves were washed; the higher the pH the more watery and voluminous the froth or gum concentrate becomes. An example of the concentration effected may be seen by the following analysis of the various parts listed in a run:

Flotation Heads—9.6 per cent resin and rubber.

Flotation Concentrate—49.1 per cent resin and rubber.

Flotation Tails—3.6 per cent resin and rubber.

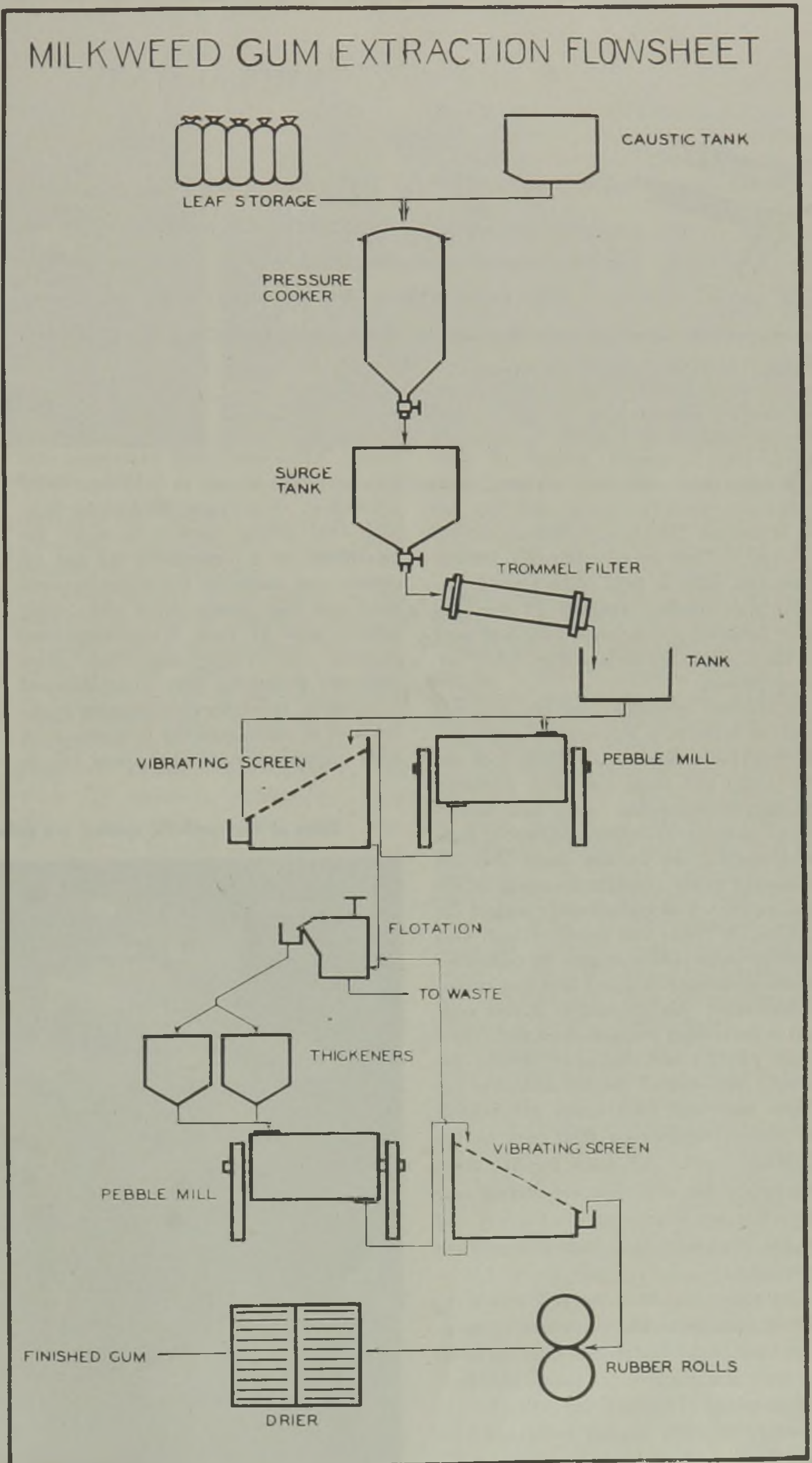
However, the tails are still quite high in resin and rubber, much higher than in laboratory tests, and work is being done to bring down this resin-rubber content.

Thickening: The concentrate from the flotation cell is quite watery, and thickening is undertaken for two reasons. A larger dry weight of thickened material may be put into the agglomerating mill and the rate of agglomeration is faster. The method employed has been to fill two tanks alternately and while one is filling the other is settling and being drained.

Agglomeration: Simple rubbing of the concentrate agglomerates resin-rubber. The pebble mill, however, gives excellent agglomeration. Hence the pebble mill does both the work of agglomeration and of comminution. A porcelain-lined Abbé mill 30" dia. x 36" long is charged with 25 gal. of the thickened concentrate and the charge heated to the boiling point with steam. The increased temperature helps the gum agglomerate more rapidly. The mill is rotated at about 36 r.p.m. for 5 hours and at the end of this time most of the gum is the size of wheat kernels and larger.

The charge is dumped through a grating and put over a vibrating 80-mesh screen, and the undersize is sent back to the flotation cell while the gum oversize is put back into the agglomerating mill with the remainder of the gum. The mill is half filled with boiling water and rotated for about ½ hour. At the end of this time the gum has all been brought together into one lump, which may then be picked out by hand and may weigh anywhere from 6 to 14 lbs. depending on the grade.

Drying: The gum contains 20 to 30 per cent moisture and must therefore be dried before it can be used for compounding. To ensure rapid drying the rubber must be sheeted out. This is easily done on rubber washing rolls where it is worked into corrugated sheets about 1/16 of an inch thick and spread onto wire screening. These laden screens are set into either a vacuum or air drier. The warm air drying oven is kept at 60° C., and requires 3-4 days to take the moisture down to 0.5-1 per cent. Vacuum drying may possibly be better because there would be less oxidation of the rubber fraction. Atmospheric equilibrium moisture content at 30-40 r.h. is about 2 per cent so that there is not much point in drying below this unless the gum is to be used right away. The dried gum is ready for use.



Manufacture of ELASTOMER SPECIALTIES for War Uses

EDITORIAL STAFF

CHEMICAL SPECIALTIES

ANOTHER GROUP OF MATERIALS that is playing an inconspicuous but important part in production for war is the elastomer-base specialties, such as adhesives, sealants and special coatings. Minnesota Mining & Manufacturing Co. is turning out some thousands of pounds a day of these materials for holders of Army, Navy, and Air Corps contracts.

SEVERAL million gallons of elastomer-base adhesives, sealants, insulators and specialty coatings will flow out of Minnesota Mining and Manufacturing Company's four-story mid-town Detroit plant this year to help make United Nations war supplies ranging all the way from battleships to aviation fuel. And most of these will carry no less than AA-1 priority ratings.

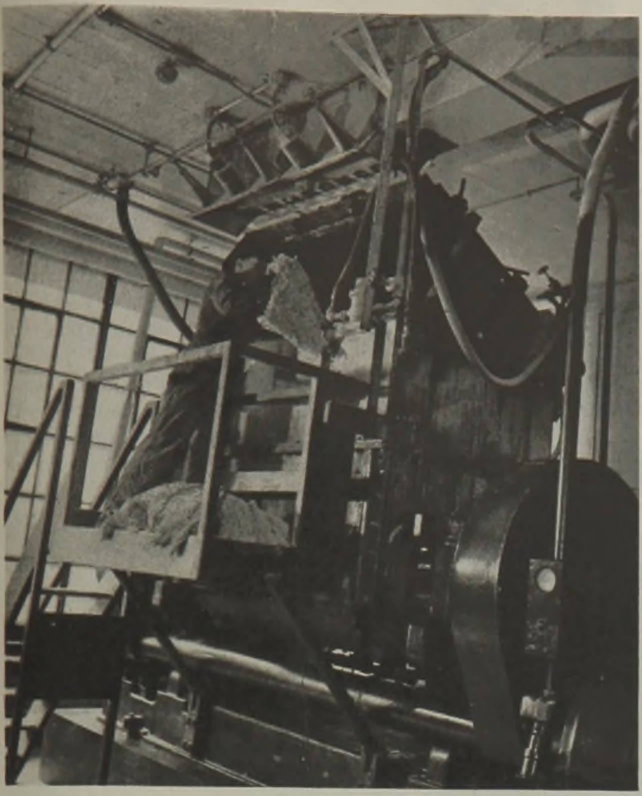
Elastomer specialties are big and important business in this war. Special adhesives, for example, are doing jobs for the Army and Navy that were formerly considered impossible. One such waterproof product is holding down a non-skid material on warship decks that are subjected to the constant pounding of 40-ton waves. A special pressure sealant for use on the joints and seams of high altitude airplane cabins retains its properties under conditions of desert heat and stratosphere cold. An all-weather gasket sealant is preventing seepage of oil and grease from aircraft and ordnance vehicle engines. Waterproof closure adhesives for paper bags and fiber boxes are helping to protect supplies on their way to the fighting fronts. All down the line these elastomer-base materials are finding new uses that are helping to win the war and at the same time have important postwar possibilities.

As those who have worked with them know, elastomers and elastomer formulations are tricky materials. The variables in their manufacture are many, and foolproof means of control that will give absolutely uniform results from batch to batch, are still an unattained goal. As a result, "know-how" and experience still play a dominant role in their successful production. For example, blending technique—the precise manner in which the ingredients of a formulation are put together—can mean the difference between good and bad results even when other factors such as time, temperature and pressure are perfectly controlled. Raw materials frequently vary from shipment to shipment, requiring compensating modifications in manufacturing procedures. A good organic chemist must spend two to four years in elastomer formulation work before he can really pull his own weight in this field.

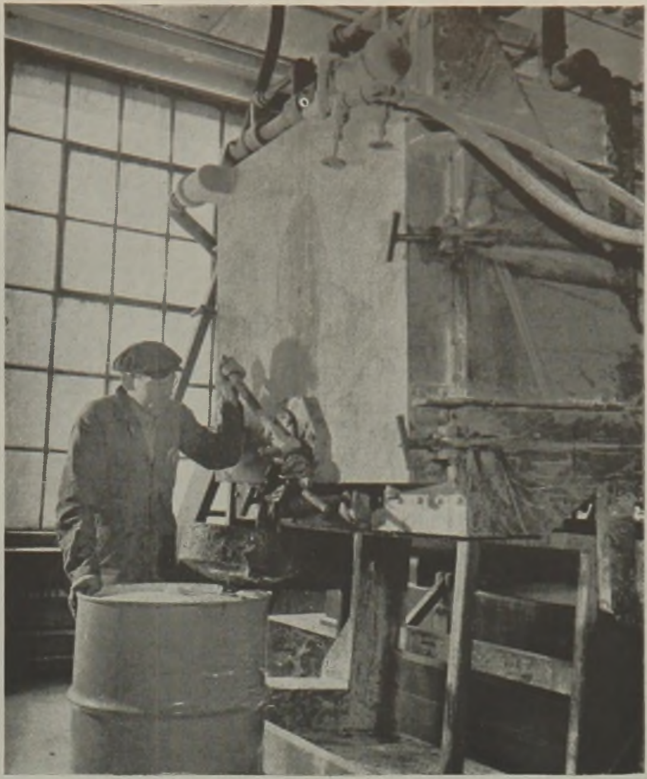
In a business where science has thus yet to replace much of the art, Minnesota Mining over recent years has built up a considerable store of specialized knowledge. Formed in St. Paul, Minnesota, at about the turn of the century to manufacture abrasive products, the company first became interested in elastomers about a dozen years ago when it decided it needed a better adhesive for holding the abrasive grain on sandpaper, one of its major items of manufacture then as now. Customers wanted a sandpaper that was flexible, that would "go around corners without cracking and the grain coming off." The research department experimented with rubber, resins, and glues as the bases for adhering grain to paper or cloth and established the foundation for the present line of commercial adhesives.

With a foot thus in the door of the

Some of the synthetic rubbers are milled before they are put into the mixer.



Charging milled sheet into one of the 600-gal. mixers.



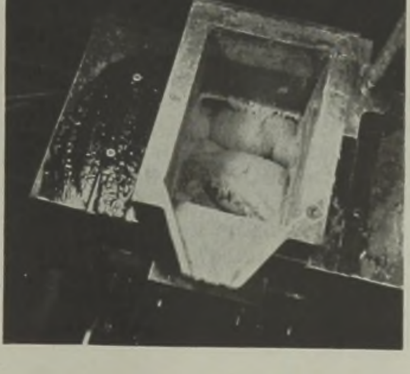
Emptying a finished run from the mixer into a steel drum.

rubber adhesive and coating field, the company saw the way open to other products of a similar nature and soon perfected its now-famous "Scotch" tape, the first pressure-sensitive tape for general use. This in turn led to further work in adhesives, particularly in relation to their possibilities in motor cars for fastening upholstery and rubber parts to metal. The latter market grew rapidly and to such proportions that the present plant in Detroit was established in 1936 to handle most of the adhesives operations of the company. The buildings used to make the old Rockne automobile were purchased from the Studebaker Corporation and remodeled to provide manufacturing space, warehouse, pilot plant and laboratories. In fact this location is now the headquarters of the Adhesives Division. Another interesting sidelight on the property is that the Ford Motor Company's building, erected in 1903, in which some of the early Ford cars were produced, is a part of the present group of buildings.

Because of the special nature of the jobs they do, most of Minnesota Mining's elastomer specialties are made to order. There are few "standard lines." Most of the 770 formulas on the Adhesive Division's books were developed to solve special customer problems on which company field engineers were called in. Of these 770 formulas, incidentally, about 360 are still active, the rest having been discontinued because of obsolescence or because some of the ingredients were shut off by the war. As an indication of present activity in this field, new formulas or modifications of existing formulas are being added currently at the rate of three or four a week.

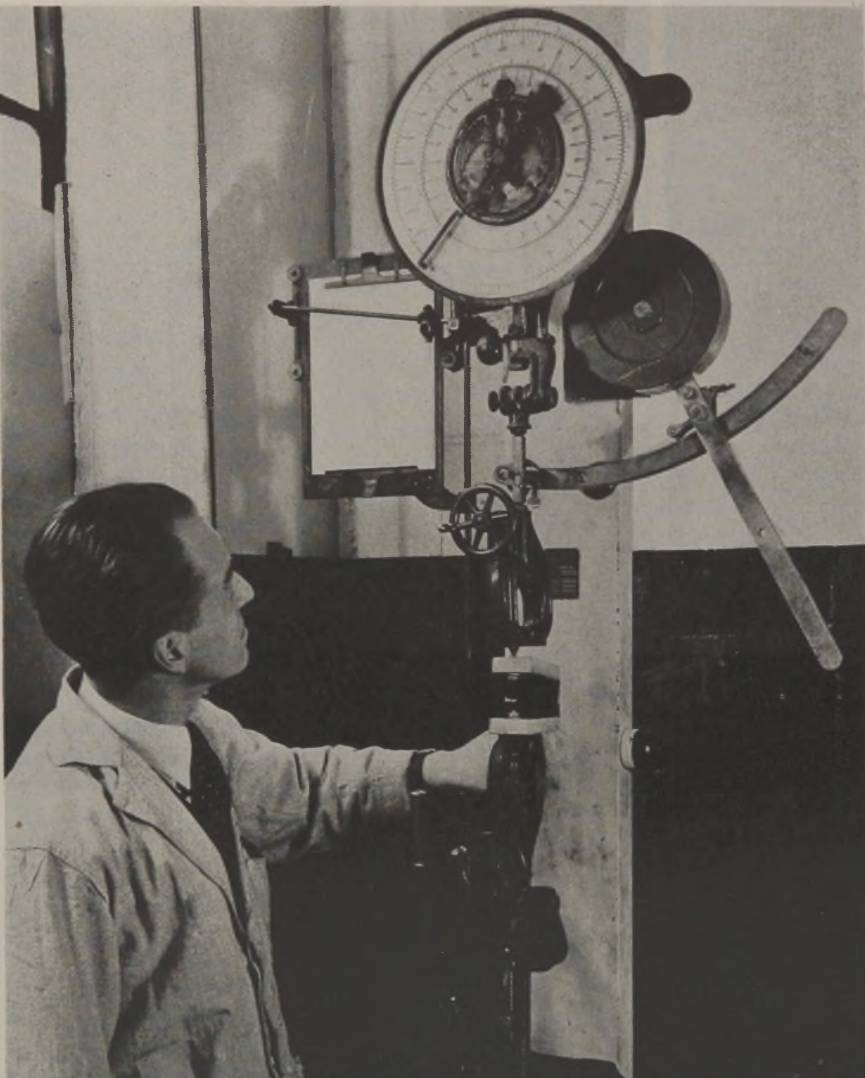
Before the war, the principal base raw materials used in the manufacture of elastomer adhesives and coatings were latex, crude rubber and reclaimed rubber. Now, however, natural latex and rubber have given way entirely to synthetics, principally of the neoprene, thiokol and vinyl types, although others are being used for certain special purposes. In general, among the synthetics neoprene seems to have properties that are most closely related to natural rubber and hence offers a desirable base for many adhesives. Developmental work is going forward as fast as conditions will permit, however, and it may well be that one of the newer synthetics, especially if price is favorable, will move into the picture in an important way. Thus far, synthetics have required much closer cooperation between the laboratory and manufacturing units than either reclaimed or natural rubber bases.

Views showing masticating action of dough mixer.



In addition to the base materials a large number and variety of compounding ingredients are required—fillers, pigments, accelerators, anti-oxidants, resins, plasticizers and solvents. Altogether there are about 125 types of such materials coming into the plant regularly. The principal solvents are petroleum fractions, butyl acetate, amyl acetate, acetone, ethylene dichloride, and certain aromatics. These are received in tank car quantities and are stored in underground tanks, from which they are pumped direct to the mixers as needed.

All of the compounding is done in internal dough-type mixers fitted with special blades and gears, or in ordinary rubber churns, depending on the amount



Testing adhesion of hard cellular sponge rubber to wood.

of power or type of mixing required. In some cases the base material, received in sheet or shredded form, is milled between smooth milling rolls before it is put into the mixer. This gives a further breakdown which speeds up dissolving in the mixer and also permits incorporation of some of the solid compounding ingredients which seem to achieve better distribution in the batch through the roll action than when incorporated directly in the mixer. The material comes from the milling rolls in sheets, which are allowed to cool before going to the mixers.

All operations are on a batch basis. Ingredients are charged into the mixers according to a definite timetable worked out in the laboratory and pilot plant and checked by experimental runs in either a 50-gal. mixer or one of the six big 600-gal. mixers used for regular production runs. It is extremely important that the ingredients be added in the proper sequence, at the proper time intervals and at the proper rate. That is where the art comes in. To insure proper supervision over operations and to get the value of cumulative experience and knowledge, Minnesota Mining follows the policy of assigning a single chemist to each new formula. It is this man's job to develop the formula in the laboratory, carry it through the pilot plant and experimental manufacturing stages and finally supervise its continuous production and handle any technical problems that come up. Each member of the chemical staff thus eventually acquires a number of formulas for which he is entirely responsible.

The length of run for a single batch in a mixer or churn may vary anywhere from a few to many hours, depending on the particular product being made. Some of the mixers are water-jacketed, some steam-jacketed, and some are fitted with pressure heads. All have equipment for automatically recording the temperature of the batch. For safety reasons, each mixer is housed in an individual 20 x 30-ft. brick-walled room fitted with a carbon dioxide fire extinguisher system around the walls and directly over the mixer.

As the batch nears completion, samples are drawn off and checked in the control laboratory for viscosity, this being *a* more simple test than one for solids content and just as satisfactory for practical purposes. When the batch reaches the proper viscosity it is dumped directly into 55-gal. drums or into smaller containers and is sealed and labeled ready for shipment. The final products in all cases are either solvent solutions or water dispersions, the dispersions being used principally as adhesives for fiber containers where penetration into the fiber is desired.

At its present rate of operation, the plant is shipping out material just as fast as it can make it. Production facilities are being taxed to the limit, and with new equipment unobtainable attempts are being made to increase the capacity of present equipment. One possibility being investigated is the use of compressed air to speed up dumping of the viscous product from the mixers. Another is better preparation of the raw materials by roll milling and other methods in order to cut down dissolving time in the mixers and churns. It is interesting that both of these possibilities not only hold promise of solving an immediate problem but of developing into permanent process economies as well.

Product Development

The Adhesive Division of Minnesota Mining has followed a policy of conservative expansion in its progression from adhesives into other branches of the elastomer specialties field. Its venture into the sealants stemmed naturally from its knowledge of adhesives. These in turn led into some of the problems of protective coatings, which when combined with a sizable accumulation of knowledge of the behavior of elastomers in solution, gave natural birth to a number of specialty coatings where good adhesion and protection from corrosion were the principal requirements. Insulating coatings developed as a special branch of the coating work.

Classified by uses, the major products now manufactured at the Detroit plant are:

(1) Coatings and sealants that must have resistance to motor fuels containing aromatics.

(2) Sealants for fuel storage facilities. These must be resistant to oil, water and pressure. They must be tough, flexible films not affected by high or low temperatures and have good adhesion to concrete and steel.

(3) Packaging adhesives. Much work has been done in cooperation with Forest Products Laboratory in the development of special adhesives for Army ordnance and air corps packages.

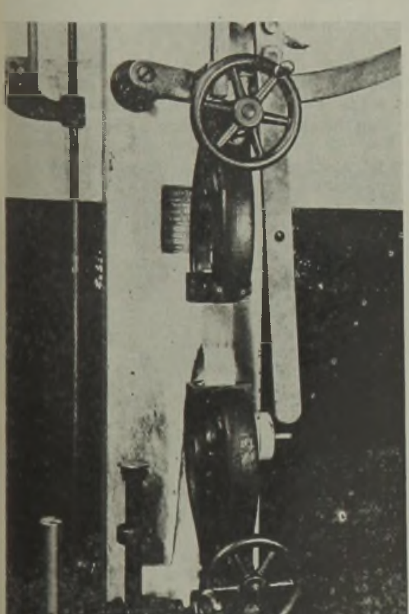
One of the company's outstanding wartime developments has been an abrasive cloth known as "Wetordry Safety Walk," and the adhesive with which it is applied, that is being used on many types of naval craft for non-skid surfacing on exposed deck areas that must be traversed by men in action. This material is an offshoot of the company's "Wetordry" sandpaper that is used for sanding of plastics and other materials under water.

Rubber Tank Linings

Another development has been neoprene adhesive linings for tanks. The first interest in these materials was as linings for metal treating vats. What was wanted was the high tensile strength and good adherence of a cured rubber without the use of an accelerator. A neoprene formulation meeting these requirements was devised that gave a very high strength rubber-to-metal bond. A recent application of this type of coating was the lining of a large bromine tower, where the requirement was a film having great elasticity and toughness. It was obtained by combining three neoprene compounds.

Although Minnesota Mining maintains 14 branch offices with a complete staff of sales engineers who handle its general line of abrasives and tape products, most of the Adhesives Division work requires the services of technically trained field engineers. These men are fully conversant with the products and manufacturing methods of the Division and it is they who serve as consultants, expediters and liaison officers on all customer problems. For the past two years field engineers and laboratory have been engaged in a constant struggle to keep ahead of a fast-changing raw materials picture and find alternates as old materials became unavailable. That they have succeeded remarkably well is evidenced by the important war job this Detroit plant is doing.

Strip back test for testing adhesion of cloth to cloth.



O. P. R. D. Reports on Balls-Tucker Alcohol Process

PROBABLE SAVINGS IN GRAIN would be canceled out by extra manpower and equipment requirements, is judgment of War Production Board in report officially tabling Balls-Tucker process.

The Balls-Tucker process for substituting wheat amylase for malt in the conversion of starchs to sugars in making wheat alcohol has been officially tabled by the War Production Board on the ground that probable malt savings would be counterbalanced by additional manpower and equipment requirements.

For those who have been following the progress of the Balls-Tucker process (Chemical Industries, July '43, p. 53; Dec. '43, p. 855) there are presented here the conclusions and recommendations of the Office of Production Research and Development's memorandum of April 12, 1944, to the Alcohol Research Advisory Group.—EDITORS.

THE Balls-Tucker process consists essentially of the treatment of wheat or granular wheat flour slurries with sodium sulfite to liberate and activate wheat amylase. With sulfite treatment and proper agitation the slurry separates into three layers consisting predominantly of a starch sludge, a supernatant liquor of wheat amylase, and a protein foam. This foam may be removed, and the supernatant liquor used in converting starches to sugars, either in the absence or presence of malt.

The process was developed by A. K. Balls and I. W. Tucker of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration. It was first announced publicly at the Peoria Wheat-Alcohol Research Conference held in February, 1943, under the auspices of the U. S. Department of Agriculture. The possibility of both saving malt and recovering protein in the industrial alcohol production program made the process of immediate interest to the War Production Board and to the Department of Agriculture.

Consequently the joint Alcohol Research Advisory Group of the Office of Production Research and Development and the Agricultural Research Administration recommended that OPRD arrange to have the process evaluated on a large scale. OPRD then arranged to have various distillers try the process on both pilot-plant and full-plant scale. Most of this work has been completed and written reports made available to OPRD. Two distillers are known to be continuing their study of the process on a commercial scale.

The following conclusions have been drawn up by OPRD on the basis of written reports of pilot plant and plant-scale experiments conducted by Merchant Distilling Corporation, Terre Haute, Indiana; Schenley Distillers Corporation, Stamping Ground, Kentucky; Century Distilling Company, Peoria, Illinois; U. S. Industrial Chemicals, Inc., Yonkers, New York and Newark, New Jersey; Hiram Walker & Sons, Inc., Peoria, Illinois; Publicker Commercial Alcohol Company, Philadelphia, Pennsylvania; and Park & Tilford Distillers, Inc., Brownsville, Pennsylvania, and Midway, Kentucky:

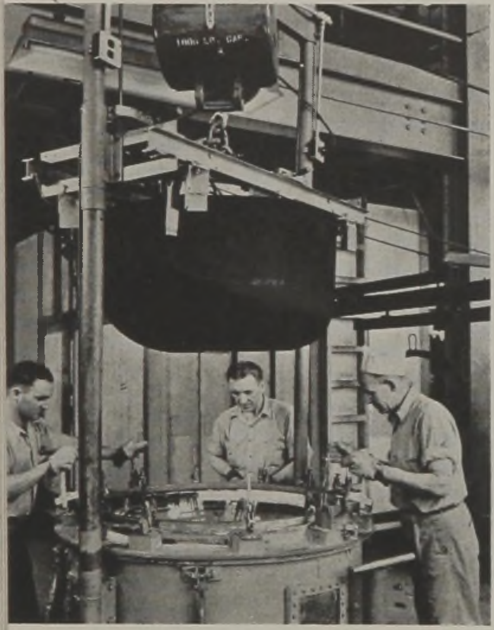
1. The enzymes of wheat and granular-wheat flour may be activated with sodium sulfite and used to replace part of the barley malt used in starch conversion.
2. The amount of malt replacement will vary with the wheat used, and therefore will require careful control of process variables for maximum efficiency.
3. Extra equipment will be required in distilleries using sodium sulfite to replace part of their malt requirements.
4. With careful control, fermentation efficiencies may be expected to equal those obtained using conventional malting procedures.
5. The quality of alcohol produced by this procedure should be comparable to that produced by the conventional procedure.
6. Protein recovery beyond 2½ pounds per bushel cannot be predicted. Since extensive washing and separation equipment and large quantities of water would be required to recover high-grade protein, an essential use other than animal feed must be found for this material to warrant this type of recovery.

Recommendations

At present, OPRD cannot recommend the general commercial use of the Balls-Tucker process throughout the alcohol industry since probable malt savings are counterbalanced by additional equipment requirements, probable additional manpower requirements, and a probable loss in alcohol production during the period of perfecting process operations.

First step in "snap-back" forming of a bomber turret: flat sheet of Plexiglas, hung by spring clips, being rolled into hot-air oven at temperature of 220-300° F.

Sheets are taken from oven after heating. Thoroughly limp and flexible, they are clamped between a Masonite die-stock ring and the top flange of the vacuum pot.



Heated plastic sheet is stretched and forced downward as a vacuum is created in the chamber.

AIR FORMING METHODS

PLASTICS HAVE COME of age during the last few years not only because of improvements in materials, but also because of improvements in methods of transforming those materials into finished products. It was only a few years ago, for example, that an 8-oz. injection molding press was a novelty; now presses of three and four times that capacity are in service and much larger ones are promised for the future.

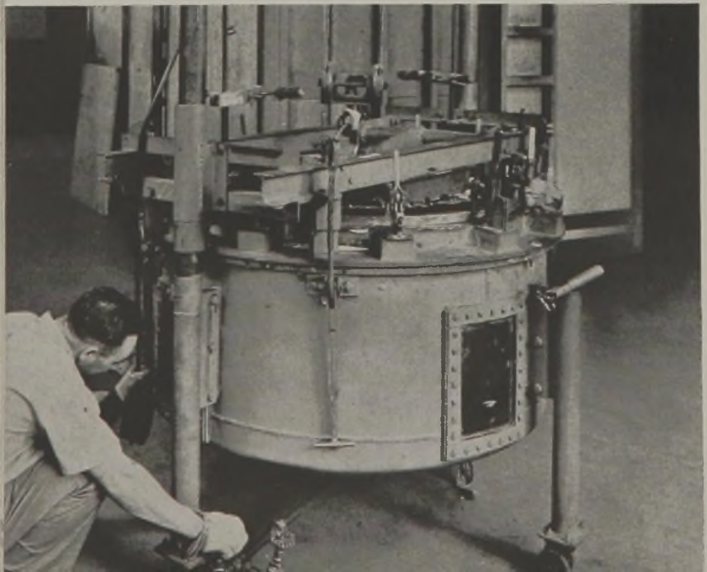
Similarly, the fabrication of plastic sheets was in the trinket stage not so long ago. Now large aircraft parts, meeting high optical as well as mechanical standards, are in mass production.

One major step forward has been the use of air pressure differentials in the forming of three-dimensional sections from flat sheet. These methods developed by the Rohm & Haas Company have been the key to successful fabrication of thousands of Plexiglas turrets, astradomes a[nd] other aircraft parts.

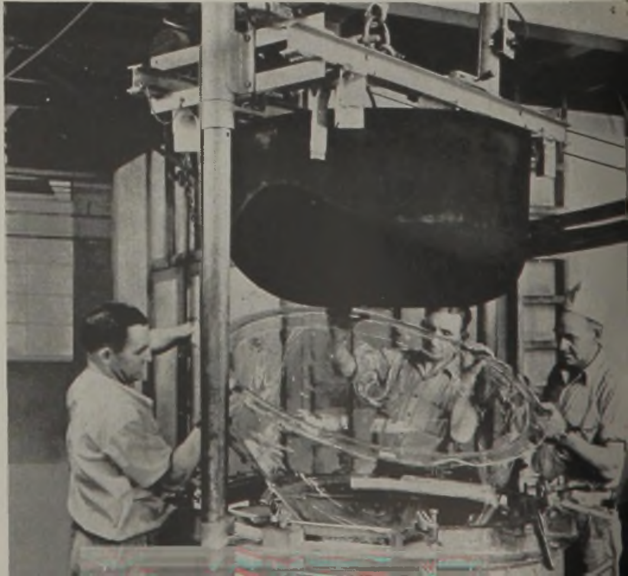
At the beginning of World War II t[he] standard procedure for forming lar[ge] three-dimensional methacrylate sectio[ns] consisted of heating to 220–300°F. Th[en] a ring of men, sometimes as many [as] twelve, stretched the sheet over a for[m]. Naturally this was a costly and inefficie[nt] system, and led to considerable waste [of] manpower, material and time. The u[se] of several other methods of fabricati[on] also proved unsatisfactory and then t[he] idea of air-pressure differentials was d[e]veloped.

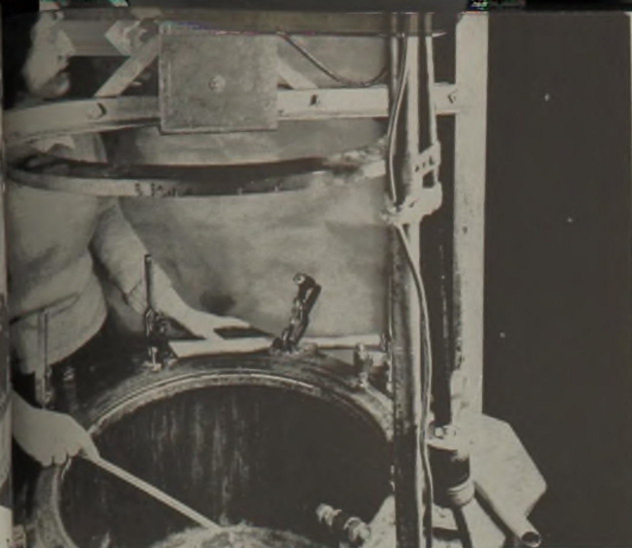
When forming is done by this meth[od] all the objections of the other processes a[re] answered. Time and particularly ma[n]power are cut. Stretching the sheet [is] far more uniform than a ring of men c[an] usually obtain. Most important, conta[ct] between the Plexiglas and the form

With soft sheet drawn to sufficient depth, turret-shaped form is lowered into vacuum pot. Operator releases vacuum, permitting sheet to "snap-back" slowly around the form.

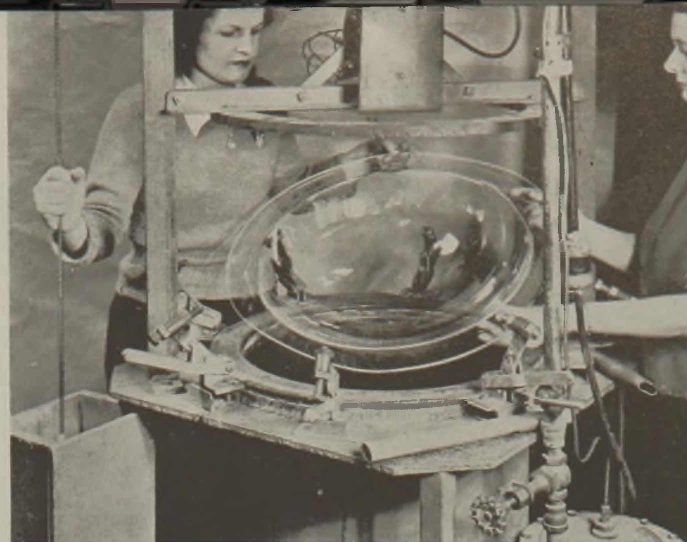


The formed turret is removed from the pot. The form is made with a slight draft or clearance so that it can be lifted from inside the Plexiglas.





Forming astradomes for bombers is done in vacuum chambers. Operator points to the contact pin, which shuts off the valve when the sheet has been drawn to the proper depth.



The soft, flexible sheet is stretched across the vacuum pot. At this point the Plexiglas acts and feels like a sheet of gum-rubber.

SPEED PLASTICS FABRICATION

ither entirely eliminated or markedly reluced and optical distortion of the surace is therefore at a minimum.

An excellent case in point is the fabriation of Army and Navy navigator's istradomes. These are shallow spherical ections about six inches deep and twentywo inches in diameter. For these pieces, nd, in fact, for most air-forming, vacuumorming is preferred to pressure blowing, irst because of the safety factor, and second to avoid the danger of stray drafts of cool air hardening the sheet unequally luring forming.

Plexiglas sheets are heated in an oven o approximately 250°F. The soft sheet s removed and quickly laid over the top of a vacuum pot. A ring of Masonite dietock is lowered to clamp the edges of the heet, and the vacuum valve is opened. As the sheet is drawn to the required six nch depth, it touches a contact point which automatically shuts the vacuum valve. If, in cooling, the sheet tends to draw away from the contact point, the vacuum valve is again opened.

Where the desired part varies quite radically from a true surface tension shape, it is often possible to form the part by the so-called snap-back method. This method is based on the tendency of heated Plexiglas to return to its original flat sheet form, a tendency known as "elastic or plastic memory."

Snap-back forming is a variant of vacuum-forming and is also done in a vacuum pot. After the heated sheet is drawn into the pot, a wood or plaster make form, which reproduces the inside contour of the desired part, is lowered into the bubble formed by the Plexiglas sheet. Since the Plexiglas sheet is still hot, it still will have a tendency to resume its flat sheet form. Therefore, as the vacuum is gradually released, the Plexiglas "snaps back" slowly against the form. This stage of the operation requires care to reduce to a minimum any movement of the soft Plexiglas sheet relative to the form.

Here again the work of forming is done by air. Instead of being stretched across the form, the Plexiglas is stretched before it comes in contact with the form. The form is, of course, constructed with sufficient draft to permit easy removal of the piece.

Since these methods have been in use in the Rohm & Haas plant, their possibilities in the manufacture of aircraft sections have been thoroughly explored. However, in forming other Plexiglas parts, ranging from light shields to business machine housings and bottles to decorative globes they should prove even more useful.

After heated sheet is clamped across pot, the valve is opened and the sheet drawn to the proper depth. A fan in the hold-down ring speeds cooling.

After cooling, the finished astradome is removed from the vacuum pot. It is then carefully inspected for optical and other properties before it is packed and shipped.

PLANT OPERATION

Accident Analysis In Wartime Chemical Plants

by CAPTAIN G. C. WHALEN, Chief, Safety Section
Plant Protection & Safety Department, Chemical Warfare Service, Washington

WAR CONDITIONS HAVE ADDED to the problems of safety in chemical plants, but they are also teaching new and valuable lessons in industrial accident prevention.

IN THIS WAR as in the first World War, the chemical industry has been called upon to supply hazardous materials for which new plants had to be designed, chemicals for which there was little if any peacetime need and about which information was extremely limited. It has been difficult and is rapidly becoming more difficult to secure necessary equipment, raw materials, supplies and technical manpower. New and improved munitions and fighting equipment are continually coming off the drafting boards. Often this has made it necessary to cancel contracts in the middle of the stream, and nothing is more completely confusing to the plant operator than such an unfortunate event.

The quality of workmen in chemical plants has been a major problem for which conscription has been only partly responsible. Many chemical plants are, at best, disagreeable places in which to work, and today workmen can, within reason, write their own tickets; hence, chemical plants must frequently offer special inducements to attract labor. In addition to these special aches and pains the chemical industry has all the complex problems of other industries.

New commercial chemical processes usually require several years from the laboratory to production. But wars and Commanding Generals will not wait for trials, pilot plants or elaborate experiments. If the Commanding General in a theater of operation wants a more sensitive starter on incendiary bombs, a more effective screening smoke, or a flame thrower that will work effectively from a jeep, he cables his desire and expects to get delivery in the shortest possible time. Experts on the staff of the Chief of the Chemical Warfare Service and those from industry go into a huddle. A paper formula or design results. A manufacturing directive is sent to Chemical Warfare Service Arsenals, and chemical plants all over the country bid for a contract. Contracts are let; then, as in caustic plants, everything goes badly for a while; then all of a sudden it gets a lot worse. But the General gets the goods and gets them on time.

Tendency to Relax

During such a blitz, plant safety is an easy item for management to forget. The relaxed effort is not immediately apparent; hence, it is little wonder that matters of safety are occasionally asked to wait until the pressure is off. Frequency and severity rates for private chemical plants assigned to Chemical Warfare Service for continuing protection indicate that there has been little or no compromise with safety during this emergency, but this is largely because the products most inimical to safety are manufactured in the arsenals.

The Chemical Warfare Service has safety responsibility for all plants manufacturing toxic, irritating, or incendiary products manufactured for the War or Navy Departments. This includes many chemical plants of all sizes and types. They all have one common aim—to produce with the smallest number of industrial injuries.

In January of 1943, private plants assigned to Chemical Warfare Service for continuing protection developed a frequency rate of 23.6 and a severity rate of 3.48. The safety section of Chemical Warfare Service was started under a War Department directive in November of 1942. January was the first month that the program really got under way. Men who were well informed in plant protection had to be trained in safety. In February of 1943, the frequency rate came down three points to 20.7 and severity was reduced from 3.25 to .32. By June the frequency rate was down to 18.9 and severity, after fluttering around a bit, landed at 2.7. For the six months' period from January through June, the rates were: frequency 20.9 and severity 1.62.

Processing Hazardous Materials

These suffer by comparison with the chemical industry rate, as published in "Accident Facts", of 9.90 and 1.29 respectively. But in comparing these rates, it must be remembered that the plants assigned to Chemical Warfare Service are all of the heavy chemical group, that they are processing extremely hazardous materials, many of which are not used commercially. For example, a few weeks ago, in the mixing of a compound used for screening troop movements, eight men were killed. There had been thousands of tons of the same material mixed before with the same equipment and by the same men. One change had been made: instead of shipment being made in paper bags, it was ordered in metal drums. I can hear the word "static." Perhaps that is right, but it is far from all.

All the ingredients that go into the smoke mix have high ignition temperatures. They had all been tested and met specifications. There was no evidence of dust before or after the catastrophe. The room was air-conditioned, and relative humidity was controlled between 50° and 60°.

In the investigation following the accident it was found that one of the ingredients was releasing acetylene and some free hydrogen when exposed to the moisture in the air, there being small quantities of carbide as an impurity in this component. There were no workers to question, since the eight persons present perished at the time of the blast or shortly thereafter. It was discovered, however, that for some reason the mix was heating. This discovery was made in questioning various plant employees. A guard had observed one of the workers from this room out on the loading platform. He said that he had gone out to cool off. The air conditioning should have made such action unnecessary since it should have been much cooler inside than out. One of the compounds going into this mix had been secured from a new supplier and may have had the properties that would cause heat which would accelerate the formation of acetylene and hydrogen. Tests are being run on this possibility.

It was soon recognized that the definite reason for the blast might never be fully known. As in most fires and explosions, this blast destroyed most of its own evidence. Therefore, a mix which was considered comparatively harmless is now being prepared in the same manner as a high explosive, in small batches by remote control and in barricaded cubicles. This method is being extended to all plants making the same or similar products.

Repetitions Prevented

Another disaster occurred in a plant mixing a similar compound when a recirculating air-conditioning system, moving 12,000 cubic feet of air per minute, picked up smoke generated by the slowly burning mix in the mixer and carried it in great quantities into an assembly room where approximately thirty-five persons were working. The assembly room was approximately 40′ x 60′ and equipped with four double exit doors equipped with panic bolts, yet the smoke became so dense in so short a period of time that several workers could not find the doors; this resulted in two deaths from suffocation and several minor injuries. One woman worker broke a window and crawled through it with an open door little more than three feet from the window. Several persons were injured when panic prompted them to climb a man-proof fence two hundred feet from the plant.

The indicated action to prevent a recurrence of this type of accident was clear. Two avenues were open: either install an automatic smoke and fume detector in the air-conditioning system, which would shut off the air conditioning and exhaust all lines to outdoors; or move the mixing operation to a separate building and mix it by remote control in small cubicles and in small batches.

It is believed that no further hazard exists from these sources, but this is finding the hazard the hard way. More time in the test tube stage should eliminate most of the hazards in chemical plants that have caused injuries and deaths since the war began, but this is war and while we cannot retrieve the spilled milk or put Humpty Dumpty together again, by close analysis and exchange of information, repetitions can be and are being prevented.

Industry Generally Cooperative

Private plants contracting for war products under the Technical Services, such as ordnance and Chemical Warfare, are manufacturing under the Walsh-Healey Act and are, therefore, subject to cancellation of contract or work stoppage if they do not maintain a safe work place. There have been only two occasions of contract cancellation and three of work stoppage by Chemical Warfare Service, and none of these cases were in strictly chemical plants. The chemical industry generally has been extremely cooperative, and frequency and severity rates quoted are considered to be very good.

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"The fact that the total loss of production time through injuries increased again last year is cause for real concern, and prompts me to express my sincere hope that management and labor will join wholeheartedly in responding to your appeal for a 40 per cent reduction in the accident toll over the next twelve months."—President Roosevelt to the Secretary of Labor, May 25, 1944.

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On the other hand, our inspectors have reported many strange conditions in plants where better practice is known, and a check of the frequency and severity rates for these plants bore out the inspectors' contention that the interest in safety was more apparent than real. We have found plants with more than 1000 employees who kept no injury record except first aid station record, which did not indicate where the injury occurred or any information concerning it except clinical record. Yet this plant employed a full-time safety director and went through all the motions of a complete, wide-awake, safety-conscious outfit.

Another plant, one of the oldest in its field, experimented with a grinding process that built up what was described as slight pressure in a 10-lb. ball mill. Without anything but rule-of-thumb estimates, they went into a 500-lb. mill; result—complete loss of that part of the plant, one death and five very serious injuries.

No plant is perfect, and recommendations are in order everywhere, but these recommendations must be tempered by the inspector's knowledge of the availability of equipment and manpower to make the recommended changes. However, it has been clearly demonstrated that neither safety consciousness nor plain common sense can be taken for granted even in the largest plants.

Difficulty of Setting Up Programs

In addition to the private contractors, Chemical Warfare Service has four manufacturing arsenals. All but one of these are operating where nothing but trees and grass grew before Pearl Harbor. This in itself was a tremendous engineering feat. It is impossible to visualize the miracle that has been wrought without seeing these establishments. These arsenals manufacture all the war gases, and also load them into many types and calibers of shells and bombs. They do all the research and developing of new chemical products. These arsenals produce an amazing quantity and variety of products that are unknown commercially, with very few serious injuries.

However, the frequency of injuries has been quite high. Collectively for the first six months of 1943 four arsenals have had a frequency rate of 54.35 and a severity rate of 2.0. It actually took six months to determine the causes of injuries on which to base an accident prevention program. That program is now in execution and it is expected rates will be cut 50 per cent before 1943 is over. The arsenals producing the greatest number of man hours have turned in frequency rates of 8.5 and 11.6 for the past two months and severity rates for the same period of 0.04 and 0.1. This shows excellent progress and indicates what can be done.

Postwar Profit

The spirit of competition, plant safety, recognition of hazards and lots of respect for the hazardous products will, it is felt, overcome the insidious conditions imposed by war. The chemical industry will profit greatly by the experiences these arsenals and the chemical plants themselves are having. New products are being developed, many of which are hazardous and create a hazardous atmosphere in which to work. The plant that eliminates these hazards will also eliminate most of the objectionable working conditions and, as a result, will attract the better-class worker. This worker will turn out the best product, and management will find that the time and money which have been used for safety developments will pay unexpected dividends when the war is over.

Manufacture of ARRHENAL and SODIUM CACODYLATE

by ANDREW TREFFLER, Detroit, Michigan

BASED ON GERMAN PROCEDURES, the commercial synthesis of these arsenic drugs involves techniques acquired largely through experience.

IN THE treatment of skin diseases, anemia, leukemia, malaria, tuberculosis, and certain other ailments, inorganic compounds of arsenic, such as sodium arsenate, have proven to be too toxic for safe use on the human body, and organo-arsenic compounds have replaced them in most instances. A methyl group linked to arsenic buffers its poisonous action and increases the absorption by organic compounds. Arsenates with one or two methyl groups are less poisonous but still very efficient.

Both arrhenal (sodium methyl arsenate) and sodium cacodylate (sodium dimethyl arsenate) are used widely in Europe and South America, but in the United States the cacodylates are used almost exclusively, and in fact arrhenal is not even listed in the U. S. Pharmacopoeia. Arrhenal is administered in the same quantity and in the same manner as sodium cacodylate, although it does not impart the same disagreeable odor to the perspiration and its synthesis is somewhat simpler. The syntheses of both products are, however, not without difficulties.

Synthesis of Arrhenal

Sodium methyl arsenate, also known as disodium monomethyl arsenate, arrhenal or arsinyl ($Na_2CH_3AsO_3 \cdot 6H_2O$), has a molecular weight of 292.08. It is a white crystalline powder, soluble in water and slightly soluble in alcohol. It was prepared originally by the reaction of methyl iodide on As_2O_3 dissolved in NaOH as outlined in Liebig's Annalen 249, 149/1888:

Sixteen grams of sublimed and water-washed As_2O_3, 19.4 gms. NaOH, and 10.3 gms. CH_3I ($As_2O_3 + 6NaOH + 2CH_3I$) are dissolved in 190 cc. water and 150 cc. absolute alcohol. The quantities of water and alcohol are proportioned so that the salt as well as the methyl iodide stays just in solution. The solution is covered and left standing. After 12 hours a copious crystallization, with well formed, clear crystals, takes place. After three or four days the crystals are separated, washed with 50 percent alcohol until the filtrate, tested with $AgNO_3$. does not form any more AgI. The yield is 14-24 gms. The crystals dissolve very easily in water.

Evaporation with phenolphthalein alkaline reacting solution of the sodium salt gives thin, long, colorless crystals in the form of needles. Addition of alcohol to the solution precipitates the salt as very fine crystals. By adding $CaCl_2$ solution to the dissolved sodium salt and heating to 100°C., a heavy crystalline precipitate of $As(CH_3)OCa \cdot H_2O$ separates out.

The method was improved later according to a report from *Chemisches Zentralblatt* 1913/2/276, as follows:

In a flask provided with a glass stopper are dissolved 99 gms. As_2O_3 in 250 cc. water containing somewhat more than 3 mols NaOH. After cooling, 50 cc. CH_3OH and 145 gms. CH_3I are added and the mixture shaken at least 24 hours, with occasional cooling. When the reaction is finished, the filtered precipitate is dissolved in the minimum amount of boiling water required for complete solution. The arrhenal is precipitated by gradually adding three times the volume of 90% alcohol. The precipitate, which still contains some NaI and arsenite, is dissolved again in a minimum of cold water. An excess of $Ba(OH)_2$ is added and the solution left undisturbed for 24 hours, then filtered and the filtrate brought to a boil. The excess of $Ba(OH)_2$ is precipitated by CO_2 and filtered again after cooling. The new filtrate is concentrated until a film forms on the top, and the arrhenal is precipitated by adding three times the volume of 90% alcohol. The yield by this process is claimed to be at least 95%. The pure product contains six molecules of water of crystallization.

The discovery of a new reaction simplified the method again. It was found that arrhenal is formed by the reaction of dimethyl sulfate on a solution of sodium arsenite, which can be expressed as follows:

$$Na_3AsO_3 + (CH_3)_2SO_4 \longrightarrow CH_3AsO(ONa)_2 + NaCH_3SO_4$$

The reaction is exothermic and takes place at a temperature between 10 and 20° C. When it reaches 20° C., cooling becomes necessary.

The method is outlined in a German patent letter of October 9, 1924, as follows:

Add 19.8 parts As_2O_3 to sufficient 30% NaOH solution to complete the reaction to trisodium arsenite. To this is added slowly and with agitation 25.2 parts dimethyl sulfate. Agitation is continued until the dimethyl sulfate has completely disappeared. Cooling crystallizes out a part of the arrhenal and it can be separated by pressing and washing with a little water, or by centrifuging. The rest is obtained from the solution, which also contains the sodium methyl sulfate, by heating with $CaCl_2$ to form the slightly soluble calcium salt. This can be transformed into the sodium salt by heating with Na_2CO_3.

The writer himself produced C. P. arrhenal in the following manner:

Technical NaOH, 56.1 parts, and U. S. P. As_2O_3, 45.3 parts, are dissolved in 128 parts water. The cooled solution is placed in an enamel or stainless steel container and covered with two glass plates notched in the centers of the adjoining edges to admit a stirrer shaft. Sixty parts dimethyl sulfate are added slowly to the solution while stirring. The beginning of the reaction is indicated by a rise in temperature. Control of temperature by a cooling device is necessary in order to prevent the inclusion of foreign matter by too rapid crystallization. As soon as the temperature ceases to rise the reaction is complete. The solution, filled about one-third with arrhenal crystals, is cooled to about 150° C. and just enough water added to dissolve all the crystals. A small additional amount of dimethyl sulfate is now added to react with the sodium arsenite which has been occluded in the crystals. The end of the reaction is ascertained by the following test:

Take 25 cc. of the solution and add it to three times the volume of methyl or ethyl alcohol. Filter and wash the resulting crystals several times with alcohol. Upon dissolving about ½ gm. of these crystals in distilled water and adding $AgNO_3$ solution, the precipitate obtained shall be pure white and not yellow, as in the presence of arsenite, phosphates, carbonates and other impurities.

As soon as this test gives an almost white precipitate, the other impurities—phosphates and carbonates — generally present in smaller amounts, have to be removed by adding $Ba(OH)_2$ solution while stirring until the nitrate gives no further precipitate or cloudiness with $Ba(OH)_2$. At this stage the $AgNO_3$ test shall give a whiter precipitate than before; otherwise, more dimethyl sulfate should be stirred in. As soon as both tests give satisfactory results the solution is filtered through a small filter press or a filter bag, made from heavy material, and run into three times the volume of methyl or ethyl alcohol. Crystallization takes place almost immediately—in ethyl alcohol rapidly and with formation of small crystals; in methyl alcohol somewhat slower but with formation of large crystals.

Twelve hours later the crystals are filtered by suction and washed with alcohol until the sodium methyl sulfate has been removed completely. They are then dried for one or two days upon a cloth stretched over a frame. As arrhenal solutions are often injected into the blood stream they have to be free from lint, and great care has to be taken therefore in selecting the right kind of drying cloth. Yield is about 60% of theoretical, the losses being due to the slight solubility of arrhenal in alcohol.

As the raw materials used for this process are inexpensive, and as the alcohol can be redistilled and concentrated again, this method seems to be the most economical so far. Purity tests for arrhenal are given in the French Pharmacopoeia of 1908.

In the treatment of leukemia, undernourishment and constitutional weakness, the sodium salt is eliminated from the system faster than desired and a less soluble salt such as the acid Ca salt with the formula $Ca(AsO_2CH_3OH)_2$ may be used with better results. It is obtained by reacting two mols methylarsinic acid $CH_3AsO(OH)_2$ and 1 mol $CaCO_3$.

The methylarsinic acid can be prepared from the neutral Ca salt $CH_3AsO_3CaH_2O$. It crystallizes from the absolute alcohol in long spearlike plates, does not decompose in dry air, and is very easily soluble in water and alcohol—even more so than cacodylic acid. It is a strong acid, decomposes carbonates, and has a pleasant acid odor.

Throughout the synthesis of sodium methyl arsenate, great care must be taken in handling dimethyl sulfate, and the fumes released during the reaction must be avoided because of their toxicity.

Preparation of Sodium Cacodylate

Sodium cacodylate, or sodium dimethyl arsenate, $Na(CH_3)_2AsO_2 \cdot 3H_2O$, has a molecular weight of 214.0, melts at about 60° C., and becomes anhydrous at 120° C. One gram dissolves in 0.5 cc. water, 2.5 cc. alcohol. It is available commercially as white odorless crystals or as granular powder. It is prepared from cacodylic acid.

Cacodylic acid manufacture has not changed much and is still based on the same reaction as used 50 years ago. Four molecular parts of sodium or potassium acetate are intimately mixed with 1 molecular part of finely powdered arsenic trioxide in a vessel equipped for dry distillation to the melting point of the acetate. The following reaction takes place:

$$4\ CH_3COOK + As_2O_3 \longrightarrow (CH_3)_2AsOAs(CH_3)_2 + 2CO_2 + 2\ K_2CO_3$$

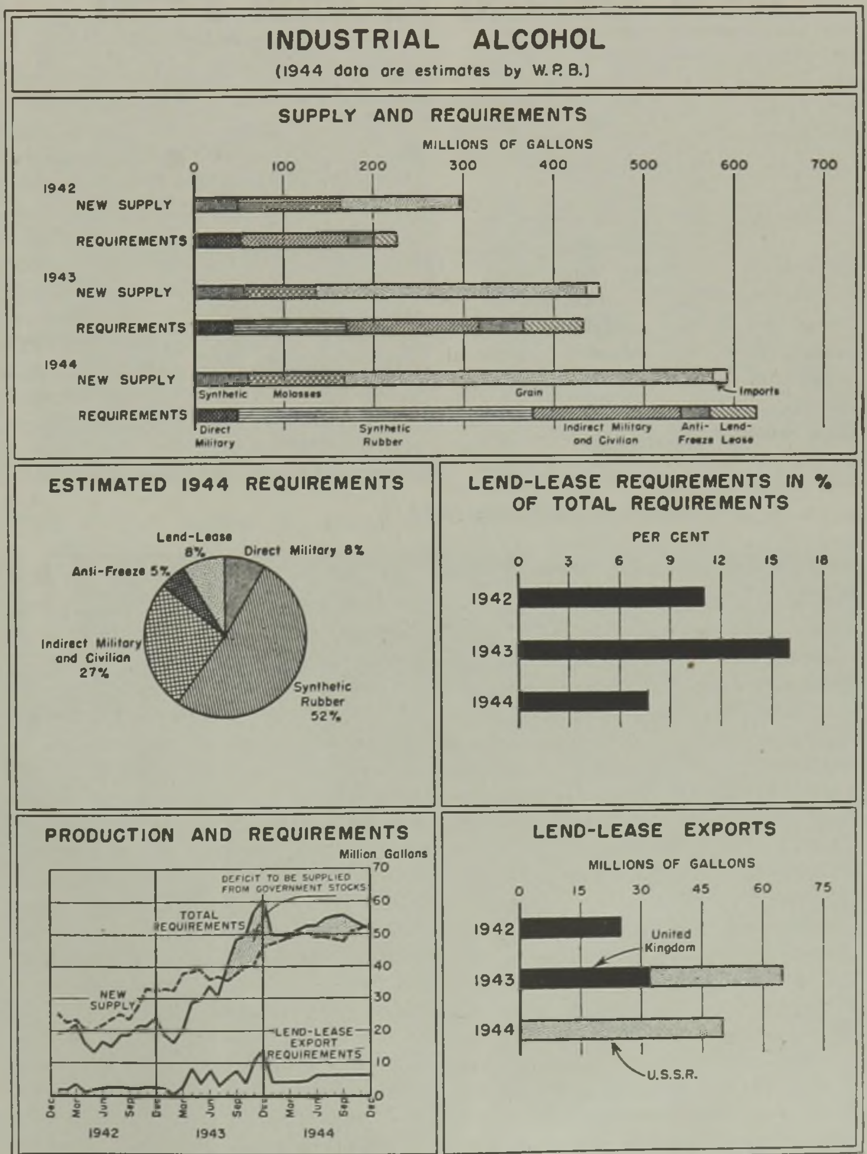
The cacodyl oxide is oxidized slowly in the air or with HgO to cacodylic acid:

$$(CH_3)_2AsOAs(CH_3)_2 + 2\ HgO + H_2O \longrightarrow 2(CH_3)_2AsOOH + 2Hg$$

The reaction is exothermic, and as quite a bit of heat is developed the oxidation with HgO is carried out under water gradually as the cacodyl oxide is distilled over. The solution separated from the mercury is evaporated and the impure cacodylic acid so obtained is recrystallized from alcohol. The purified crystals are colorless and odorless, with a melting point of 200° C. and good solubility in water. The acid is monobasic and much less poisonous than the inorganic arsenic compounds. The yield of cacodylic acid can be increased if the As_2O_3 powder is first pulverized and better distributed in the mixture and if overheating of the molten mixture is avoided. Overheating can be avoided by keeping the reaction vessel in a molten lead bath. Cacodylic acid has been used in the treatment of tuberculosis, anemia, malaria, chronic bronchitis, and other diseases, although it has now been largely replaced by the sodium and iron salts.

The sodium salt can be prepared easily by adding the calculated amount of NaOH to the acid in aqueous or alcoholic solution and crystallizing by evaporation.

The iron salt $[(CH_3)_2AsO_2]_3Fe$ is more valuable than the sodium salt, as iron itself is valuable in the treatment of anemia, blood diseases, and run-down conditions and is not poisonous. The salt is an amorphous, brown-red powder and is prepared by the reaction of the barium salt with $Fe_2(SO_4)_3$.



FOREIGN ECONOMIC ADMINISTRATION

General view of the Omaha alcohol plant.

New Omaha Alcohol Plant

ANOTHER NEW ALCOHOL PLANT has come into operation recently to help meet the tremendous wartime needs for this basic and versatile chemical raw material.

This latest unit to be added to the nation's industrial alcohol productive capacity is located in Omaha, Nebraska. It was built and is being operated by the Farm Crops Processing Corporation for the Defense Plant Corporation. This is one of the largest of several grain alcohol plants which were planned by the War Production Board back in 1941 when it became apparent that greatly increased supplies of ethyl alcohol would be required for the war production program.

Work was started on the plant in May 1943 and was completed about nine months later and since then it has been put into operation and is building up its operating rate. When it reaches capacity production it will require 20,000 bushels a day or 6,500,000 bushels a year of grain (corn and wheat) to produce 50,000 gallons of 190 proof alcohol a day or 17,500,000 gallons per year. The plant is also designed and equipped to recover 126,000,000 lbs. of high protein livestock feed each year.

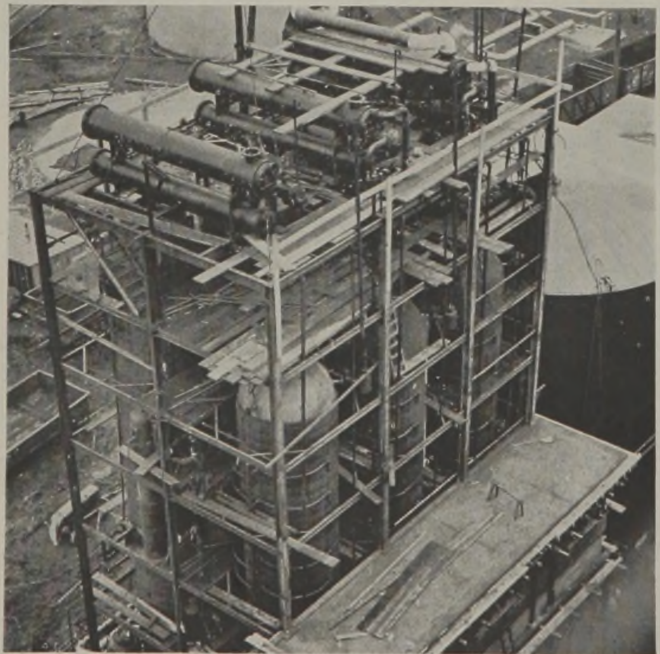
A number of obstacles such as location of plant and procurement of facilities and equipment were met by the Farm Crops Processing Corporation. The matter of plant site was solved by taking over and rebuilding a power plant in Omaha which was formerly used by the Omaha & Council Bluffs Street Railway Company. The matter of hard-to-get supplies was licked by employing used and salvaged equipment and materials of construction to the tune of 80 per cent. The remaining 20 per cent of the required supplies was obtained on a priority basis. One of the officials of the company, in remarking on this achievement with salvaged materials, claims that the plant is about 90 per cent equivalent to one built entirely with new materials.

When the grain arrives at the plant it is first thoroughly cleaned of dirt, chaff and other extraneous matter and then given a uniform coarse grind. It is next subjected to high pressure and temperature and released to flash chambers to explode the starch granules. These starch granules are then put into a large vat to which water and barley malt are added. Here the diastase in the malt converts the starch to fermentable sugars. The yeast culture which is specially prepared as a sidestep in the plant is then added to innoculate the mass and effect the fermentation or conversion to alcohol.

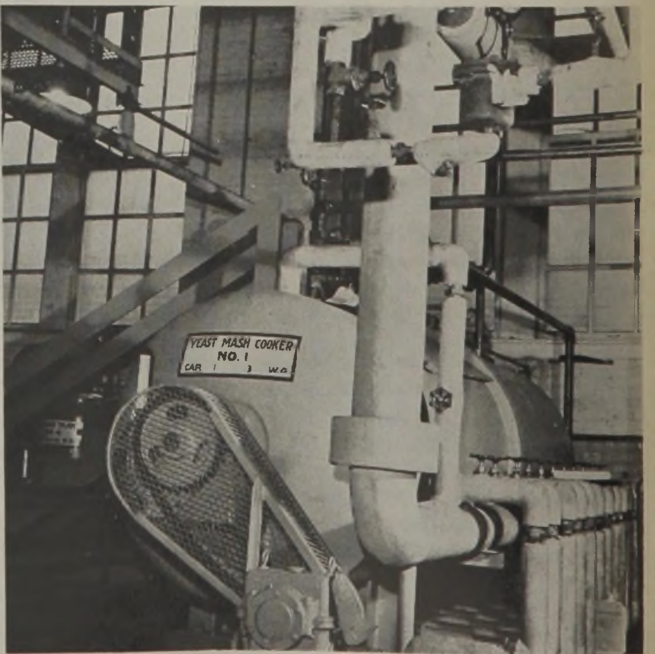
When the fermentation step is completed the eight per cent beer is sent to the stills where the alcohol is concentrated to 190 proof.

This new plant, when it reaches capacity, will play an important role in the effort to achieve an alcohol output of more than 600,000,000 gallons in 1944.

Distillation equipment being installed.



Yeast culture is prepared in cooker.



HEADLINERS in the NEWS

DR. LAWRENCE W. BASS has been appointed Associate Director of Chemical Research, to serve in this capacity jointly for Air Reduction Co., Inc., and U. S. Industrial Chemicals, Inc.

J. E. UNDERWOOD, formerly with the Office of Production, Research and Development, has been appointed director of research of Diamond Alkali Co.

DR. C. L. KNOWLES, formerly with the Dorr Co., has been appointed Technical Director of General Process Equipment.

DR. PAUL B. DUNBAR has recently been appointed Commissioner of Food and Drugs for the Food and Drug Administration.

DR. H. J. ROSE, formerly of Mellon Institute, has been elected vice-president and director of research of Bituminous Coal Research, Inc.

R. W. McCLELLAN has been appointed special assistant to F. A. Wardenburg, general manager of the duPont Company Ammonia Dept. He was director of sales of the dept.

DR. E. D. RIES has been appointed director of sales of the duPont Company Ammonia Dept. He was formerly sales manager for solvents and miscellaneous products.

DR. KLARE S. MARKLEY, Southern Regional Research Laboratory, was elected president of the American Oil Chemists' Society at the 35th annual convention of the society.

M C A Meets in New York

The annual meeting of the Manufacturing Chemists' Association took place in New York on June 1. The afternoon session heard a report from Harry L. Derby, president, on the affairs of the association and the contribution of the chemical industry in the war effort. Matthew Woll, American Federation of Labor, and J. Anton de Haas of Harvard also spoke on postwar export trade. The Union Dinner, held jointly with the Synthetic Organic Chemical Manufacturers' Association, heard Thomas H. Beck of Crowell-Collier Publishing Co., shown at right with Lammot duPont, chairman of executive committee of MCA, speak on postwar export trade.

Above, left to right: Harry L. Derby, president of American Cyanamid & Chemical Corp. and president of MCA; Gene Flack, Loose-Wiles Biscuit Co., toastmaster at the Union Dinner; August Merz, president of Synthetic Organic Chemical Manufacturers' Assoc.; Com. Donald J. MacDonald; H. O. C. Ingraham, president of General Chemical Co. and chairman of MCA Program Committee; William B. Bell, president, American Cyanamid Co.; George W. Merck, president, Merck & Co.; and Col. Harry A. Kuhn, Chemical Warfare Service.

E. H. Killheffer, duPont; D. P. Morgan, chief, Chemicals Division, War Production Board; Lt. Col. W. F. Sterling, Army Service Forces; C. F. Hosford, Jr., Pennsylvania Coal Products Co.; Capt. M. A. Sawyer, Navy Dept., Bureau of Ordnance; Charles S. Munson, president, Air Reduction; and H. F. Atherton, president, Allied Chemical & Dye Corp.

L. T. Beale, president, Pennsylvania Salt Manufacturing Co.; Lt. Com. C. H. Brooks, U. S. Navy, Bureau of Ordnance; Henry Howard, retired, formerly with General Chemical Co.; Lt. Com. R. B. Colgate, Army-Navy Munitions Board; August Kochs, president, Victor Chemical Works; Charles P. Gulick, president National Oil Products; H. W. Elkinton, Philadelphia Quartz Co.; B. R. Armour, president, Heyden Chemical Corp. and W. B. Thom, president, Westvaco Chlorine Products Corp.

A I Ch E Meets in Cleveland

The American Institute of Chemical Engineers met in Cleveland on May 14, 15 and 16 for its Thirty-Sixth Semi-Annual meeting. Discussions centered on the industry's wartime and post war problems. Eighteen technical papers were given covering, among other things, manufacture of vitamins, penicillin, heat transfer, solvent extraction, new process using chlorine dioxide, distillation, and diffusion. At the right Professor Olaf A. Hougen, University of Wisconsin, receives the William H. Walker Award from T. H. Chilton of duPont.

Above, left to right: J. C. Olsen, Polytechnic Institute of Brooklyn; T. H. Chilton, E. I. duPont de Nemours & Co., Inc.; Martin H. Ittner, Colgate-Palmolive-Peet Co.; Alfred H. White, University of Michigan; Dr. Wm. E. Wickenden, president, Case School of Applied Science, who addressed annual dinner on "Postwar Goals in Engineering Education"; G. G. Brown, president of Institute; J. V. N. Dorr, Dorr Co., and A. E. Marshall, president of the Rumford Chemical Works.

Stephen L. Tyler, secretary of AIChE; James L. Bennett, Hercules Powder Co.; Francis C. Frary, Aluminum Co. of Amer.; Olaf C. Hougen; Sidney D. Kirkpatrick, editor of Chemical & Metallurgical Engineering; C. F. Prutton, chairman of the meeting; and L. W. Bass, vice-president of AIChE; were among the members at the speakers table at dinner meeting.

N. C. Winslow, Calco; E. R. Woodward, Mathieson Alkali Works, presented paper on process for producing chlorine dioxide; E. D. Unger, Joseph E. Seagram & Sons, Inc., presented paper on cooking and mashing of cereal grains; J. W. McCousland, Universal Oil Products Co., co-author of paper, "Butane Dehydrogenation"; J. M. Mavity, Universal Oil Products Co., co-author of paper on catalytic production of isoprene; M. C. Molstad, University of Pennsylvania; and John J. Grebe, Dow Chemical Co.

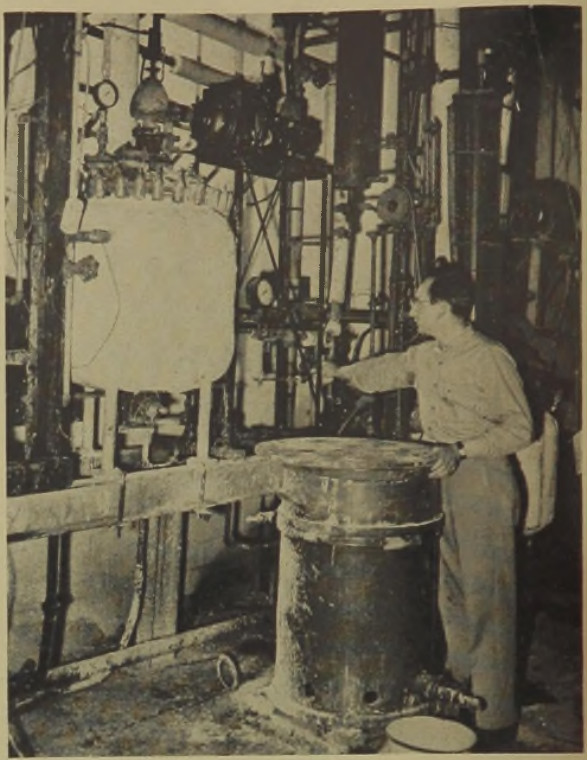
Monsanto Announces New Thermoplastic

A new thermoplastic, the first ever developed that can hold its shape and strength in boiling water and yet can be molded by the fastest, most economical methods, was announced recently by Monsanto Chemical Company. Known as Cerex, the new plastic opens up an entirely new field of industrial and household applications by virtue of its ability to withstand sterilization.

Produced for some time on an experimental basis by Monsanto, the new plastic has already found wide use in war work, particularly Radar, radio and other military electronic equipment where substances of light-weight, suitable electrical and great heat-resistant properties are in demand. It is also in demand for surgical instruments, aircraft instruments and many other war applications. The entire production is now going to war work. After the war, Mr. Belknap, president of Monsanto, said an equally wide range of civilian applications is possible wherever high heat-resistant qualities are in demand such as dishes and utensils which are subject to boiling water.

Dr. Charles Allen Thomas, director of Monsanto Central Research Laboratories, describes Cerex as "a thermoplastic, readily moldable in standard molding machines, and combining high resistance to heat with resistance to strong, corrosive chemicals, excellent electrical insulating properties, and high rigidity and strength."

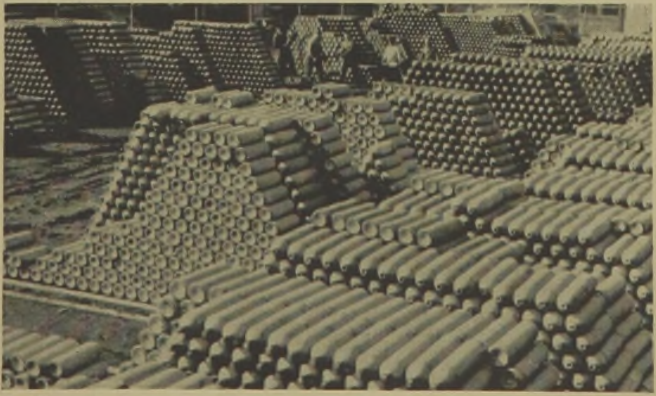
The acid and alkali resistance of Cerex at elevated temperatures is believed by Monsanto to be superior to any other thermoplastic. Cerex has been subjected to boiling sulfuric acid solution without effect. In a series of prolonged tests, parts molded of Cerex withstand conditions that corroded enameled steel and attacked the surface of aluminum.



One stage in the joining of organic molecules to make complex synthetic plastic, Cerex, is reaction unit.

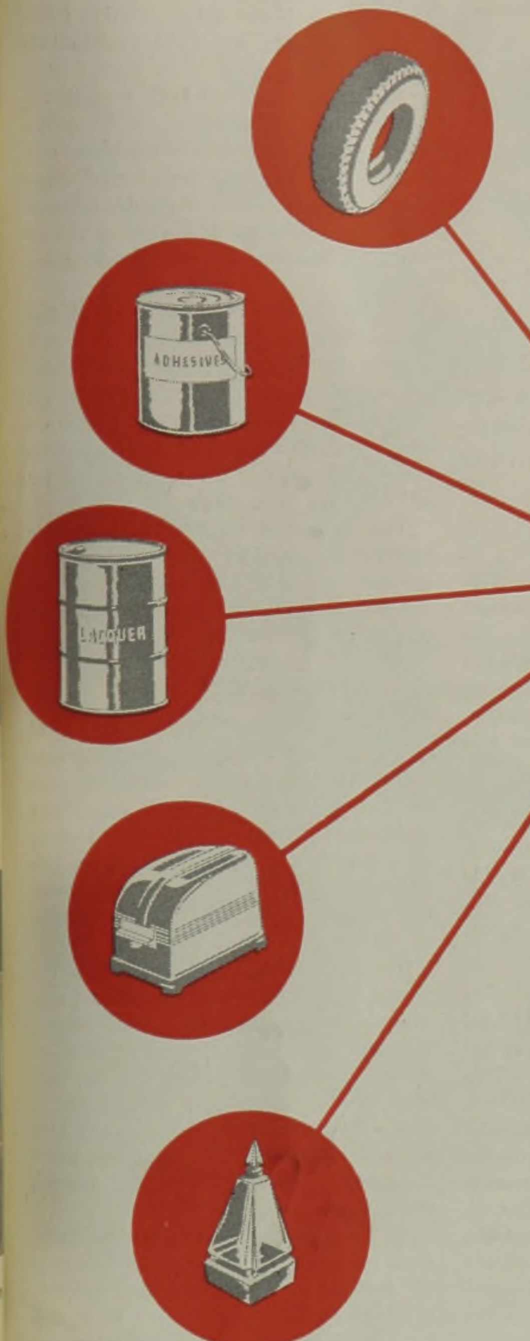
The feel and texture of Cerex is like powdered soap. This material will next go to mixing mills and then flakers.

This mixing mill, a smaller twin brother of the blenders of industry, mauls between its rolls a sheet of Cerex.



OXYGEN FOR AIRMEN: High altitude flying has tremendously stepped up need for oxygen, and mass production of cylinders is big business. Acres of them are stacked at plant of Walter Kidde & Company in New Jersey.

NEW GOODYEAR UNIT: J. E. Waters, General Cable Corp.; R. D. Vickers, of Goodyear, and E. J. Butler, General Electric Company, examine a piece of Chemigum at Goodyear's display in New York when Plastics and Chemical Sales Division was introduced.



relatives of the Phthalates

. . . WAR-WORKING PLASTICIZERS

The family of Monsanto Phthalates has a lot of relatives among products of America's war production . . . and a few among goods manufactured for the home front.

For example, Dibutyl Phthalate is used as a plasticizer in adhesives and lacquer . . . in synthetic rubber . . . and in plastics. Dimethyl Phthalate is used in plastics and Diethyl Phthalate in both plastics and perfumes. These products have many other uses, some of which may fit your needs. Other applications possibly can be revealed by experimentation in relation to your product.

Because these Monsanto products are so important to war production, our output is under government allocation. We invite your inquiries whether you seek a shipment, samples for experimentation or data to help you in planning a peacetime product. We assure you prompt attention and the best service conditions permit. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

DIBUTYL PHTHALATE

A standard lacquer plasticizer giving high degree of plasticity; excellent light stability and good weathering qualities.

DIETHYL PHTHALATE

Generally used in mixture with Dimethyl Phthalate as a plasticizer for cellulose acetate.

DIMETHYL PHTHALATE

Standard cellulose acetate plasticizer generally used in mixtures with Diethyl Phthalate or other plasticizers.

MONSANTO CHEMICALS

SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO PLASTICIZERS

Tricresyl Phosphate • Triphenyl Phosphate
Santicizer 8 • Santicizer 9
Santicizer B-16 • Santicizer E-15
Santicizer M-17 • Dibutyl Phthalate
Diethyl Phthalate • Dimethyl Phthalate
Diphenyl Phthalate.

The Tanning Chemicals Situation

Just beginning to climb out of wartime shortages, tanning chemicals may again be plunged back into the scarce category if restrictions on corn result in a rush of cattle to the slaughter pens, with a corresponding increase in hides. Domestic chestnut extract has been hit by the declining wood supply, thus putting more of the burden on imported quebracho.

GOVERNMENT action in restricting sales of corn to those agencies supplying it for conversion to industrial uses is expected to intensify indirectly the current stringency of leather tanning materials, such as chrome chemicals and native and imported bark extracts and powders.

It works in this fashion: Curtailment of grain for stock feed, inherent in the Government's freezing of corn supplies, means that more cattle will be rushed to market, which means more hides. Leather tanneries, recently complaining for lack of sufficient leather to meet anticipated military needs, thus may now get the leather, but an already short supply of tanning chemicals and materials will be further strained.

A series of Government orders are shaping that are designed to meet the situation by favorable pricing of tanning extracts to encourage domestic production and to induce larger shipments from abroad. The move may extend to action by the War Manpower Commission in the case of some commodities, and perhaps to some action to insure shipping facilities in the case of foreign supplies.

The price actions probably will cover domestic chestnut bark extraction and oak and hemlock bark extraction industries; in the case of oak and hemlock extracts, and chrome chemicals used for tanning leather, the manpower problem is a serious factor also. Price action has occurred already in some instances, notably chestnut extract, imported quebracho and wattle extracts. In the case of the chestnut product, it is now realized, a further change must be made, and the order is in preparation.

Chestnut bark extract is strategically an important product. It is essential for tanning heavy leather, such as belting and sole leather. It produces a very dense, water-proof, long-fibred and long-wearing leather. It also has other uses, but last year approximately 90 per cent of all chestnut extract was used in the leather industry. Probably an even larger amount will have been required this year.

Current production is less than half the previous rate. Although used in varying proportions with other tanning extracts, no satisfactory substitutes for it are said to be available in sufficient quantities to meet present needs. Parenthetically, it has been known for years that the Palmetto tree, indigenous to the Southeastern coast, Florida and the Gulf Coast, yields a high tannin-content product, but this possibility has never been really explored.

Chestnut Bark Extract

The predominant tanning material used by the American leather industry is believed to be chestnut bark extract. This is a vegetable tanning material derived, as its name indicates, from the domestic chestnut tree. Incidentally, due to the prevalent chestnut blight, the domestic extract is being produced from dead wood.

While the tree is found in a number of other states, the densest growth occurs in Virginia, North Carolina and Tennessee. The extracting plants naturally are fairly well centered in these three states. The extracting plants fall into three groups: those using their entire output in their own tanneries, those selling a substantial part of their production to associated tanneries, and a third, comprising three plants, selling to non-affiliated outlets. Two of the last-mentioned plants produce chestnut extract along with operations producing paperboard and paper. In all there are 9 companies which make all the chestnut extract produced in this country. They operate, altogether, 16 extracting plants.

The great bulk of chestnut bark extract is the standard grade, which is sold in a highly concentrated liquid form containing approximately 25 per cent tannin, or as dry powder, approximately 65 per cent tannin. In production, the wood is transported to extraction plants, where it is chipped, and the extract obtained by cooking the chipped wood in steam-heated water.

No oak and hemlock bark extracts are being produced currently, it is understood, primarily because of manpower difficulties, but also with some complications due to price, which, it is further believed, the Office of Price Administration will attempt to overcome in pending price regulations.

The most serious shortage of all has been in chrome tanning chemicals. It is complicated by both manpower and pricing situations. Signs of easing, however, are found in the WPB report that in April a major portion of civilian needs was met, although the supply was not sufficient for all soakings in tanneries.

This brings us to imported vegetable tanning materials, of which the most important is quebracho extract, derived from the heartwood of the quebracho tree of Argentina and Paraguay.

Quebracho Essential

Both from the fact that by the end of this year there will be a critical shortage of the domestic chestnut extract, because of declining chestnut wood supply and advancing production costs, and because of its use as a blending material, production by the leather industry of this country depends on the continuous arrival of quebracho.

Compared with 77,000 metric tons imported in 1939, imports have jumped each year as the United States went further into the war, until in 1943 imports of quebracho stood at 119,000 metric tons, even then a decline from 125,000 tons in 1942. Of the imports, 95 per cent in 1943 went to tanners, 3 per cent for water treatment, 1.75 per cent for oil-well drilling.

As a tanning agent it is used either by itself or with other tanning materials, such as chestnut or oak extracts, divi-divi, myrabolans, and synthetics. It is also used in the manufacture of dry colors and dyes, among other things.

Visions of cartel deals are raised by the report that production is centered largely under British control, in one company, which through a subsidiary in the United States sold in 1943 approximately 70 per cent of the amounts imported by us. However, an American firm is also in the field and, according to report, is an active competitor.

For the past several years quebracho has come into the United States only as a solid extract, manufactured in the Argentine and Paraguay, but when shipping conditions were easier in the past, quebracho logs were shipped into the country for processing here.

The solid extract comes in two grades: ordinary, basis 63 per cent tannin, and

(*Turn to page 924*)

PHOSPHORUS . . . Chemistry's Modern Scheherazade

As with Scheherazade . . . fictitious teller of tales of the Arabian Nights . . . the story of phosphorus goes on and on. Friendly phosphorus joins hands readily with other elements . . . forms a never ending collection of unusual and interesting compounds.

The stories of these phosphorus compounds are constantly being unfolded in the Victor Research Laboratories where physical and chemical properties are determined, potential uses recorded. Recently investigated by Victor chemists is the phosphorus compound whose brief "story" is related below.

Victor Emulsifier No. 20—A neutral, long-chain alkyl phosphate containing a water-solubilizing group. Specific gravity 1.057 at 30° C. A thick amber liquid soluble in organic solvents, hydrocarbons and oils. Self emulsifiable in water. Strong emulsifying agent. Suggested uses—surface active compound, emulsifier, oil additive.

A catalog of Victor chemicals in commercial production is available upon request.

Victor

CHEMICAL WORKS

HEADQUARTERS FOR PHOSPHATES • FORMATES • OXALATES

141 W. Jackson Blvd., Chicago 4, Ill.; New York, N. Y.; Kansas City, Mo.; St. Louis, Mo.; Nashville, Tenn.; Greensboro, N. C. Plants: Nashville, Tenn.; Mt. Pleasant, Tenn.; Chicago Heights, Ill.

NEW PRODUCTS & PROCESSES

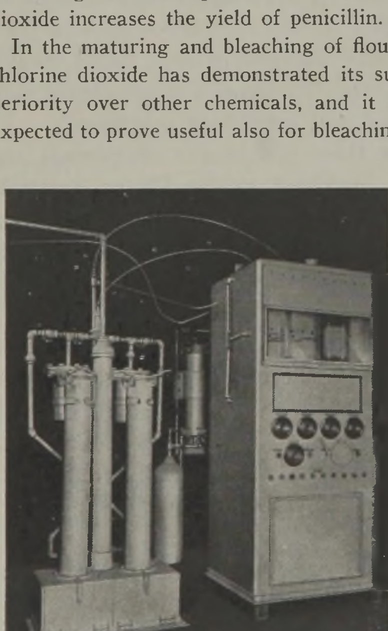
New Chlorite-Chlorine Process Makes Chlorine Dioxide Available

A new dry chlorite-chlorine process, which makes the powerful oxidizing and bleaching compound chlorine dioxide available for industrial purposes, was described at the recent meeting of American Institute of Chemical Engineers by E. R. Woodward of The Mathieson Alkali Works.

Because of its instability, chlorine dioxide must be generated at its point of use. The development of a method which makes this practical is expected to be followed by various industrial applications, since the oxidizing power of chlorine dioxide in terms of "available chlorine" is 2½ times that of chlorine.

Chlorine dioxide has already proved to have specific values in improving taste in public water supplies, checking blue mold in citrus fruits, and reducing spoilage in canned foods. On an experimental scale, sterilizing the atmosphere with chlorine dioxide increases the yield of penicillin.

In the maturing and bleaching of flour, chlorine dioxide has demonstrated its superiority over other chemicals, and it is expected to prove useful also for bleaching such products as starch, soap, paper and textiles.



Equipment for producing chlorine dioxide, developed by The Mathieson Alkali Works, consists of a two-tower generator and a cabinet, which houses control and measuring apparatus. The chlorine dioxide is generated by feeding chlorine and air into the towers which are filled with flaked commercial sodium chlorite.

Summary of Process

The generator consists of two vertical steel towers, 4 in. in diameter and 3½ ft. high, lined with stoneware or glass, and filled almost to the top with flaked commercial sodium chlorite. Chlorine and a large excess of air are fed at the bottom of the first tower, and the chlorine dioxide formed is carried through by the air current into the base of the second tower and passes out the top into the mixed gas manifold.

When the chlorite in the first tower is exhausted, the flow is reversed, the first tower being disconnected, recharged, and introduced as the second tower, without interruption to continuous gas generation.

Although the possibility of an explosion is remote, because an air pressure operated control valve in the chlorine line guarantees proper dilution of the chlorine with air, safeguards are provided which will allow harmless discharge of the salts and gases in case of accident.

Chlorine dioxide distribution lines may be as numerous as necessary. Each is controlled through a hand-operated valve, a rotameter, and a valve for admitting by-pass air into the line.

The control of the total pressure is effected by means of an Arca regulator, which is actuated by the pressure of the gases. The control of the partial pressures can be maintained by varying either the input of chlorine or the air flow.

To determine the chlorine dioxide content in the gas mixture, an opaque Hempel tube is used for sampling, the gas is absorbed in 10% potassium iodide, and titrated with 0.1N or 0.01N thiosulfate.

New Organic Chemical Insecticide

A new chemical compound which is sprayed on the ground and absorbed by food-producing plants to render them immune both to insect and fungi destruction, has been shown to increase potato crops as much as 25 to 100 bushels per acre, it was announced recently by scientists at the laboratories of Rohm & Haas Co. The "plant inoculation" possibilities of the new synthetic, known professionally as "diethylene-sodium-misdithiocarbamate" and familiarly as "Dithane," were discovered by accident, and later tests proved it to be fatal to both chewing and sucking insects but harmless to plants and non-toxic to man.

In recent field tests in Florida and Texas, Dithane, according to the company, has not only proved deadly to such fungi menaces as late blight which swept many food-producing areas of the South this spring, but also made possible potato yields running from 25 to 100 bushels more per acre than plots sprayed with conventional fungicides. Further proof of this chemical's remarkable powers is revealed by the fact that it not only acts as a repellant to certain insects—unlike such standard fungicides as Bordeaux Mixture which actually builds up aphid infestations—but actually kills them. The serum-like effect of the chemical was discovered after unsuccessful attempts to grow beetles on a plot which had been sprayed with the experimental "fungicide."

Possibilities for the post-war development of the recently-announced synthetic louse-killer, gesarol (or "DDT") and other new synthetic insecticides, also were demonstrated. Now being widely used by the Army in the Pacific in the elimination of insects, these synthetics are so effective on certain species that one part in 50,000 parts of water will eradicate insect larva floating on the surface of tropical streams. Strangely enough, DDT is deadly to human lice and flies but practically harmless to such crop destroyers as plant lice and the Mexican Bean Beetle. The Navy is using thousands of tons of synthetics, notably Lethane, in fighting insects at shore installations and aboard ships.

Demonstrations also were made of new synthetic organic compounds, carrying such forbidding chemical names as beta-beta-dithiocyano diethyl ether and beta butoxy beta thiocyano ethyl ether and designed to replace the dangerous and highly toxic stomach poisons, lead and calcium arsenate. One compound still in early stages of development holds great promise of eventually replacing dangerous arsenic. Other synthetics, among them one known as H-264, are proving deadly to the destructive Mexican Bean Beetle and may eventually replace a large tonnage of rotenone roots, imported from East Indian territories now under Japanese control.

Another new synthetic, known as Lethane B-71, was also demonstrated in field tests with a power duster. This new thiocyanate is proving a complete replacement for nicotine, rotenone and pyrethrum in the control of such sucking insects as leafhoppers and aphids. With vitally needed supplies of rotenone and pyrethrum hitting a new low this sea-

SERVING INDUSTRIES' NEEDS FROM A TRIPLE SOURCE

Dow, with plants strategically located in three states—Michigan, Texas, and California — produces Caustic Soda and other industrial chemicals of traditional Dow quality — conveniently near you. Technical service available.

CAUSTIC SODA

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York · Cleveland · Detroit · Chicago · St. Louis son, this new chemical is being welcomed as a timely development. After three years of extensive testing on Rohm & Haas' 300-acre farm and by commercial growers and State Experiment Stations in such important vegetable producing areas as Long Island, upper New York, Pennsylvania, North Dakota and Minnesota, this chemical is being marketed for the first time this season and is being made available to dust mixers as a dust concentrate.

Lethane 60 which last year replaced an estimated 2,000,000 pounds of war-embargoed rotenous roots promises this year to play an even more essential role in stretching scarce rotenone supplies. Combinations of Lethane-Rotenone are proving even more deadly to such insects as the pea aphid than straight rotenous dusts. This Lethane "contact" poison—designed for sucking insects which are killed only by being actually hit—seems destined to replace the natural or "botanical" poisons, rotenone and pyrethrum, in the control of many food destroying insects.

Corrosion-Preventive

Anti-corrosion films for steel can be obtained by the use of Sublan, produced by the Glyco Products Co., Inc. Diluted with an equal amount of thin, acid free mineral oil the Sublan was applied to highly polished steel surfaces and tested in a 90-95% relative humidity "wet saturated" with condensate forming continuously on the surface. The film thickness was that amount which adhered on cold dipping the panel and draining. After 1200 hours there was no evidence of rust formation. Polished panels protected with the Sublan, mineral oil mixture were stored wrapped in grade A paper for 10 months and showed no rusting. The coating passed the tests against hydrobromic acid and salt water immersion and humidity conducted in accordance with Government Specifications AXS 674. Furthermore the film supresses latent finger prints on the polished steel surfaces. The films are readily removed from the surface by cold solvent wash or dip.

Flame-Resistant Nitrocellulose

The first step towards successful production of a practical flame-resistant nitrocellulose composition has been made in Hercules Powder Company laboratories, according to a report made available to industry by the company's Cellulose Products Department.

The report describes the results obtained from varying the proportions of tricresyl phosphate and magnesium ammonium phoshate in a nitrocellulose formulation, and furnishes other technical information.

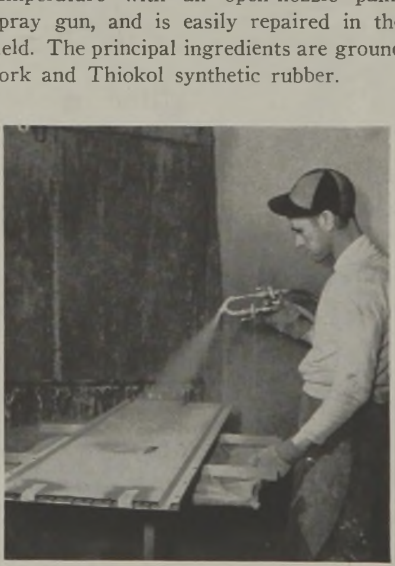
A good moldable flameproof plastic was obtained when the nitrocellulose: tricresyl phosphate ratio was held constant at 30:40 and the magnesium ammonium phosphate was varied from 30 to 60 parts.

A flame-resistant nitrocellulose composition has long been desired by industry and it is hoped that the results recently obtained in Hercules laboratories may aid in the solution of some practical problems, which when coupled with nitrocellulose's low cost may have particular significance in postwar developments.

The company emphasizes that the data outlined is of a very preliminary nature and that it has been made available in order that the suggestions in it might be used as a basis for further experimental work in industries such as lacquer, plastics, coated textiles and similar industries.

Cork-Thiokol Coating

A new non-skid walkway coating known as Flight Floor has been developed in the laboratory of The Glenn L. Martin Co., and has already seen extensive service in the planes built by the company. The new coating weighs only 47.5 grams per square foot against 232.1 grams for the rubber matting previously used, is applied at room temperature with an open-nozzle paint spray gun, and is easily repaired in the field. The principal ingredients are ground cork and Thiokol synthetic rubber.



Flight Floor was tailor made by Martin laboratory technicians to meet a specific need of the aircraft industry—namely, a non-skid surfacing material for floors and walkways that would stand up under hard wartime usage, and still would not add appreciably to the weight of the airplane or the time involved in its production. Other properties desired in the new material included good adhesion to metal, plywood and painted surfaces; flexibility and resiliency at temperatures from minus 20° F to plus 160° F; fire resistance; resistance to gasoline, aromatic fuel, oil, deicer and hydraulic fluids, salt water and oxidation; and easy repair in the field. That the new compound can meet these specifications has been demonstrated by a series of exhaustive tests as well as by actual field trial.

In production use Flight Floor is applied with a regular open nozzle paint spray gun. One application only is needed to build up a coating of sufficient thickness. The material dries rapidly and panels coated with it may be stacked on end after two hours drying and a light dusting of talc. Twelve to fourteen hours are required, however, before the material is ready to undergo use. Alternate methods of application are with a knife or brush, the latter method being particularly recommended for field repair. Patches applied in this manner show excellent coverage and adhesion and blend well with the original coating.

Anhydrous Sodium Thiosulfate

A. R. Maas Chemical Co., of South Gate, California, has begun commercial production of anhydrous sodium thiosulfate. This chemical, which is by no means new to chemists, has never received much attention, according to the company statement. Present interest is due to the discovery by customers that half the packaging, half the volume and one-third of the freight may be saved by changing to the anhydrous form. All who are in touch with the war effort know the extreme pressure that is being put on producers to save these three precious things. The ability of the anhydrous form to resist any temperature seems to fit it specially for tropical use.

True Resin Latex

Production of a true latex of vinyl chloride resin without using costly and dangerous solvents—a project on which B. F. Goodrich research chemists have been working for 17 years—has been achieved, according to a recent company statement.

In the new latex, according to William S. Richardson, general manager of the chemical division, the company's Geon resin is dispersed with water, instead of with the solvents formerly used. The dispersion can be adapted to a wide variety of uses in coating textiles, wires and other materials, and in film manufacture —and in many respects promises superior performance, he said.

Resembling the latex of rubber in appearance, the new colloidal substance holds in suspension vinyl resin particles so tiny that 25 trillion are contained in a single cubic inch, Richardson said.

The new Geon latex will increase the uses of this type of synthetic in peacetime, Richardson predicted. Some of its major potential applications, he said,

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are in coating paper, paper board and boxboard; treatment of glass fibers and fabrics; manufacture of gloves and other products in which rubber latex has been used; treatment of leather for added wear and moisture protection; and use in corrosion-resistant paints. It may replace rubber latex in the insulation of electric wire or cable by the dipping method. The list of practical uses is expected to expand continuously.

The new latex can be made to conform to fiber structure, thus allowing the materials treated to "breathe," or it can be applied as a flexible, impervious coating, Richardson said. In clear or colored form, it can be brushed, sprayed or dipped. It is more pliable and more thoroughly impregnates fabrics or fibers to which it is applied than older vinyl resins. Resistance to flame, increased wear and easy cleaning are among the advantages it will bring to materials on which it is used, the announcement said.

New Hydrogen Cell

A new type, lower cost, longer life, electrolytic hydrogen cell has been designed and installed by the Research Division of Consolidated Mining and Smelting Co., Ltd.

Characteristic features of the new cell are the concrete top supporting the electrodes, asbestos diaphragms, asbestos collecting skirt, bus bar and gas main connections. The electrodes are mild steel plates, and the anodes are nickel plated.

It is claimed that the life expectancy of the cells is about ten years, with initial cost about half that of older types.

New Detergent

A new soap ingredient developed from petroleum was announced recently by the du Pont Company, which is undertaking plant expansions to turn it out by the hundreds of thousands of pounds.

Mixed with the other constituents of soap in a proportion of about one to two, it is said the new material will remove dirt, oil and grease in any kind of water, salt or fresh, cold or hot, hard or soft. Soldiers aboard transports and on the atolls of the South Seas, where ocean water is used for bathing and laundering, have found the soap very efficient for these purposes. It also gives a good shave.

After the war, variations of this soap formula will be available for household use—some as toilet soaps and others for the kitchen and laundry.

The new ingredient is a synthetic detergent. It is a sulfonated product and is designated MP 646 by du Pont's Fine Chemicals Division, which manufactures the material at the Chambers Works, Deepwater Point, N. J. The chemical is sold to soap manufacturers, who use it in the manufacture of toilet soap.

The reason ordinary soaps do not work well in hard water arises from the fact that they contain sodium or potassium and the hard water contains calcium and magnesium. When the soap is mixed with the water the sodium or potassium is pushed out of the soap molecule and is replaced by calcium and magnesium. The reaction creates an insoluble calcium or magnesium compound, which is precipitated as a sticky curd—the ring around the tub or washbasin. Not until all the calcium and magnesium is precipitated and the water thereby softened will ordinary soap lather up and do a good cleansing job.

When the synthetic detergent unites with the hard-water minerals, the new soap forms not a heavy curd but a very finely dispersed precipitate, which remains suspended in the water and does not interfere with the soap's quick and efficient cleansing job.

New Reinforcing Grade of Calcium Carbonate

Witcarb R., a new reinforcing grade of precipitated calcium carbonate especially adapted to use in GR-S stocks, has been announced by Witco Chemical Co.

The product is a precipitated calcium carbonate pigment of ultra fine particle size which is claimed to have exceptional reinforcing properties when used in natural rubber, reclaim, and all types of synthetic rubbers.

The introduction of Witcarb R at this time is particularly opportune, since it is especially adapted to the reinforcement of GR-S (Buna S). Witcarb R produces exceptional tensile strength, tear resistance, and flex cracking resistance in GR-S. In addition, it gives stocks of relatively low hardness and modulus even at high loadings.

The outstanding ability of Witcarb R to reinforce rubber stocks is shown by the unusually high tear resistance, tensile strength, and flex cracking resistance which it gives at moderate loadings. Witcarb R stocks are also characterized by relatively low modulus and high elongation.

Vinyl Resins for Shoes

A plan to increase the durability of plastic soles by making allocations of rejected vinyl resins for their manufacture contingent on compliance with specifications to be drawn with the aid of the U. S. Bureau of Standards is now under consideration, officials of the Chemicals Bureau of the War Production Board have revealed.

At the request of the Chemicals Bureau, various types of plastic soles are now being tested by the Bureau of Standards, officials said, and the specifications which they hope to prepare will reflect the performance standards established by these tests.

Any production of shoe soles from vinyl chloride resins must come from materials which cannot be used by the Armed Forces, such as strippings and other rejects from uses in which this resin is now being employed. Production of these soles will be limited for some time because of the present shortage of production facilities for these resins.

Laminating Fabrics

Celanese Corporation of America recently was granted a patent relating to the production of laminating fabric for adhesively uniting components of a composite fabric.

According to the invention such a laminating fabric is prepared by applying to a fabric containing fibers of non-thermoplastic material in admixture with fibers of cellulose acetate or other organic derivatives of cellulose a plasticizer for the organic derivative of cellulose.

The thus treated fabric is aged at an elevated temperature in an atmosphere having a relative humidity of at least 70 per cent which causes at least part of said plasticizer to migrate from the non-thermoplastic material to the cellulose acetate material.

This migration of the plasticizer from the non-thermoplastic material to the cellulose acetate material not only improves the adhesion, when this fabric is used in the manufacture of stiffened composite fabrics such as collars, but also eliminates the greasiness and discoloration due to the sweating of the plasticizer from the non-thermoplastic fibers.

Container Adhesive

E. I. du Pont de Nemours & Co., which last August introduced adhesive "77" for the production of weather-proof paperboard shipping containers that stood up under the Army practice of floating materials into beachheads, has developed a companion adhesive that reduces the box-maker's operative costs.

Produced in the laboratories of the Grasselli Chemicals Department, the new adhesive—listed as du Pont adhesive "78"—contains all of the qualities of the water-soluble vinyl resin "glue" introduced last year. Board made with the new adhesive meets government specifications for weatherproof containers.

Containers utilizing either adhesive can be fashioned on standard box-board machinery which may be operated at full speed without any special equipment. Both "77" and "78" adhesives are stable, dry white powders that can be prepared in standard mixing equipment.

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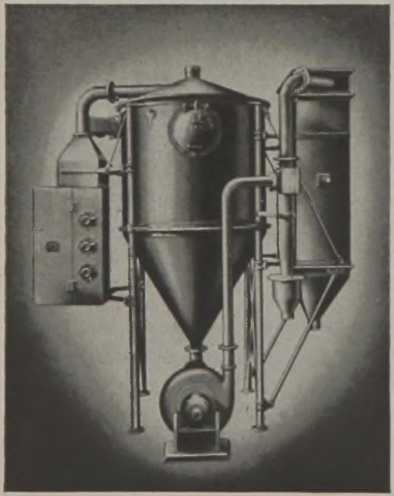
NEW EQUIPMENT

Small Capacity Spray Dryer QC 404

To meet an increasing demand for an inexpensive small-capacity spray dryer for the commercial drying of high value products, for use in laboratory research, and in pilot plant operation on specific materials, Western Precipitation Corp. has announced development of the Type N Turbulaire Spray Dryer.

This unit, according to the company, offers a number of important advantages for drying products such as fine chemicals and pharmaceuticals, and for investigation of spray drying problems. It is furnished in black iron, stainless steel or other alloys, and standard equipment includes electric heater, 4 foot desiccator with cone bottom and hand-operated mechanism for sweeping surface accumulations from the conical section, Multiclone collector, fan, bag house and control instruments mounted on a single frame for maximum compactness and ease of installation. Only electrical, compressed air and feed line connections need be made, and the complete assembly occupies a floor space of only 5′ 10″ x 9′ 8″, with a headroom of about 10′ 6″.

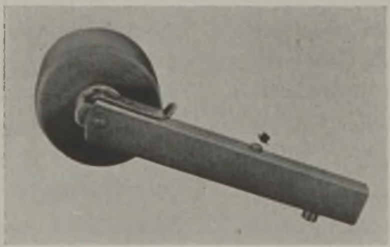


Maximum operating flexibility of the Type N Dryer is gained by means of optional heaters—either direct or indirect types—and other equipment designed to meet the special needs and facilities encountered in various applications. In addition, the desiccating chamber is provided with a secondary inlet for introducing tempering air at inlet temperature, or pre-cooled to any desired temperature. This permits investigation, for example, of the dryability of thermoplastic and heat sensitive materials as well as those having a tendency to case-harden. Other optional equipment includes a high efficiency air filter for use in processing pharmaceuticals, food products, etc., and sealed glass sight ports for inspection purposes.

The Type N Spray Dryer is rated at an evaporation of 25 pounds of water per hour at an inlet-to-outlet temperature differential of 300° F. Varying conditions such as type of material handled, concentration of solids in the feed, etc., will, of course, cause this figure to vary well above or below the rated capacity.

Safe Wrench for Container Closures QC 405

The problem of applying threaded plastic closures to glass and other types of containers at the correct tightness to insure proper sealing without damage to the closure, the gasket or the container is claimed to be solved by the Livermont Torq-Stop Wrench. Developed originally, for and used extensively in the aircraft industry, this wrench with minor changes becomes applicable where proper tightening of plastic bottle caps and similar operations are advisable, according to the manufacturer, Richmont, Inc.



A micarta head, built to fit the specific size caps to be tightened, operates efficiently without marring the material. These wrenches are set at pre-determined torques of from 8 to 750 inch pounds in accordance with the requirements of the user. They are sealed at setting and will not vary more than 2% + or —. Thus inexperienced users can achieve efficient, rapid operation immediately. When the proper torque load is reached, the Livermont Torq-Stop Wrench gives both a physical and audible signal. The audible signal is a sharp, distinct "Click" while the physical signal is transmitted by a small blunt plunger which taps the operator's palm.

Portable Scale QC 406

Either avoirdupois or metric readings may be made directly on the dial of this Toledo Portable Scale, without mental calculations. This feature adapts it to bulk packaging and compounding operations, while other variations of this model are adapted to a wide number of uses such as general weighing in factories, shipping departments, counting, testing and with conveyor lines.

A locking device is conveniently located on front of the scale housing so that it can be readily operated for locking the tare beam lever, and thus protecting the scale when it is not in use or while heavy loads are being placed on the platform. A full-floating indicating mechanism and compensating pendulums assure correct weight regardless of out-of-level conditions. The scale is fitted throughout with bearings that are self-aligning in all directions. This is an exclusive feature which guarantees a uniform distribution of the load on the pivot knife-edge, eliminating friction and reducing the danger of injury to pivots.

Toledo Portable Scales are furnished either with or without tare and capacity beams. On models with tare beams, poises are equipped with locking crews, and the tare beams are furnished with a stop pin to hold the poise in position at zero. The capacity poise is equipped with poise stop (dog) to secure the exact location of the poise at every notched graduation of the capacity beam.

Rotary Pumps QC 407

Goulds Pumps, Inc., have just announced the addition of a new line of rotary pumps of the double helical or herringbone gear type which are designed to handle liquids which possess inherent lubricating qualities. The pumps are available in ten sizes ranging from that with a one-half inch suction and discharge and with a capacity of from one to one and one-half GPM to the two

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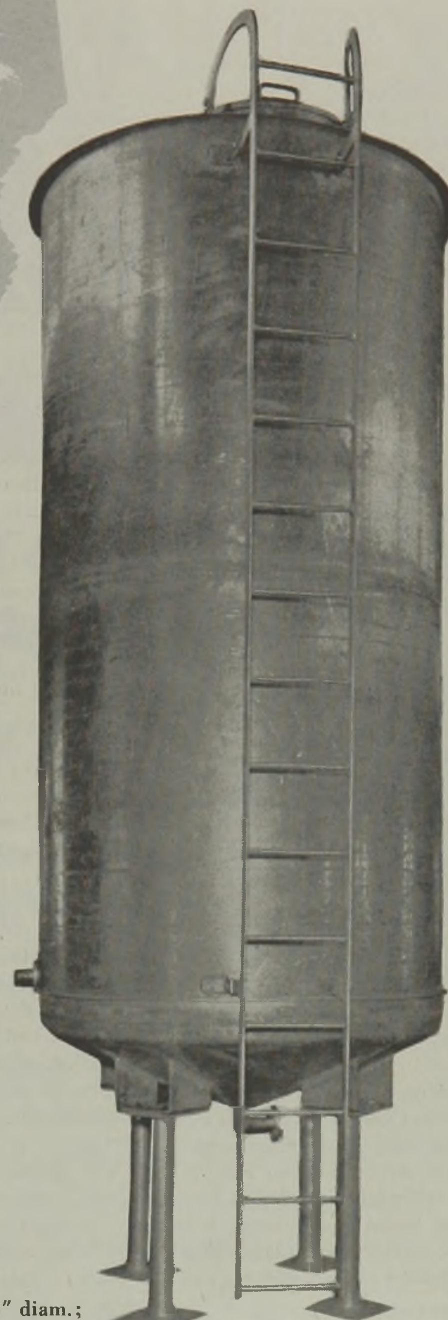

Starting with large aluminum sheets and cast connections, every fabrication step needed to produce this large tank was carried out by our workers. They cut the sheets, rolled them, dished the heads, welded the sections, and set the connections; then hydraulically tested the tank.

Although aluminum has been used industrially for many years, not many shops are yet experienced in fabricating aluminum equipment. We are. Our workers are skilled in this rather difficult work. We can take aluminum jobs in stride.

If you need heat-exchangers, pressure vessels or other equipment of any type fabricated of aluminum, this large tank which was turned out for an important war industry is evidence of our ability to serve you — design as well as fabrication.

Aluminum Stearic Acid Remelt Tank; ½" plate; 66" diam.; 152" high; contains 60 feet of 1½" aluminum I.P.S. tubing.

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Representatives in All Principal Cities and one-half inch type with capacity ranging from fifty to seventy-five GPM. Maximum working pressures in all sizes is given as 75 lb. All sizes are obtainable for direct drive through flexible coupling or for belt drive.

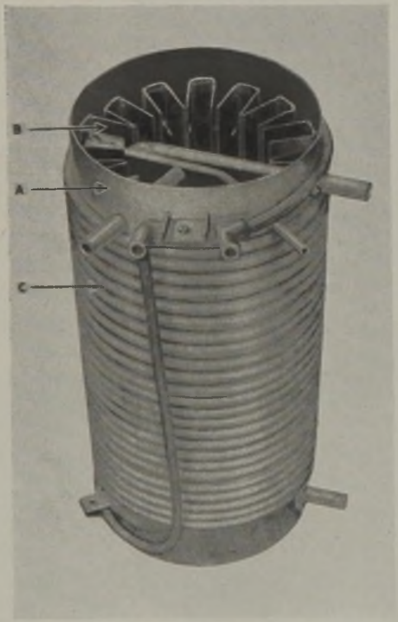
Features of the new rotary pumps include their simplicity of construction involving but two moving parts, a split bolted type gland, renewable bearings and built-in relief valve. All are claimed to be exceptionally quiet in operation.

The relief valve of the stainless steel ball type is built into the pump cover and is externally adjustable.

In addition to the standard fitted type all pumps are also available with all parts of iron or steel or in all bronze construction.

Water Cooler QC 408

Announcement of Strata-Flo water coolers, designed to eliminate warm-up and "wet" systems (water in refrigerant lines), and featuring a simplified method of control, is made by Drayer & Hanson, Inc.

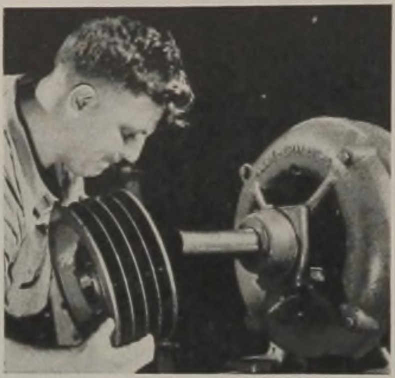


While based on standard cooling principles, Strata-Flo Coolers are entirely new in design. The shell of the storage tank "A" is between vertical interior fins "B" and external refrigerant coil "C". Continuous cooling action on the entire body of water in the storage tank is transmitted from the refrigerant coil through the shell to these fins.

The fins prevent swirling action and confine incoming warm water supply to upper levels, eliminating mixture with water already cooled in the lower portion of the tank and thus minimizing warm-up. Since refrigerant can never come in direct contact with water, or vice-versa, danger of wet systems is eliminated and control is non-critical. This permits use of the simplest types of controls, consisting of an automatic expansion valve and external adjustable thermostatic switch.

Easy-Mount Sheave QC 409

A new sheave, designed for quick and easy mounting and demounting, has just been announced by the Allis-Chalmers Manufacturing Co.



Known as the "Magic-Grip" Sheave, it locks to shaft in one tightening operation. As its tapered split bushing, which accommodates normal shaft tolerances, is drawn further into sheave, sheave, bushing and shaft are locked together simultaneously. This positive clamp fit makes sure that "Magic-Grip" Sheave is perfectly centered and secure . . . assuring smooth running performance free from back-lash and shear.

The company states that the new design of the "Magic-Grip" permits sheave to be mounted closer to motor . . . increasing bearing life by reducing shaft overhang.

Wet Ore-Pulp Controller Developed by Bureau of Mines QC 410

Development by the Bureau of Mines of a device that insures constant and controlled flow of wet ore-pulp through an orifice and thus facilitates the efficient operation of a classifier in the concentration of minerals was announced recently by Dr. R. R. Sayers, Bureau Director.

The apparatus, known as a "periodic pincer," was produced in connection with an investigation of iron ore concentration being conducted by the Bureau at its Southern Experiment Station, Tuscaloosa, Ala., in cooperation with the University of Alabama.

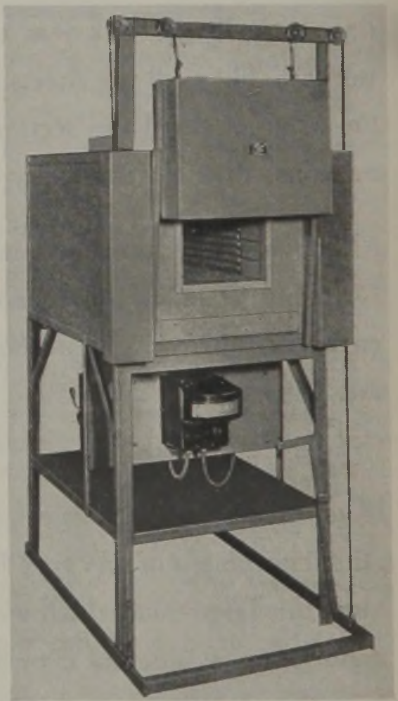
Tests proved that the "periodic pincer" can be used both in commercial and laboratory work. It controls the flow of wet ore-pulp by a periodic opening and closing of a collapsible rubber tubing which terminates an oversize orifice, the oversize opening preventing choke-ups. The device is operated by an electric motor and in practice it introduced precision approaching that of a weightometer.

When used in the laboratory the apparatus was employed to deliver as little as 50 pounds of solids per hour; in thorough testing with a commercial concentrator it delivered as much as 4 tons per hour. The publication, written by G. Dale Cole, associate chemical engineer, Southern Experiment Station, and Will H. Coghill, supervising engineer at the Station, also discusses the application of the "periodic pincer" to a wet ore feeder.

A copy of the publication, Report of Investigations 3750 "Periodic Pincer to Control Flow of Wet Ore-Pulp Through an Orifice," may be obtained by writing the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Floor Model Furnaces QC 411

A new series of floor model furnaces is being marketed by K. H. Huppert Co. The standard line of these furnaces will consist of five basic designs. Five or more variations will be available in each of these, dealing particularly with the inside depth of the furnace.



The Model 16 (illustrated) has work chamber dimensions of 12" wide 8" high and 18" deep, plus 8" throat. This furnace is also available as Model 16A with the same width and height, but a depth of 24". In the Model 16B the width and height remain the same as in Model 16 with a depth of 36". The total overall dimensions on the Model 16 is 35" wide, 6' 10" high, 46" deep and like variations as above, with the width and height remaining the same on the Model 16A with a depth of 52" and likewise, in

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the Model 16B the depth is increased to 64″.

The dimensions of the door in all models described here is 21″ wide, 17″ high, 8″ thick.

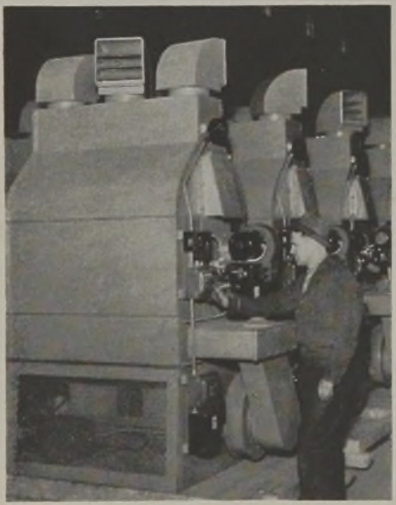
The furnace body is constructed of 14 gauge steel reinforced on all corners. Heating elements have totally enclosed contacts and connecting wiring is brought through the back of the furnaces into a special compartment provided for that purpose.

This series of furnaces are insulated with the Huppert principle of multi-insulation, which, according to the company, has been proved in other Huppert furnaces for many years. These furnaces, in all variations, can be operated on 220 volts single or three phase line and in many instances can be supplied for special voltages up to 440 volt three phase. The current consumption of the Model 16 (illustrated) is nine kilowatts.

The Series 16 furnaces have a maximum operating temperature of 1850 degrees for continuous operation and 1950 degrees for intermittent use.

Room Heaters QC 412

To meet the problem of heating small structures and providing additional heat for limited areas, a small model of the Dravo Direct Fired Heaters with capacities ranging from 300,000 to 850,000 Btu output per hour has been developed.



This new model is one which Dravo now is supplying to the armed forces to heat steel service igloos at advanced bases. It retains the principal characteristics of the regular line of Dravo Direct Fired Heaters but on a scale in keeping with the smaller Btu output. Over-all size has been reduced in proportion so that floor space requirements are now just 5¼′ x 3′. It can also be suspended from the wall where floor space is not available. This model can be equipped to burn either gas or oil. Oil burners may be quickly removed and gas burners and controls substituted or, vice versa, as conditions direct. The heater is thermostatically controlled and requires a minimum of manual attention. A small unit of this size is an excellent complement to present heating systems to provide warm air in remote parts of factories not reached by the present system.

Gas Engines for Rubber Plant QC 413

Enough water to supply the combined cities of Dallas, Houston and San Antonio is pumped at Port Neches on the Texas gulf coast by two gas driven 8-cylinder Type GMV engines manufactured by The Cooper-Bessemer Corp.

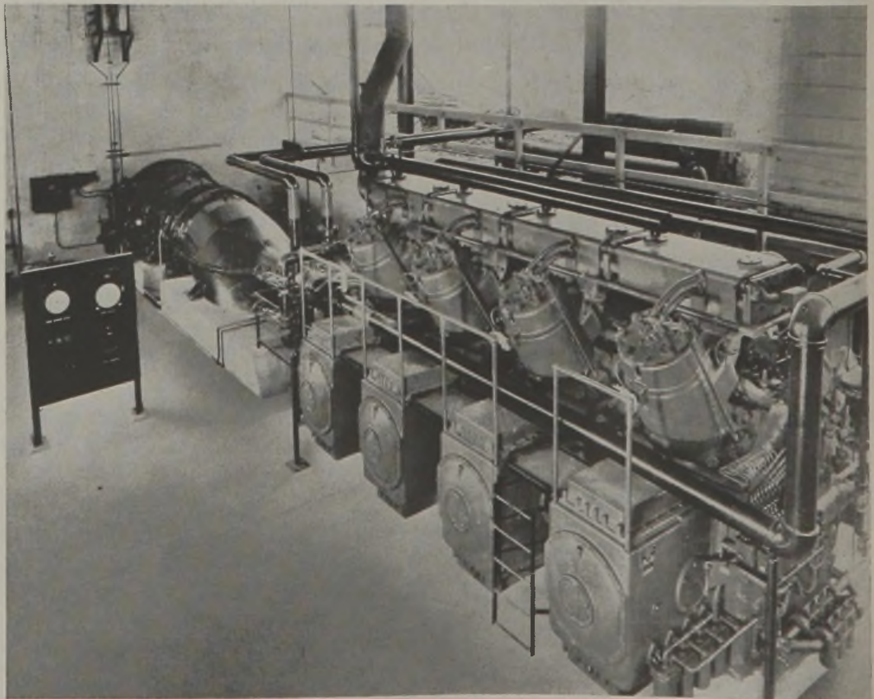
This mighty pumping job is for the new $45,000,000 Port Neches butadiene plant, recently completed and capable of producing at its peak 120,000 long tons of Buna S rubber annually.

The water being pumped by the two natural engines is for cooling purposes as well as for processing and is brought in from the Neches river, a mile distant, put through condensers and cooling equipment and then returned to the stream.

Specially designed screens prevent debris and fish from entering the pumps. The volume of water can be judged by the fact that the size of the conduit necessary to carry the water is 9 by 22 feet.

According to Cooper-Bessemer engineers, the operation of two gas engines of this size represents one of the largest installations ever made solely for pumping water to a single manufacturing or processing plant, and is particularly significant since the heavy load is carried by only the two modern gas engines without standby power.

8-cylinder Cooper-Bessemer gas engine at Port Neches Butadiene plant.



New Oscillograph QC 414

To facilitate the investigation of transient as well as recurrent phenomena over a wide frequency range, Allen B. Du Mont Laboratories, Inc., have announced a new Type 247 Oscillograph.

This instrument utilizes the Type 5CP1 cathode-ray tube with intensifier electrode, operated at an overall accelerating potential of 3000 v. High-intensity patterns are obtained on the 5″ diameter screen. The medium-persistence green screen is standard. If a permanent record of transient phenomena is required, the instrument may be supplied with short-persistence blue screen for high-speed photographic recording, or with the long-

"Sitting Ducks" for Snipers

Against the jungle background, the white underwear of the first American Troops in the South Pacific, made them "sitting ducks" for Jap snipers.

For quick protection they resorted to homemade dyes concocted from coffee grounds, root juices . . . anything to simulate O.D. camouflage. Soon direct dyes were made available for re-dyeing in emergency field equipment, in Army mobile laundries, aboard ship. All old-issue "whites" were quickly made inconspicuous . . . even the traditional white of the nurses uniforms gave way to low-visibility olive drab. Thereupon, the QMC made O.D. the official shade for all G.I. underwear.

Prompt delivery of direct dyes to our forces in the field, development of camouflage colors for men and material, production of munitions, these and many other jobs National Aniline has "delivered as promised", while still providing for the civilian needs for dyestuffs and chemicals.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET NEW YORK 6, N. Y.

PHILADELPHIA GREENSBORO CHATTANOOGA

persistence green screen for visual observation of low-speed phenomena.

The sweep frequency range has been extended down to one-half cycle per second providing a wider range of sweep operation. Thus it may be used for observations on low-speed machinery and for other low-frequency functions. The time-base provides recurrent, single or repetitive sweep operation. A beam control circuit is used with single sweep operation, to darken the screen except during the actual sweep cycle, providing a reduction of background illumination and resulting in photographs of greater contrast. Uniform response over a very wide frequency range for both the vertical and horizontal axes; a distortionless, continuously-variable low-impedance attenuator or gain control; a Z amplifier channel for applying external timing signal to the grid of the modulating electrode; and other features and refinements, are claimed for this instrument.

Sludge Collector for Settling Tanks QC 415

A new sludge collector for the smaller-diameter settling tanks, to be known as the Link-Belt Type "B" Circuline Collector, has been announced by Link-Belt Company.

Where average domestic sewage is treated, the new Type "B" collector is recommended for tanks of up to 55-ft. diameter. Installations of Type "A" collectors in tanks of up to 115-ft. diameter, are illustrated.

It is pointed out that for clarifying and thickening problems encountered in industrial processes and waste treatment, each problem must be considered separately; and that variations in the design of both Types "A" and "B" collectors are possible, to suit special conditions, unusual sludges or wastes.

In Circuline collectors, the settled sludge is collected and continuously moved radially, inwardly, on tank floor by a slow-moving scraper flight type conveyor and sludge plow, into a sludge hopper from which the sludge is withdrawn.

The conveyor is mounted on a power-rotated, centrally pivoted bridge spanning half the diameter of tank and having anti-friction-bearing equipped, resilient rubber-tired wheels at outer end of span, for smooth, easy travel on top of tank wall.

The entire floor area of the tank is cleaned of settled solids during each complete revolution of the bridge. This permits very slow rotation and insures that there is but a minimum of disturbance to the settling process and to the settled solids.

The sewage is introduced into center of the tank through a conduit under floor of tank, to assure an even distribution of flow throughout tank.

The drive, located at outer end of bridge span, consists of a motorized speed reducer carrying a sprocket wheel which engages a heavy galvanized tow chain located and anchored in the effluent trough. The outer end of bridge is pulled by this chain, or it might be said to "walk around" the chain.

When used in primary settling tanks, a screw conveyor is supported along the one side of bridge span, for the purpose of confining and more effectively moving the scum and grease to a scum trap. This feature prevents wind pressure from blowing the collected scum out of reach.

Respirator Facelet QC 416

American Optical Company, Southbridge, Mass., announces that its R-1000 respirator, developed to protect workers against certain dust, fume and gas hazards, is now being equipped with knitted cotton facelets.

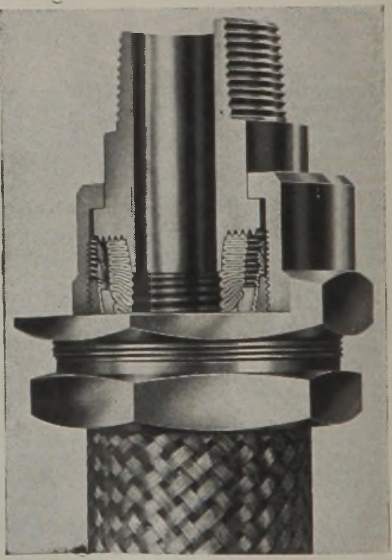
These facelets are said to make the respirator more comfortable to wear because they are soft against the skin, absorb perspiration, and give the face a certain measure of protection against dust and dirt.

The facelets help to prevent skin irritation and do away with the necessity for protective creams to avoid face chapping. Designed to make any industrial operation more comfortable, the face-

lets are particularly valuable where workmen handle such products as cement, lime and gypsum, or perform operations like paint spraying.

Metal Hose Coupling QC 417

A detachable brass coupling for helical flexible metal hose in sizes from ¾" to 1½" I.D. has been developed by Packless Metal Products Corp., offering the advantage of being mechanically self-sealing.



The unit consists of only four parts—the nut, back, stem and split ring. When assembled the convolutions of hose and the metal braid are securely held by pressure between the members as shown in the accompanying cut-away view.

The coupling withstands pressure tests of up to 800 pounds.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (6-4)

Please send me more detailed information on the following new equipment.

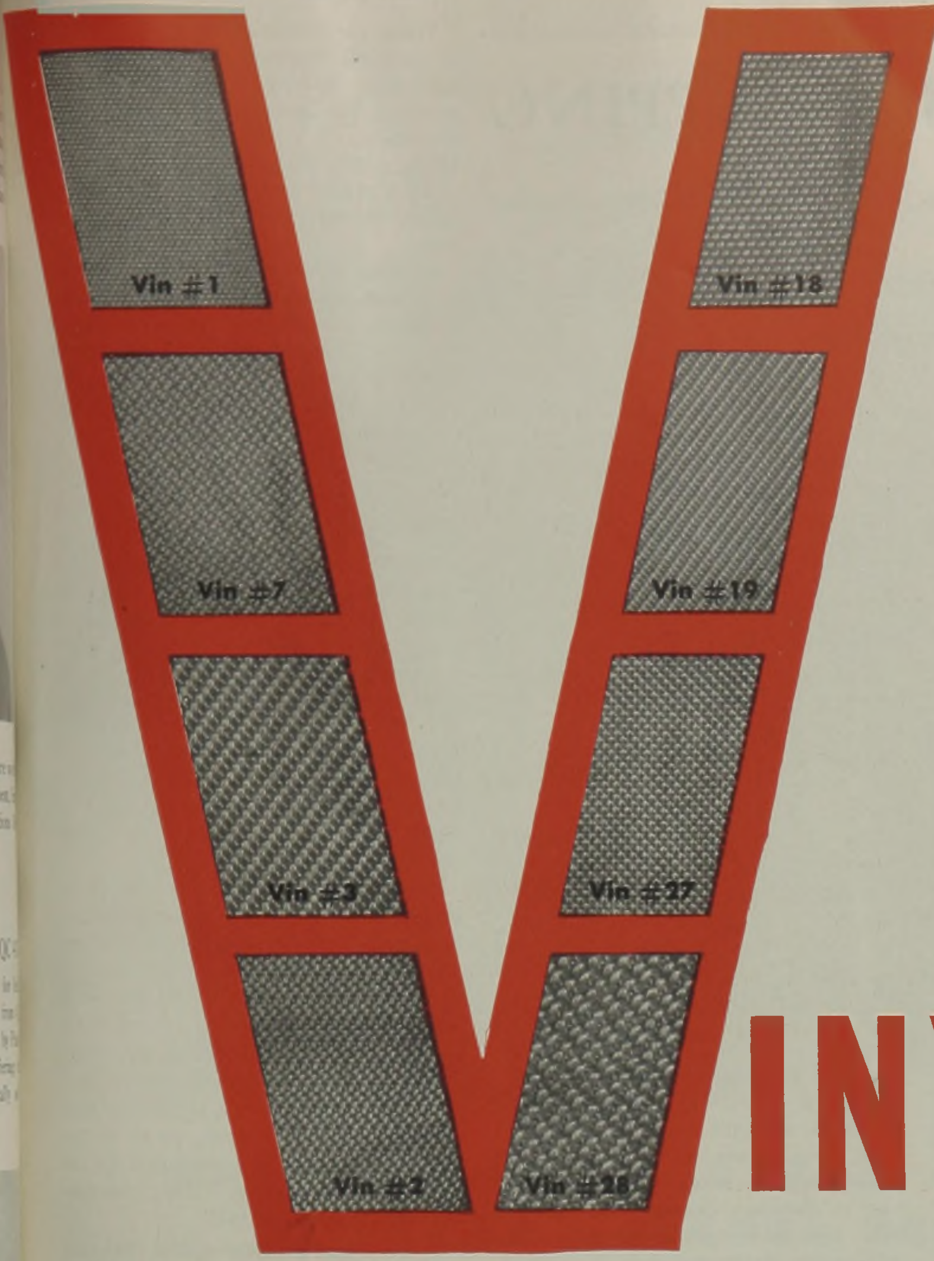
QC 404	QC 407	QC 410	QC 413	QC 416
QC 405	QC 408	QC 411	QC 414	QC 417
QC 406	QC 409	QC 412	QC 415	

Name .... (Position) ....

Company ....

Street ....

City & State ....



VINYON*

Fiber Filter Fabrics

for filtering mineral acids or alkalies

To solve filtration problems arising out of the presence of strong mineral acid or alkali in filtering operations, investigate Vinyon fiber filter fabrics.

Three years of field studies, close watch of actual performance, plus constant research have given us a wealth of valuable data on the merit of Vinyon fiber filter fabrics.

Subject always to certain heat limitations, the use of Vinyon fabrics offers definite advantages in filtration processes involving strong mineral acid or alkali solutions because Vinyon fiber is a synthetic product, highly resistant to mineral acids and alkalies.

Our engineers will be glad to discuss the possible application of Vinyon fabrics to your own particular filtration process. You are invited to make use of this time-saving check list. If you have filter fabric problems for one of these, indicate it and include any information regarding your particular filtration process:

- **Pigments and Dry Colors**
- **Dyes and Intermediates**
- **Metallurgical Processes**
- **Pharmaceuticals**
- **Mineral Acid Solutions**
- **Strong Alkali Solutions**
- **Salt Solutions**
- **Bleach Liquors**
- **Electroplating Processes**
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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Tank Cars are Specialized Chemical Containers and Should be Treated with Special Care

Tank cars used in the chemical industry are specialized containers and have been constructed to meet the requirements of the industry and the various governing agencies only after years of continuous study by all concerned. Tank cars used in the industry are constructed of stainless steel, aluminum and plain steel. In addition, in order to transport various chemicals, these cars are lined with various forms of lining, including rubber, synthetic lacquer and resins, sprayed aluminum, sprayed tin, etc.

T. Pat Callahan

From this, it is apparent that very particular attention must be exercised by all people handling such special equipment, and it is recommended that all people handling tank car equipment be acquainted with the specialized tank car in which the material is delivered. Tank cars, if not properly handled in a customer's plant, can be seriously damaged. That would be very unfortunate in these times because equipment is so scarce and in a great many cases, a damaged tank car will take it out of service for considerable periods of time. For example, a rubber lined tank car can be seriously damaged if the consignee drops a metal or sharp-pointed instrument into the tank as a "measuring stick." Obviously, this will puncture the rubber lining on the bottom of the tank car and allow acid to get through to the metal.

Another hazard in the handling of tank cars by consignees is the application of water, which in no case should ever be applied to a tank unless specific permission is received from the owner of the tank car. Likewise, the use of a tank car by a consignee for movement of any material other than that which was originally shipped in it should never be attempted.

Owners of tank cars will always welcome comments by the customers concerning any defects in the tank car equipment in which chemicals are shipped, and to this end, all persons charged with the responsibility of handling tank cars within a plant should be notified to report any defects so that they can be relayed to the shipper.

Safe Loading for Multiwall Bags

Multiwall paper bags of chemicals loaded in carloads, providing the construction of the bag is satisfactory for the material packaged therein, will arrive safely at destination if properly loaded.

The most serious hazard in the loading of multiwall bags in cars is the use of proper protection at the doors, and it has been noticed that a great amount of damage which takes place can be attributed to improper loading and bracing at the doors. Particular care should be exercised by all shippers of materials in multiwall paper bags to insure adequate protection at the doors and this can be accomplished in various ways. Blocking the doors off with heavy fibre so that there is no portion of the doorway left exposed to allow snagging is a very good way to eliminate damage. One of the large steel band manufacturers has developed a prefabricated door strip which can also be used and is proving very satisfactory.

Care and caution at the doorways of cars in which bags are loaded will definitely assure the delivery of material in a safe and satisfactory manner.

Containers Are Critical

We have been continually stressing impending shortages of various types of containers used in the chemical industry. It is apparent that container shortages are still very critical, and it is necessary that vigilance be exercised in determining container supplies and shortages.

During the past month, there have been continuous rumors of steel shortages to such an extent that steel drums will become tighter during the third quarter than they have been for some time.

All forms of paper and fibre are tighter now than they have been at any time since the war started.

Wood for packaging is being allocated in most all instances to direct war requirements making this a very critical material for general use in packaging chemicals.

The return and reuse wherever possible of all forms of containers is necessary to insure uninterrupted packing of chemicals.

Further orders affecting the procurement and packing of chemicals in various containers are expected to be issued by the War Production Board and these should be watched in order to govern the proper procurement and use of shipping containers.

Steel Drum Order L-197 Amended and Clarified

To facilitate the placing of orders for steel drums, to clarify further the uses for which new drums are permitted and to assure an equitable drum distribution, a number of changes have been made in Steel Shipping Drum Order, L-197, the War Production Board reported today.

Each order for steel drums will no longer require a specific WPB authorization, but a blanket certification must be filed with the drum manufacturer by the customer.

As amended, L-197 lists in Schedule A all commodity classes for which new steel shipping drums—perfect or reject—are permitted, and establishes the packer's drum quota for each class. Schedule A includes a wide variety of chemicals, a number of food oils and greases, petroleum products, and miscellaneous commodities. Under the new provisions, any packer may use, for Schedule A items, up to 95 per cent of the new drum weight used for the same commodity group during the corresponding quarter of 1943.

Seven classes of commodities that may have been packed in fibre drums during 1943 are now permitted the use of steel drums on a percentage basis. The commodities include paints, synthetic resins, varnish, lubricating greases. It is estimated that this will result in a saving of about 13,000 tons of fibre board during 1944.

Schedule B lists the commodities for which new steel drums—perfect or rejects—are not permitted and provides that certain of these products may be packed in second-hand drums. These products include alcohol, some oils, certain greases and tallows. Schedule B also lists many commodities, often packed in new steel drums during peace-time, for which no metal drums—new or used—are permitted. Examples of these products are some dye chemicals, glues, shellac, sand, pectin, meats, olives. This does not represent a new action, but clarifies the practice of many months, WPB said. Other shipping

OUR BEST-DRESSED MEN WEAR NO HOSE THIS YEAR!

The Chemical Warfare Service of the Army has provided this style note. ★ To lighten the load of paratroops, armored forces, assault infantry and amphibious troops, the Chemical Warfare Service has developed a streamlined gas mask which does away with the hose by attaching the canister directly to the facepiece.

It's a design that results in a gas mask lighter to carry, more comfortable to wear . . . and gives the soldier greater freedom of action. Crown Can is making the canisters for this new model . . . just as Crown Can made them for the older types.

Crown is proud of its part in the development of this new gas mask. For the duration, the whole Crown organization places the needs of our armed forces first . . . whether those needs are for weapons of war or for the cans to carry food to the front.

CROWN CAN COMPANY

NEW YORK • PHILADELPHIA   Division of Crown Cork and Seal Company, Baltimore, Md.

★ ★ CROWN CAN ★ ★

containers are available to products denied the use of steel drums.

Under the previous form of L-197, the use of new drums for some commodities was permitted only on specific authorization. The new schedule anticipates any question as to drum use and therefore eliminates paper work both on the part of industry and the War Production Board, the agency said.

More flexibility in the use of drum quotas is permitted under the amended order. Packer's unused quarterly quotas may be carried into the next quarter for packing the commodity classification to which the quota was assigned, but quotas may not be transferred from one commodity group to another. To relieve an emergency demand, 25 per cent of the next quarter's quota may be borrowed. All new drums, perfect or rejects, are under quota except those purchased by or to be shipped directly to the armed forces, Maritime Commission or under Lend-Lease.

Although present quotas are slightly below usage during last year, WPB said the order will permit use of all the sheet steel that can be made available for drums and pails at this time. The supply of sheet steel for containers is limited by expanded military demands for sheet steel capacity.

Under the amended order, preference ratings may not be used in the purchase of drums unless specifically assigned by military procurement agencies. Industrial ratings are eliminated. All existing ratings, lower than AA-2x, become void at once. Higher industrial ratings remain in effect until scheduled orders are delivered. This action is expected to facilitate deliveries, WPB said. As new steel drums are permitted to industrial users only for higher essential purposes, it is difficult to distinguish relative essentiality by ratings, the agency said.

Purchasers of new steel drums, perfect or rejects, are permitted sixty-day inventories by type of drums, or total inventory of one and one-half carloads, whichever is greater.

Proposed Amendments to I.C.C. Regulations

On May 2, 1944, the Interstate Commerce Commission issued proposed amendments to the Interstate Commerce Commission Regulations. These proposed amendments affect the shipment of Fluosulfonic Acid, Monochloracetone (unstabilized), Chlorpicrin, Bromacetone and Acrolein. They also affect Specification ICC 11A, wooden barrels.

These proposed amendments are issued under what is known as a 20-day notice in which any party desiring to be heard may advise the Commission in writing within 20 days within the issuance of the notice.

Final determination by the Interstate Commerce Commission of these proposed amendments will be published in Chemical Industries as soon as they are promulgated.

Container Cover Safeguard Against Leaks

The pressure of war has brought another packaging idea that appears to have definite post-war possibilities. According to a release from the United States Rubber Co. dangerous, corrosive acids such as hydrofluoric and a wide variety of solvents may now be transported in collapsing emergency aircraft cargo containers as a result of the development of synthetic resin-coated fabrics for container covers.

These container covers are made in flexible disc form, measure 56 inches in diameter. They are assembled in two parts in sheet form. One is a light cotton fabric which is treated with vinylite. The other is coated with synthetic rubber. They are held together with small eyelets spaced about three inches apart which are stapled into the material. A lightweight cord is drawn through the eyelets. The completed article is then ready to be placed around either a glass or metal container and drawn tight, much as a tobacco pouch, to insure against spillage on any part of the plane.

The need for this article was found when Army aircraft engineers found that spillage of acid resulting from accidental breakage while in transit was seeping into the frames of planes which carried this corrosive cargo and doing untold damage to the fuselage. This method of shipping has completely eliminated this hazard.

Should breakage occur or the caps of the containers become loosened owing to vibration, the acids now spill into the emergency wrapping. A flexible hose is inserted into a rubber disc which is placed into the top of the container before the draw strings are tightened. The acid fumes are carried off through this tube, thereby completely dispelling any possibility of damage from fumes or liquid.

Bureau of Standards Insecticide Container Recommendations

Printed copies of Simplified Practice Recommendation R203-44, Containers and Packages for Household Insecticides (Liquid Spray Type), are available, according to an announcement of the Division of Simplified Practice, National Bureau of Standards.

The recommendation includes the pint, quart and gallon packages as the stock sizes for retail trade. Standard shapes and finishes of the glass containers for these stock packages are also shown in the recommendation. The 5- and 54-gallon drums are designated as the stock sizes for industrial packages.

It is estimated that the general adoption of this recommendation should result in a saving of approximately 19% of the glass formerly used in the packaging of household insecticides. Other savings are possible through use of less metal for closures; also through conservation of paperboard for corrugated shipping cases.

Copies of Simplified Practice Recommendation R203-44 may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 5 cents each.

Drum Return Incentive

In order to assure maximum re-use of scarce shipping cartons, Harold Boeschenstein, Acting Director of the WPB Forest Products Bureau, suggests that employers offer their employees nominal incentive payments for the return of that essential commodity.

As an example, say that a truck driver is offered three cents for each returned carton. Then, in making deliveries, he waits an extra minute or two while the carton is emptied, loads it back on his truck where it returns to his starting point and is of service in future deliveries. Such a plan need not be limited to a three-cent payment or to truck drivers, but can be adapted to the special needs of each company. Cash incentive, however, must be nominal in relation to the service performed and the value of the container. William H. Davis, chairman of the War Labor Board, has stated that nominal incentive payments, for cartons returned by employees, do not require specific WLB approval.

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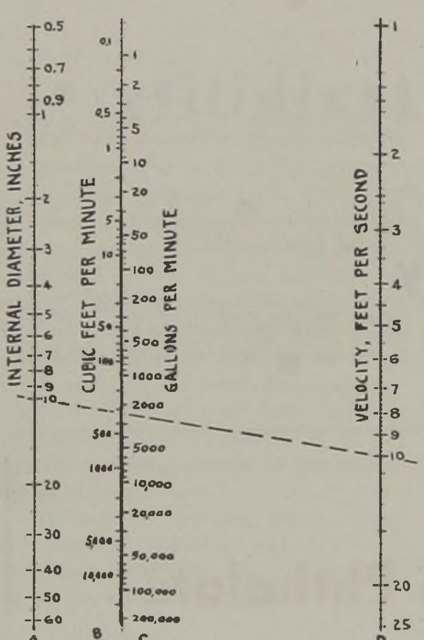
PLANT OPERATIONS NOTEBOOK

by W. F. SCHAPHORST

Water Flow Through Pipes

A water flow specialist asked the writer to prepare this chart in such a way that it would include all of the ordinary diameters from 0.5 inch to 60 inches, column A, and water velocities up to and including 25 ft. per second, column D. It is therefore a decidedly practical chart as the problems most commonly met are solved by simply running a straight line across through the two known points in columns A and D.



Thus for example the dotted line drawn across this chart shows that if the internal diameter of the pipe is 10 inches, column A, and the velocity of the water is 10 ft. per second, column D, the flow of water amounts to nearly 2500 gallons per minute, column C, which is equivalent to nearly 325 cu. ft. per minute, column B.

Supporting Loads With Standard Pipe

Ordinary pipes often come in handy for use as columns or struts, or for use as "push members" in transmitting forces. Due to its circular form a pipe is ideal for these purposes. No shape is stronger than a pipe.

However, when it comes to "figuring columns" it usually takes considerable time to dig around in handbooks, etc., and as a result the use of a pipe is avoided. Or, a pipe much too large is used—or perhaps too small—chosen entirely by "guess." The pipe that is too small may fail and be the cause of costly disaster.

Those who may have occasion to use standard pipes in this way will find the following simple table and rules of value:

1. Knowing the load that is to be carried and the length of pipe needed, make a "guess" as to the size of pipe. Column A in the tables will help in making the guess as it gives the maximum length of pipe that may be used. Thus, never use a ⅛″ pipe, as an important column, longer than 14.5″. Never use a 3″ pipe, as an important column, longer than 139″. Etc.

2. Multiply the length of the pipe in inches by the corresponding figure in column B of the table. This product should never be greater than 12,000. If it is greater than 12,000, it means that you have guessed a pipe that is too small. After getting the right size, proceed as follows:

3. Subtract the above product from 19,000. If the difference is equal to or less than 13,000 use it, in (4). If the difference is more than 13,000 use 13,000 in (4).

4. Multiply by the figure in column C, corresponding with the pipe size.

The result is the number of pounds that the pipe will carry as a column, strut, or push member. If the result is less than the load to be carried, try again, using the next larger pipe size, and so on until the proper and most economical size is selected

Size of Pipe, inches	*Column A Maximum Length inches*	*Column B*	*Column C*
⅛	14.5	826.4	0.07
¼	19.4	617.3	0.12
⅜	25.	480.8	0.17
½	31.3	383.1	0.25
¾	40.	300.3	0.33
1	50.6	237.5	0.50
1¼	64.7	185.5	0.67
1½	75.	160.5	0.80
2	94.7	126.9	1.07
2½	114.	105.3	1.71
3	139.	86.21	2.24
3½	161.	74.63	2.68
4	181.	66.23	3.18
4½	202.	59.52	3.68
5	226.	53.19	4.32

Let us now take an example to make certain that the above is fully understood. Let us say that we have a load of 10,000 pounds and we want to support it at a height of 84 inches. What size of pipe shall we use? Following the above rules we proceed in this way:

1. "Guessing" the size of pipe, column A shows that 84″ falls between 1½ and 2″ pipe. We will try a 2″ pipe because, of course, a 2″ pipe is stronger than a 1½″ pipe.

2. 84 × 126.9 = 10,650. This is less than 12,000 and we can therefore continue.

3. 19,000 — 10,650 = 8,350. This is less than 12,000 and we can therefore use it in (4). If the difference were 18,350 we would have to use 13,000 in (4).

4. 8,350 × 1.07 = 8,950.

This means 8,950 pounds, but since 8,950 is less than 10,000 pounds a 2″ pipe is too small. We will therefore recalculate, this time trying a 2½″ pipe. Briefly, the results are as follows:

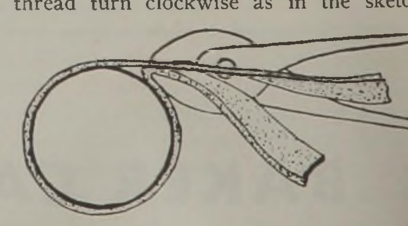
2. 84 × 105.3 = 8,850
3. 19,000 — 8,850 = 10,150
4. 10,150 × 1.71 = 17,370 pounds

A 2½″ pipe will therefore be amply safe to hold up 10,000 pounds at a height of 84 inches. The result shows that a 2½″ pipe is capable of holding nearly twice as much as a 2¼″ pipe at that height. The small difference in pipe sizes and the great difference in strength makes clear the necessity for careful computation and the danger involved in guesswork.

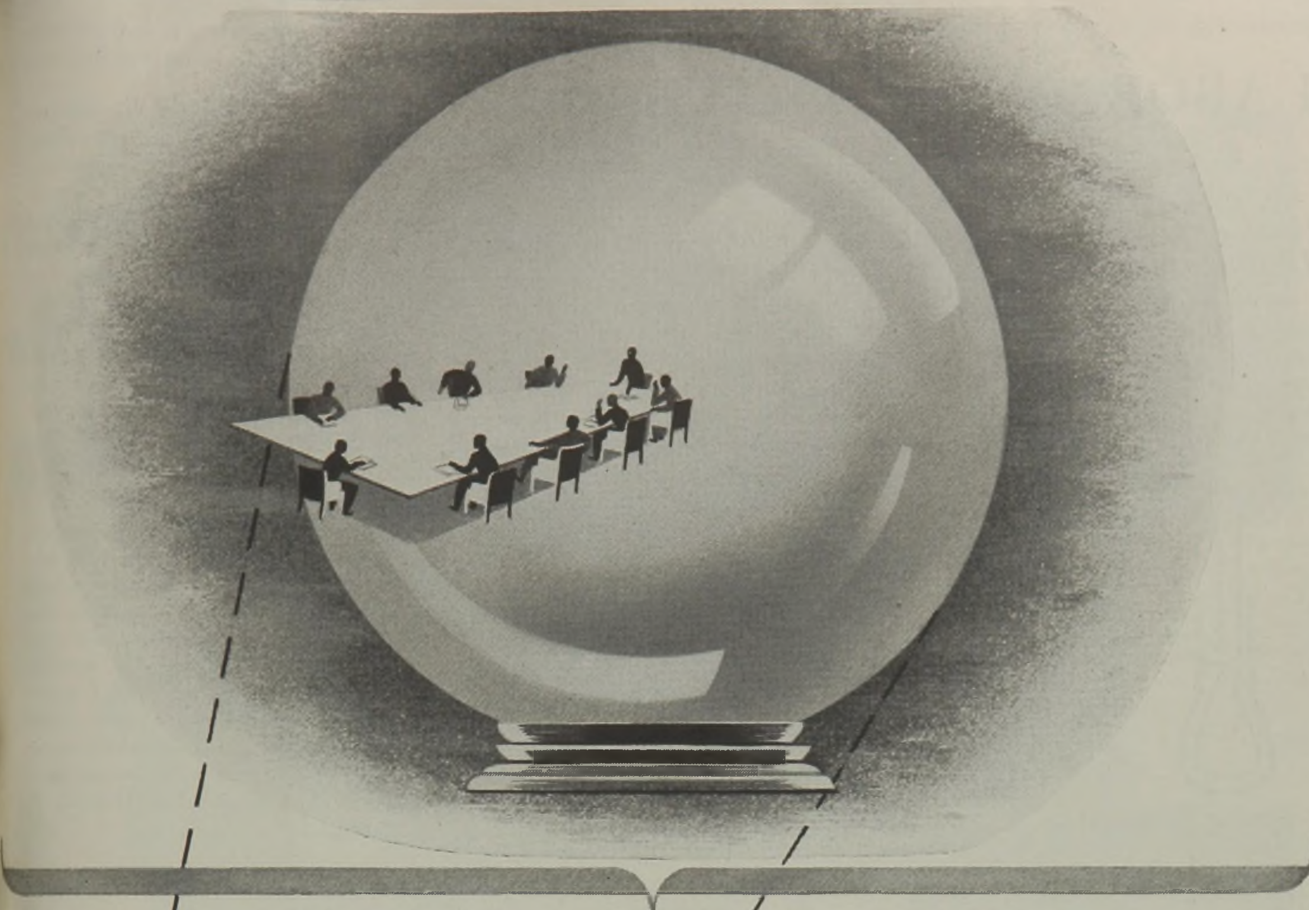
The above rules are based on the well known and much used "America Bridge Co. Formula."

Scratchless Wrench

When it comes to twisting "slippery round things," as we often must, the accompanying sketch shows how easy it is to make a good wrench out of a leather strap and a pair of pliers. Wrap the strap around the article to be turned, as shown, and grasp close to the article with the pliers. If it is desired to tighten a thread turn clockwise as in the sketch.



If the thread is to be loosened, simply pull the other way just as with any regular wrench. This idea is of special value where the article is nickeled or polished and must not be scratched as the leather forms a cushion between the pliers and the metal. If a single thickness of leather is not strong enough, use two thicknesses, or more. Or, use any other strong flexible material—even rope.



RCI Research Board Promises Big Postwar Advancements

What is America's largest producer of synthetic resins thinking about these days? *What is RCI planning for after the war?* These, and similar questions, load every mail at RCI.

And here's the answer: RCI is organized for peace as thoroughly as for war. Without abating one iota from its big war jobs, this organization is forging full speed ahead on postwar projects.

Right now a special research plan board is in session—weighing the peacetime value of the startling product changes brought about by war . . . scrutinizing the probable needs of the widely different industries and industrial processes that will follow Victory . . . laying plans that will not only maintain RCI leadership in its special fields, but will also vastly extend its services to all industry.

The time is not yet ripe to reveal results; RCI is, naturally, working only for Victory now. But you can be assured that when peace comes, with it will come new RCI products that will fully uphold this organization's reputation as a foremost exponent of progress in every sense of the word.

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LABORATORY NOTEBOOK

Improved Vacuum-Distillation Flask

An improved form of Anschutz distilling-flask illustrated in the figure and found useful during work on the isolation of members of the sterol group, is described by W. Schmitt and G. Coutelle in *Chemische Fabrik,* May, 1941, p. 200.

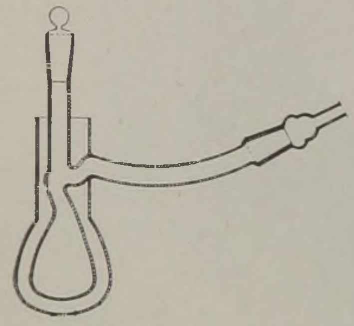

Fig. 1

It overcomes certain difficulties which arise in the distillation of unstable substances at high temperature under high vacuum. The distillation temperature of a substance is dependent not only upon the vacuum applied but to the degree of cooling of the neck of the flask. The heat supplied to the neck by the rarified distillate is so small that even when the neck is wrapped with asbestos it cannot be maintained at the temperature of the liquid in the body of the flask. In order to overcome the effect of refluxing it is necessary to raise the temperature of the liquid so that the vapors may raise the neck of the flask to the true distillation temperature.

Round the bulb and the lower part of the neck of the flask is fused a mantle, which holds the oil or other heating medium. All joints are closed with ground-glass stoppers or cones, since rubber is unsatisfactory for use at high temperatures. The heated oil maintains the neck at the same temperature as the liquid and refluxing is prevented. Using this form of flask the temperature of the liquid is many degrees lower than the conventional type for distillation at equal pressures. Where for instance a bath temperature of 200° C. is required to effect distillation from the ordinary flask a reduction of about 50° C. may be expected when using this new design; this reduction of temperature is considerably greater at higher temperatures. The small exposed surface of the oil bath prevents rapid loss of oil by vaporization.

Low Temperature Thermometer

A new low temperature thermometer graduated from minus 200 degrees to plus 30 degrees Centigrade has been placed on the market. Designed to take the place of the pentane-filled thermometers formerly obtained from Germany, it is said to offer better performance, for the mixture of organic compounds used in this new instrument does not start to freeze until about —193° C., and then only after 30 to 60 minutes exposure. Conventional in style, 14 inches in length, with a 1¼ inch bulb this thermometer has an average discrepancy of 1.53° which is entirely satisfactory for many measurements of unusually low temperatures.

Utility Hand Tool

The simple yet highly effective principle of vibration is applied in a portable hand tool that literally writes on steel, cuts, slices, engraves or carves into plastics, stone, wood, cardboard or glass as the need may dictate, making 120 vertical strokes per second.

This utility tool called the Vibro-Tool offers a simple, fast and economical method for making identification markings on almost any type of material. Hard steel, such as is used for tools and jigs, can easily be marked by using a tungsten needle.

The Vibro-Tool marks tools, jigs, and dies for identification; cuts identifying numbers on production parts; engraves names on identification discs; engraves trade marks or other insignia on finished parts; engraves inspection marks or other data on machinery, finished products, or assembly line parts, to facilitate tracing on defective parts. Cuts cloth patterns; engraves on all types of glass stock, equipment or parts; cuts stencils, gaskets, washers, and patterns from rubber, fibre, cardboard, leather, etc.

Laboratory Motor Stirrer

A small model laboratory motor stirrer, put out by Otto R. Greiner Co., is adjustable to any angle by means of a ball joint, is non-sparking and brushless for stirring inflammable solutions, and can obtain speeds from a few R.P.M. to 3,000 R.P.M. with the rheostat control which also acts as an "off" switch. The chuck is adjustable and will accommodate glass or metal shafts. A six-inch monel shaft with a one and one-half inch propeller is standard.

New Glass Joint Pinch Clamps

A new type of pinch clamp put out by the Arthur H. Thomas Co. adds greatly to the convenience and speed of mounting and dismantling glass apparatus with spherical interchangeable ground joints, and reduces the possibility of breakage in handling.

New Desk-size Electron Microscope Shown

The electron microscope, in console desk form, which makes this important explorer of the sub-microscopic world available to smaller laboratories, schools, hospitals, and factories, was shown for the first time at the wartime conference of the Society of American Bacteriologists by Dr. V. K. Zworykin (seated left), associate director of the RCA Laboratories, Dr. James Hillier (seated right), and Perry C. Smith (standing), RCA engineer.

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ARMY E NAVY

INDUSTRY'S BOOKSHELF

Organic Medicinal Compounds

The Chemistry of Organic Medicinal Products, by *Glenn L. Jenkins* and *Walter H. Hartung*. John Wiley & Sons, Inc., N. Y., 1943; 675 pp., $6.50. Reviewed by *Ernest H. Volwiler*, Abbott Laboratories.

THIS BOOK fills an obvious need which previously has not been well met in any language. Its object is to present, in organized form, the important organic medicinal compounds arranged according to the accepted scheme of chemical classification. In the various chapters the authors discuss first the general reactions involved, together with the chemical properties, and then present a brief but informative discussion of the more important medicinal compounds coming within that chemical category. For each class there are given methods of preparation, properties, and descriptions of the more important representatives. Brief statements regarding uses and modes of administration are included.

In certain instances correlations of physiological action and chemical constitution are stated. However, these correlations are necessarily quite limited because of the difficulty of extending such correlations to any considerable or particularly useful degree. In a field of such wide scope it is obviously impossible to cover much of it by specific references; hence, the general references that are provided at the end of each chapter are particularly useful. The tables are very well chosen and provide much useful information.

Few criticisms of the material can be offered. In the discussion of Vitamin K_1, credit for its simultaneous synthesis should be given to Doisy, et al. and Almquist, et al., as well as to Fieser and his group. In the discussion of penicillin, the commonly used sodium and calcium salts merit consideration rather than the ammonium salt which is not being used. In view of its importance, penicillin might well receive more extended consideration in the book.

This second edition has been completely revised and some of it largely rewritten. A brief new chapter has been included on, "Some Physiochemical Properties of Medicinal Products."

This book presupposes at least some knowledge of organic chemistry. It is very useful for chemists who are engaged in the drug field, physicians, pharmacists, and students. Each of these classes can find so much useful and readily available information in the book that it merits a place close at hand.

Chemistry of Wheat

The Constituents of Wheat and Wheat Products, by *C. H. Bailey*. Reinhold Publishing Corp., 1944, $6.50, 332 pp. Reviewed by *Ezra Levin*, Viobin Corporation.

THIS is an A. C. S. monograph. Say the editors, "When men who have spent years in the study of important subjects are willing to coordinate their knowledge and present it in concise readable form, they perform a service of the highest value."

C. H. Bailey fulfills his commission in this volume. Anyone who is interested in wheat and wheat products will want this book. One third of the volume deals with proteins of wheat, an excellent historical perspective. But the reader will not find any reference to the significant studies on proteins of wheat after 1939; not a word about biologic values of wheat proteins. The chapter on vitamins of wheat and wheat products, however, which is quite complete, is brought up to 1943. The data on starch are excellent, but here again—as far as they go—to 1941.

It may be that no work of consequence has appeared dealing with the sugars of wheat or wheat products since 1938. It may also be true with the chapter on gums, pentosans, hemcellulose and cellulose, which with the exception of a private communication of July, 1941, and a 1939 work, deals only with older references.

In general, the same limitation is true about the excellent summary of lipids, phosphatides and sterols with the important references to the biologic values of the unsaturated fatty acids not to be found in this volume.

In the chapter on minerals, we find no reference to the significance of iron "availability" in terms of hemoglobin regeneration. The high "availability" of the iron in wheat products is considered by some workers to be equal to that of liver. Here again, this chapter is excellent, as far as it goes, almost entirely confined to work before 1940. It is no reflection on the quality of this work to state that this book, with the exception of the chapter on vitamins, is not qui up to date.

Some day, some worker on wheat a wheat products will write a text co lating the work on the germ, the bra and the endosperm separately. The st dent interested in any part of the ber will find the information all together its protein, minerals, lipids, etc., just he will find the other parts of the ber discussed. Today, more than ever b fore, we know that the analysis of whe is essentially an analysis of distinct pa of the wheat, so different in every r spect as to be considered completely se arate entities. To support such treatme is the fact that the utilization of whe for food or for industry, is almost e tirely differentiated according to the v rious parts of wheat.

Federal Labor Regulation

Wage and Hour Manual, 1943 Editi Bureau of National Affairs, Inc., Was ington, D. C., 1943, 739 pp., $7.50.

THE STRINGENT CONTROL wages and hours effected by the issuan of the Economic Stabilization, Premiu Pay, and Minimum Workweek Ord has made this manual of the rulings a interpretations relating to them of spec importance.

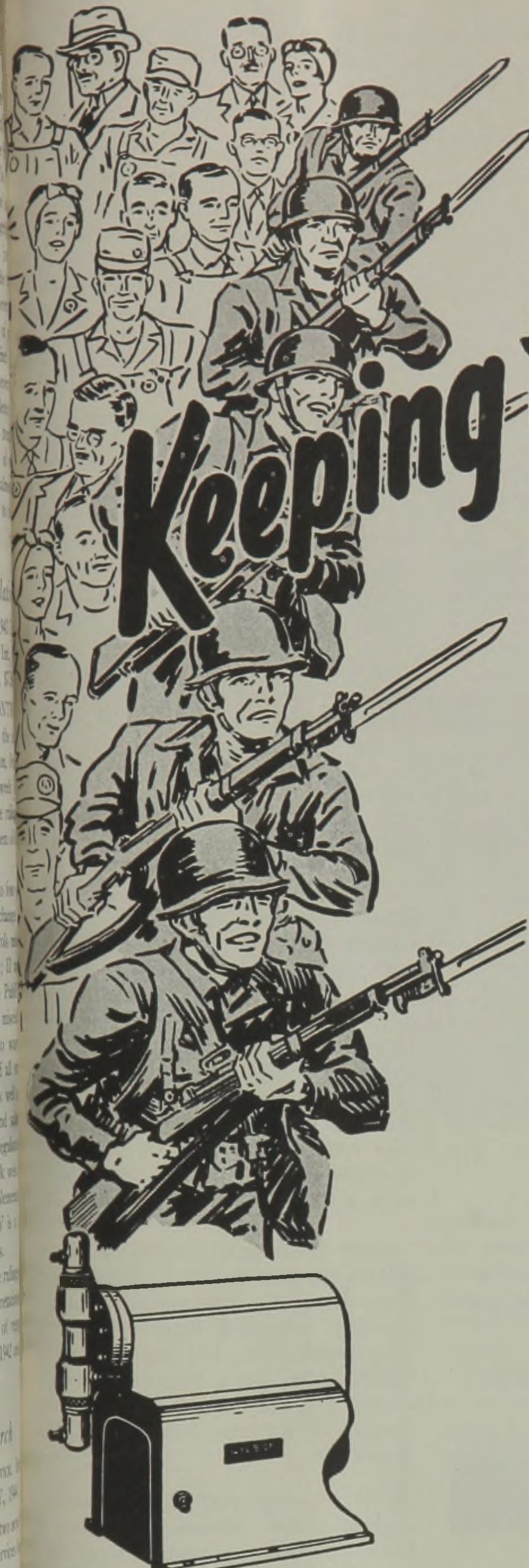
The manual is divided into four prin pal parts including I, all changes ma since March, 1942, in controls under Fair Labor Standards Act; II and I similar material under the Public C tracts Act and a group of miscellane federal statutes relating to wages a hours; and IV, the text of all statut and regulatory material, as well as a lytical articles on wage and salary s bilization, premium pay regulation, the minimum wartime work week. Pa I, II and III provides supplements to 1942 manual, and Part IV is a spe guide to wartime controls.

A topical index to all the rulings, re lations, articles, and interpretations is cluded with a finding list of regulati and statutes in both the 1942 and 1 editions.

Textile, Oils Research

Literature Abstract Service. Inter ence Publishers, Inc., N. Y., 1944.

THE FIRST ISSUE of two new lo leaf literature and patent services has peared. One covers Natural and S thetic Fibers and will be edited by Milton Harris and Dr. Herman M About 50 journals will be surveyed this service according to the publish The subscription price is $60.00 a (binder $3.00 extra). The other stract service covers Fats, Oils, Deterg and will cover material from about journals. The subscription price $36.00 a year (binder $3.00 extra).



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BOOKLETS & CATALOGS

Chemicals

A646. Acetate Liquid Dyes. A small folder explains the product, "Lucidip," and other special acetate liquid dyes used for dyeing lucite, plexiglas, cellulose acetate and tenite dyes in clear transparent shades, pastel or deep, with price listings of various quantities of the dyes. Kreiger Color and Chemical Co.

A647. Chemicals Price List. The quarterly wholesale price list beginning with April, 1944, has been issued by the Heyden Chemical Corporation.

A648. Finishings. A well-illustrated booklet pictures and describes the Wrinkle finish in all types of applications with particular emphasis on its use for war equipment. New Wrinkle, Inc.

A649. Natural Amino Acids. A price bulletin on natural amino acids has been published and is available. B. L. Lemke and Co.

A650. Plastic Coatings. A well-planned, illustrated catalog describes a new product, Amercoat, a plastic cold-applied coating, applicable by either brush or spray, which guards against contamination and corrosion. The catalog presents some of the Amercoat uses, its versatility in solving production problems, directions for its application, and illustrations from industrial uses in the foods, beverage, dairy, fishing and laundry industries. American Concrete and Steel Pipe Co.

A651. Price List and Catalog on essential oils, balsams, aromatic chemicals, oleoresins, certified colors, flavoring materials, and basic perfume products is available. Magnus, Mabee, and Reynard.

A652. Propylene Glycol. Technical information on a new versatile product, propylene glycol, N. F., may be found in a small attractive pamphlet recently published. It includes extensive lists of properties stressing its use in foods, flavors, extracts, cosmetics, and pharmaceuticals. The Dow Chemical Co.

Equipment—Methods

F111. Bending Presses. Catalog No. 2010-A on steelweld bending presses includes photographs of varied work being performed and covers many of the details of construction. It includes a complete table of sizes and dimensions. The Cleveland Crane and Engineering Co.

F112. Centrifugal Castings. A colorful, well-planned booklet explains and shows applications of centrifugal steel castings, and a chart of mechanical tests made with diagrams comparing centrifugal with ordinary sand castings. Pettibone Mulliken Corporation.

F113. Chain Belts. A new catalog descriptive of Rex Z-Metal chain belts for economical drive and conveyor service which are claimed to be superior to malleable iron or steel chain belts in tensile strength, high yield point and toughness. Chain Belt Co.

F114. Chart of Pipe Fittings. A large, colorful wall chart of all types of pipe fittings is available which includes photographs and cross-section diagrams of each of 63 different kinds of fittings. Charts of emergency interchangeability of parts, and of hose coupling and tube fitting thread sizes are also shown. The Parker Appliance Co.

F115. Combustion Control. Catalog N-01P-163 describes a new system of combustion control, Type P, designed for smaller industrial and municipal power plants. The system regulates fuel-feed and draft by a simple electrical balance, varying the settings of valves, dampers or vanes in definite proportion to steam demand, while furnace pressure is automatically regulated. Illustrations show the application of this system to different types of boilers, stoker fired, pulverized coal fired, gas fired, and oil fired. Leeds and Northrup Co.

F116. Continuous Blow-Off Systems. Bulletin 4081 descriptive of the continuous blow-off systems illustrates the application of this heat-saving device, the advantages from the standpoint of regulating boiler concentration, the type of equipment available for different heat balance requirements, as well as illustrations and photographs of installations, heat exchangers, and other devices of interest to steam users. Cochrane Corporation.

F117. Conveyor Systems. Bulletin 310 illustrates and describes air-operated conveyor systems for conveyance of fine, granular or fibrous materials. Morse Boulger Destructor Co.

F118. Couplings. An eight-page bulletin describes couplings designed for applications where space limitations make a close-coupled connection necessary or desirable, and includes engineering details, application diagrams and tables of sizes, ratings and dimensions. Farrel-Birmingham Co., Inc.

F119. Cutting Tools. A new, revised pamphlet entitled "Stellite Star J-Metal Cutting Tools" has just been published with sizes and prices of Star J-Metal round tools added to more complete data on standard square, rectangular, and tipped tools. In addition, the list of standard milling cutter blades has been extended; information is detailed on tool holders and adaptors made for use with Star J-Metal; and the sizes, prices, and descriptions of "Stellite" alloy wear strips are included. Haynes Stellite Co.

F120. Electronic Controllers. A new bulletin No. B220 describes a line of Free-Vane Electronic Controllers for automatically controlling temperature, pressure, liquid level, and humidity. The bulletin gives wiring diagrams, principle of operation and general description and features of the new instruments. The Bristol Co.

F121. Electronics. An interesting exposition called "Electronics Begins in Metals" is made in an attractive, illustrated booklet—the story told by F. L. Hunter, chief engineer Electronics Division, Fansteel Metallurgical Corporation.

F122. Engines and Compressors. Flow charts, diagrams and brief discussions of the use of compressors for repressuring pressure maintenance and oil conservation are featured in a 12-page booklet. Clark Bros. Co., Inc.

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CANADIAN REVIEW

by W. A. JORDAN

1943 Chemicals Production at All-Time High

PRODUCTION by Canada's chemical industries reached an all time high in 1943, according to a preliminary summary just compiled by W. H. Losee and H. McLeod of the Bureau of Statistics.

The official figures place the output value of chemicals and allied products at $653 million, up 30 per cent over 1942, and more than four times the prewar peak for the industry. However, a substantial part of the increase can be attributed to the higher returns from shell-filling plants. Without such an inclusion the overall increase was about 8 per cent, a figure more representative of the general trend in the chemical field.

In the entire chemical and allied product industry there were 918 establishments in operation, representing an investment of $559 million in fixed and working capital, and employing a monthly average of 105,755 workers. Salary expenditures totalled $143 million; raw material purchases $333 million; fuel and electricity $16 million.

Compared with 1942 the increase in capital was 19 per cent; in employment 14 per cent; salaries and wages 7 per cent; cost of materials 43 per cent; and value of production 30 per cent.

Nine divisions showed higher output values than in 1942 with total production in millions of dollars, as follows, and percentage gain over the preceding year in brackets: heavy chemicals $70.0 (7.4); compressed gases, $9.2 (12.2); fertilizers, $27.0 (27.6); medicinals, $48.4 (15.3); toilet preparations, $14.2 (16.0); adhesives, $5.0 (8.1); polishes, $6.4 (4.3); miscellaneous, including explosives and shell filling, $385 (52.9); soaps, $31.7 (0.5).

There was a decline in the output of paints, $44.4 (3.0); inks, $4.6 (4.9); wood distillation, $1.7 (2.3); and coal tar distillation $6.2 (8.5).

Chemical Imports Double

That Canada is progressively becoming a more substantial market for American chemical producers is revealed by an official statement that the U.S.A. supplied 88 per cent of the Dominion's $70.5 million imports of chemicals and allied products during 1943. In 1938 U.S.A. imports accounted for only 65 per cent of the total.

Imports for the year, by main groups, and in millions of dollars were: acids, $4.3; alcohols, $0.5; cellulose products, $4.8; drugs, $7.3; dyeing and tanning materials, $7.4; explosives, $1.3; fertilizers, $3.9; paints, $6.3; inorganic chemicals, $12.8; miscellaneous, $21.5.

In all but two groups, namely dyes and paints, the values were higher than in 1942. The total was about double normal prewar figures.

Maass Gets S. C. I. Medal

Otto Maass, chairman of the department of chemistry at McGill University, will receive the Society of Chemical Industry (Canada) medal for 1944. Dr. Maass has been closely associated with the pulp and paper industry in Canada for many years, and his outstanding work on the chemistry of cellulose is well known. He is consulting physical chemist and general director of the Pulp and Paper Research Institute of Canada.

Pilot Plant to Investigate Laevo-2,3-Butylene Glycol

As an outgrowth of research initiated in 1942 the National Research Council has just completed a $100,000 pilot plant to investigate on a semi-commercial scale the manufacture of laevo-2,3-butylene glycol from wheat.

The original research program was designed to appraise the possibilities of producing the glycol, economically, as a base for butadiene manufacture, but with Canada now committed to pertoleum butadiene, work has been realigned to study more intensively the potentialities of the glycol as such, and other derivatives.

Early laboratory studies resulted in a yield of about 9 pounds of glycol and 6 pounds of ethyl alcohol per bushel of wheat, or a glycol-alcohol ratio of 1.5 to 1. More recent process developments, based on bacillus selection, aeration, time cycle and temperature modifications, have increased this ratio on a laboratory scale to as high as 5 to 1. However, Dr. W. H. Cook and his co-workers emphasize that this is a laboratory figure and as yet pilot plant work has not progressed sufficiently to evaluate fully the economics of commercial production.

Canadian work has centered on the laevo-2,3-butylene glycol rather than on the meso-dextro type, because the laevo variety possesses interesting antifreeze properties, lacking in the mess form. For practical purposes the butylene glycol is equivalent in antifreeze value to ethylene glycol, of which Canada imports 11 million pounds annually in normal times.

Further investigations will be conducted at the pilot plant on the preparation of diacetyl, acetoin, and methyl ethyl ketone from the glycol by catalytic dehydrogenation or dehydration.

Cerium Oxide Abrasive

Research Enterprises, Ltd., Crown-owned optical glass producer, has constructed a unit for the preparation of optical grade cerium oxide, primarily for its own consumption.

A number of process improvements have been developed so that a uniform, high quality, polishing oxide can be prepared, and although most of the details are not revealed it is understood that, broadly speaking, production entails the conversion of the crude ceria to a phosphate, then to the nitrate, and subsequently to the refined oxide.

Even though the polishing properties of cerium oxide have been accorded consideration by a number of optical glass finishers of late, most Canadian companies still utilize rouge exclusively.

(*Turn to page 933*)

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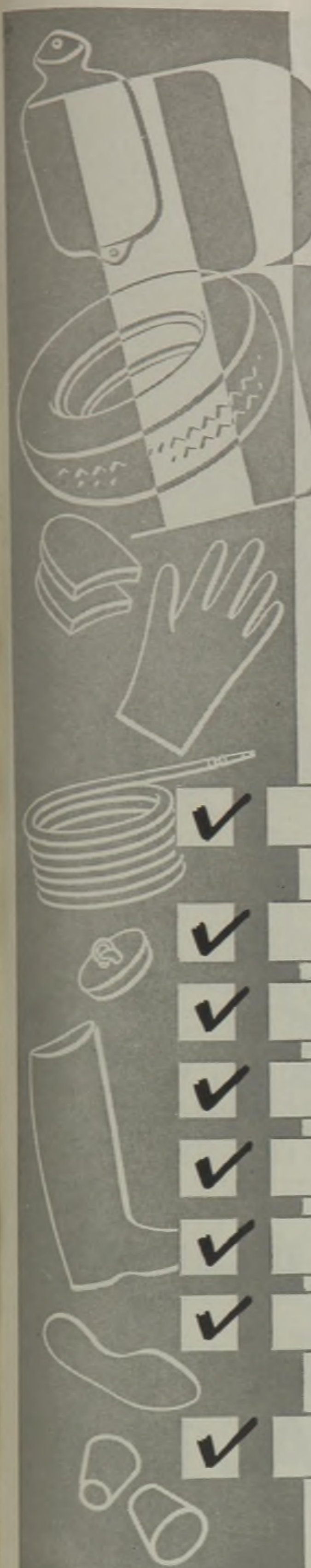

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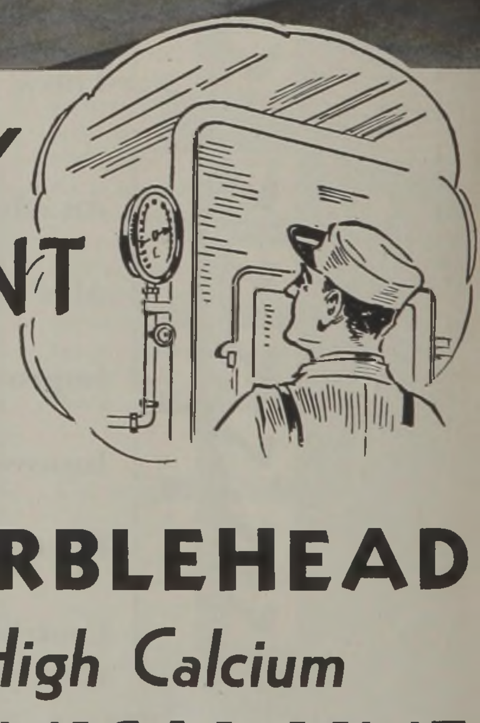

ON ACTIVE DUTY AT THE *Water* FRONT

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NEWS OF THE MONTH

MCA Hears Forecast on Trade, Industry

Derby stresses investment made in chemical industries. Governmental control of postwar trade a necessity, de Haas warns.

IN POINTING out that "we are waging technological warfare against an enemy who is technologically expert", Harry L. Derby, president of the Manufacturing Chemists Association of the U. S., declared at the association's annual meeting in N. Y., June 1, that one third of the total amount spent on the chemical war program between 1939 and 1944 was provided by private investment. The basis of industry's ability to complete, under stress of war, developments which in normal times would have required a generation to realize is the continually widening scale of the industry's research program on which more than 40 million dollars have been expended annually for many years. Chemical output increased 233% over that of 1939, and a further increase is possible if required, Mr. Derby said.

Besides the contribution of the chemical industry to such strategically important programs as aviation gasoline and synthetic rubber, Mr. Derby cited the unusual advances chemical research made possible in construction, medicinals, and plastics, all vital to the war program.

"An important development of the present war has been the progress made in the welding of ships, tanks, and planes, which involved a tremendous increase in the consumption of oxygen and acetylene.

"In the present war, deaths resulting from wounds have been reduced approximately 80% due to developments in medicines and the treatment of the wounded. The sulfa drugs, penicillin, and blood plasma are three of the outstanding items. Anti-malarial substitutes for quinine, when the latter was cut off by the Japs, have been an added contribution to the medical program without which our soldiers and sailors would have been subject to the gravest risks.

"Add to those the magic development of radio direction finders and the contribution to it by chemical products such as plastics; in fact, much of the development in the wide use of plastic materials has been hastened through war necessities. Synthetic resins now waterproof maps and food containers and through the impregnation and coating of textiles render them waterproof and flameproof."

Matthew Woll, vice-president of the American Federation of Labor, who addressed the association on the subject "International Trade as Viewed by American Labor", stated that "the outstanding post war problem is to find ways and means to meet the proper economic aspirations of both nations and individuals in order that the temptation to international war may be removed."

J. Anton de Haas, Professor of International Relationships, Graduate School of Business Administration, Harvard University, warned against over enthusiasm regarding the enormous profits to be made from post war export trade, before examining the prospects critically. Only adequate purchasing power on the part of foreign countries can translate the potential demand into an effective demand, and it will be some time before the purchasing power of Europe will be sufficiently recovered, he said.

"Strict control over imports, and over foreign exchange, will be inevitable, since purchases must be limited at first to the more essential items and to such industrial reconstruction as will create exportable goods in the shortest possible time. All this means that, as far as European countries are concerned, private enterprise will for some time play a relatively small part in foreign trade." In answer to those who favor a quick return of foreign trade to a private business basis, he said, "We may as well face it, whatever we might like to see, Government control over trade abroad will exist, not from choice but from necessity."

All officers of the Manufacturing Chemists' Association of the U. S. were re-elected. Harry L. Derby, president of American Cyanamid & Chemical Corporation, New York, N. Y., was re-elected president to serve for the coming year, and Lammot du Pont, chairman of E. I. du Pont de Nemours & Company, Wilmington, Delaware, was again named chairman of the executive committee.

Other officers re-elected were George W. Merck, Merck & Co., Inc., Rahway, N. J. and Charles Belknap, Monsanto Chemical Company, St. Louis, Mo., vice-presidents; J. W. McLaughlin, Carbide & Carbon Chemicals Corporation, 30 East 42nd Street, New York, treasurer; and Warren N. Watson, 608 Woodward Building, Washington, D. C., secretary.

Greer Joins Continental Carbon

Harvey G. Greer, lately of the Rubber Reserve Corporation, has joined the technical-service staff of Continental Carbon Company to handle its growing line of products for the rubber and synthetic rubber industries.

WPB Approves Exploratory Industrial Alcohol Plant

War Production Board approval of the $2,247,000 project of the Willamette Valley Wood Chemical Company for a plant near Eugene, Oregon, to produce industrial alcohol by the hydrolysis of wood wastes was announced by Donald M. Nelson recently.

Mr. Nelson said the plant had been approved on the basis of its exploratory value. Successful development of a method for large-scale industrial alcohol production from wood wastes, he said, would represent a form of national insurance against any future raw materials shortages.

The WPB chairman said that the Oregon plant presumably could not be brought into operation before the spring of next year and therefore could not make any immediate contribution to the war effort. It was for this reason, in conformity with the policy of the War Production Board, that the project was denied approval by WPB's Requirements Committee some time ago. Furthermore, the new plant's capacity of 4,100,000 gallons per year, will not of itself have any great significance in the 1945 alcohol program. Its value will lie chiefly in establishing the practicability and efficient design of additional plants, the WPB chairman said.

Flavoring Extract Group Hears Reports on Alcohol, Raw Materials, Containers, Supply Problems

Industrial alcohol production in the post-war years will range from 250,000,000 to 300,000,000 gallons a year, almost three times normal prewar output, after emergency alcohol sources such as beverage distilleries are returned to their normal uses, Milton F. Martin, of U. S. Industrial Chemicals, Inc., stated at the opening day session of the annual meeting of the Flavoring Extract Manufacturers Association, held in New York, May 22 and 23.

Mr. Martin further declared that the future of alcohol production is closely tied to the uncertain future of the nation's synthetic rubber plants, which currently are consuming three times as much alcohol as was consumed for all purposes in pre-war years. Regardless of Government actions, "certain types of synthetic rubber are here to stay," Mr. Martin said, adding that the industry will remain a sizable user of the chemical after the war.

Other subjects which featured this meeting were manufacturing problems growing out of the shortage of certain raw materials, together with a review of the container supply situation. The business of flavors has increased in volume in the last two years by 50 per cent, Lloyd Smith, of the Virginia Dare Extract Company, Brooklyn, N. Y., told the meeting in his report as president of the association.

Garret F. Meyer

Elected to succeed Mr. Smith as president was Garret F. Meyer of the Warner-Jenkinson Manufacturing Co., St. Louis. Other officers elected were: First vice-president, William B. Durling, of the William J. Strange Company, Chicago; second vice-president, George E. Chapman, of the Liquid Carbonic Corporation, Chicago; third vice-president, Clark C. Nowland, of the George H. Nowland Company, Cincinnati; treasurer, Leslie S. Beggs, of the Styron-Beggs Company, Newark, Ohio; secretary, E. L. Brendlinger, of the Dill Company, Norristown, Pa.; corresponding secretary, John Hall, Chicago.

Elected to the executive-committee were: Lloyd E. Smith, of the Virginia Dare Extract Company, Brooklyn, N. Y.; Frank Green, of the National Aniline Division of the Allied Chemical & Dye Corporation; John H. Beach, of Seeley & Co., New York, and John N. Curlett, of McCormick & Co., Baltimore.

Elected to the advisory committee were: Leland P. Symmes, of the Baker Extract Company, Springfield, Mass.; George M. Armor, of McCormick & Co., Baltimore; George H. Burnett, of the Joseph Burnett Company, Boston, Mass., and Clark E. Davis, of the Virginia Dare Extract Company, Brooklyn, N. Y.

Axis Chrome Supply Curbed

The export of all chrome to Germany from Turkey ceased on April 21 after prolonged negotiation between Turkish and British and American diplomats. This stoppage of the export of chrome from Turkey is a serious blow to the war economy of the Axis; it will deprive Germany of at least half of her supplies of an essential alloying element. Some chrome is theoretically available in certain mines in Yugoslavia and Greece, but deliveries from these are problematical today, to say the least of it. It is pointed out that the weight of this blow will be all the heavier now that the manganese deposits of Nikopol are no longer accessible to the Germans, and that the tungsten supplies from Spain are reduced to a minimum.

Turkey's exports of chrome in 1943 amounted to 47,000 tons to Germany and 56,000 tons to the United Nations; in January and February, 1944, however, 14,800 tons went to Germany and only 1,870 tons to the Allies, the falling off in the latter supply being ascribed to transport difficulties. Reports from Ankara have stated that exports to Germany had also been greatly reduced during recent weeks for similar reasons.

New Industrial Research Project Instituted at Columbia

A center for industrial research in the field of high-frequency electrical heating has been established at Columbia University, it is announced by Professor Arthur W. Hixson, head of the department of chemical engineering.

The laboratory, which is located in Havemeyer Hall, will be operated by Columbia chemical engineers and by scientists and technical experts from the Induction Heating Corporation of New York, which provided the high-frequency equipment for the new research enterprise. The Columbia department of chemical engineering will have full authority in guiding the laboratory program and in publishing the researches, Professor Hixson said.

High-frequency heat is already being used successfully in the dehydration of foods and in the setting of glue between plywood layers. It is believed that it will have wide application in such processes as the drying of lumber, soap, and ceramic materials and in the curing of rubber and the shaping of synthetic plastics.

The research program, which will attempt to discover the basic principles of high-frequency heating and to apply them to industrial uses, is under the direction of Professor Hixson, and Professor Philip W. Schutz, of the department of chemical engineering. Everette K. McMahon, a graduate of the Georgia Institute of Technology and a specialist in chemical engineering applications of high-frequency heating, is in charge of the laboratory.

Neoprene Production Expands

Construction has begun on additions which will increase the neoprene plant capacity at Louisville, Ky., by fifty per cent, the Du Pont Company announced.

The government-owned plant, built and operated by the Du Pont Company, has been producing in excess of its rated capacity of 40,000 tons of neoprene synthetic rubber per year. The expansion just authorized by the Defense Plant Corporation will bring the rated capacity up to 60,000 tons. Work on the new construction is expected to be completed by the end of 1944.

A.S.T.M. Plans Annual Session

The one hundred technical papers and reports being presented at the forty-seventh annual meeting of the American Society for Testing Materials in New York June 26-30, have been arranged in sixteen technical sessions which begin Tuesday, June 27 extending through Friday June 30. All day Monday, the 26th, i[s] devoted to technical committee meeting[s]. As is customary, the papers on metal[s] have been grouped, those on cement an[d] concrete, building materials, etc.; the pro[-]gram being arranged so that if session[s] do run simultaneously, the subjects do no[t] conflict.

Features of this 1944 meeting at whic[h] the Society will take action on a numbe[r] of its widely used specifications and test[s] will include round-table discussions on th[e] following: Centrifugal Castings, Classi[fi]cation of Industrial Waters, Symposiu[m] on Colorimetric and Photometric Metho[ds] of Analysis and several addresses—o[ne] on "Minerals in War and Peace," by D[r.] C. K. Leith, the address of the Preside[nt]

Dean Harvey, and the Marburg Lecture this year by Dr. Harold DeWitt Smith on "Textile Fibers—An Engineering Approach."

Boric Acid Labeling Proposed

A resolution was introduced in the New York City Council, petitioning the municipal and state authorities to require "Poison" labels on all containers of boric acid. The bill was presented by Councilman Vogel at the meeting of the New York City Council on May 9 and referred to the Committee on City Affairs.

Similar legislation has been introduced in the House of Representatives by Congressman Sol Bloom. The text of his bill (H.R. 4708) has been referred to the Committee on Interstate and Foreign Commerce.

Industrial Conference Planned Again for Chemical Show

An important feature again this year of the National Chemical Exposition to be held Nov. 15 to 19 at the Coliseum in Chicago will be the National Industrial Chemical Conference. Noted authorities on virtually all phases of pure and applied chemistry will appear on the program at the various sessions to be held during the five-day period. All sessions are scheduled for the conference hall on the second floor of the south annex which may be entered directly from the show. The conference committee is now arranging the program.

Winthrop Faces Tainted Drug Distribution Charge

Distribution of contaminated medicinal supplies was charged to the Winthrop Chemical Co., Inc., in a criminal information filed in New York on May 25 in Federal Court by United States Attorney James B. M. McNally. The company is charged on twelve counts with shipping dextrose solution, atabrine, phenarsin hydrochloride, and neopharsin contaminated with living molds and pyrogens. The official opinion is that the drugs became contaminated through failure of the manufacturer to cleanse distilled water receptacles properly at its plant in Rensselaer, N. Y.

The Winthrop company has denied that its product was responsible for the reported death, and its president, Theodore G. Klumpp claimed that only a short time ago for the first time, standard tests were developed to detect the presence of pyrogens and undissolved material.

He said, "There is no scientific evidence that the solutions said to contain pyrogens and particles are in any way injurious, nor doe[illegible] company make any such charges.

"We regret that mold gained access to some of the dextrose ampules. We have every reason to believe that the mold in question is penicillin which is grown in our penicillin plant at Rensselaer, N. Y."

Mellon Institute Appoints Young

Dr. George H. Young has been appointed executive assistant at Mellon Institute of Industrial Research, according to an announcement by Dr. Edward R. Weidlein, director of that institution. Dr. Young has been associated with the Institute since 1935, first as industrial fellow, then as senior fellow, on the Stoner-Mudge, Inc., Multiple Industrial Fellowship on Protective Coatings.

Doering Lecture Course Scheduled at Columbia

Dr. William Doering of Columbia University, co-discoverer of the newly announced process for making synthetic quinine, will give a graduate lecture course on recent advances in organic chemistry in Columbia's six-week summer session, beginning July 3 and extending through August 11, it is announced by Professor Harry Morgan Ayres, director of the Summer Session.

The course will include lectures on the reactions of halides, olefins, carbonyl compounds, and conjugated systems in the light of the electronic and resonance conceptual scheme. Other topics are theories of aromatic substitution, mechanism of rearrangement reactions, and reactions involving free radicals.

Lamb Appointed to Bureau of Mines

Secretary of the Interior Harold L. Ickes has announced the appointment of George A. Lamb, of Idaho, former chief of the Economics and Statistics Division of the Solid Fuels Administration for War, to a newly created post of assistant director of the Bureau of Mines, and at the same time revealed that virtually all

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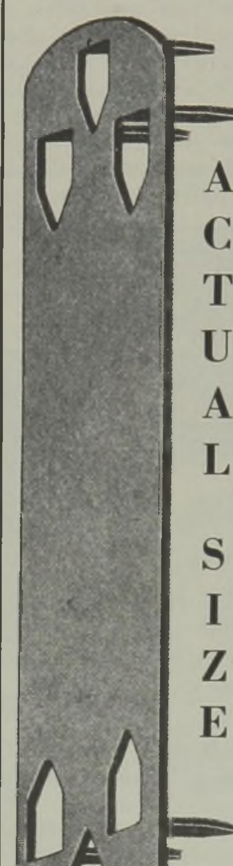

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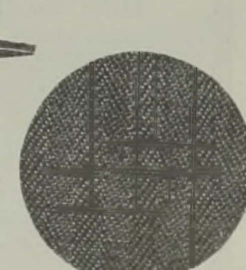

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activities of the Economics and Statistics Division of the SFA have been transferred to the Bureau of Mines.

Dr. R. R. Sayers, Bureau Director, said that Lamb will direct coordinating programs of the Bureau and will administer the expanded activities of the Economics and Statistics Service of the Bureau which maintains authoritative up-to-date information on all mineral commodities. Hereafter the Bureau of Mines will be responsible for the collection, compilation, and analysis of the bulk of statistical information regarding the coal industry (both bituminous and anthracite) of the United States.

Allied Chemical Continues Scholarships

Allied Chemical & Dye Corporation announces continuation of its graduate fellowships plan in universities and colleges during the academic year 1944-45. Although registration in graduate schools is at present below peacetime level, the company believes that availability of these fellowships will make possible additional research studies of war importance originating at the schools and at the same time will aid outstanding graduate students to complete their work for the Ph.D. degree. Nominations of fellows and selection of research subjects are made by the schools; any subject may be chosen which is expected to prove suitable for a Ph.D. thesis. Stipend of each fellowship is $750.

Universities and colleges to which fellowships are available for 1944-45 are:

University of California, California Institute of Technology, Columbia University, Cornell University, Harvard University, University of Illinois, The State University of Iowa, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, Northwestern University, Ohio State University, University of Pennsylvania, Pennsylvania State College, Princeton University, Purdue University, University of Wisconsin, Yale University.

Cuban Molasses-Alcohol Agreement Reached

Agreement has been reached between the U. S. and Cuban Governments in regard to the import by the former from the latter of blackstrap molasses. During the current year the U. S. is to purchase an initial minimum of 65 million gallons of the molasses to be used solely for the production of industrial alcohol. In addition, the U. S. is to buy from Cuba 12.5 million gallons of 190 proof industrial alcohol or, if Cuban alcohol production does not permit the export of this amount, an additional equivalent quantity of molasses will be shipped.

Bigelow Retires From Hercules

The retirement of Charles A. Bigelow, vice president, director, and member of the finance committee of Hercules Powder Company, was announced after the board of directors' meeting May 31. Mr. Bigelow became associated with Hercules in 1921 when Aetna Explosives Company was acquired by Hercules.

Anti-Malarial Drug Test Reported

Dr. Melvin H. Knisely of Chicago has announced the discovery of a way to test the effectiveness of anti-malaria drugs and predicted the method eventually would be used to measure the value of other disease treatments.

Dr. Knisely, Assistant Professor of Anatomy at the University of Chicago, told the Ohio State Medical Association the discovery resulted from three years of secret experimentation with malaria-infected monkeys at the University of Tennessee's Medical School.

Drugs administered to the diseased monkeys caused large masses of agglutinated blood to disintegrate, thus freeing the individual red cells and making the blood fluid again.

Aluminum "Feed Material" Freed

The Aluminum and Magnesium Division of the War Production Board announced on May 26 that limited amount of low-grade "feed material" would b released, as it becomes available for th manufacture of sub-grade aluminum pigment for unrestricted or partially re stricted use.

Paint manufacturers and distributors c aluminum pigment interested in obtain ing a supply of this type of pigmen should consult their usual sources of sup ply, WPB said. Since the terms unde which pigment manufacturers may obtai the aluminum feed material, as a resu

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ESTABLISHED 1919

of military contract cutbacks and changed specifications, will be determined in advance by directives issued by WPB, there will be no need for consumers or distributors to apply to Washington for such low grade pigment.

Barium Chemicals Advisory Committee

Fred Lester, general manager of the Chemical Products Company, of Cartersville, Ga., was elected chairman, and W. K. Coolidge, secretary-treasurer of the Chicago Copper and Chemical Company, of Blue Island, Ill., was chosen as secretary of the newly appointed industry advisory committee representing producers and dealers in barium chemicals at an organization meeting held recently in Washington, the Office of Price Administration has announced.

After the election of officers, the committee discussed with OPA provisions of a proposed dollars-and-cents price regulation covering barium chemicals such as barium carbonate, barium chloride, and barium nitrate, all of which are essential to the war effort.

Fuel Coordinators Appointed

Secretary of the Interior Harold L. Ickes has announced the appointment of 58 additional coordinators in the national fuel-efficiency program as signed pledges of cooperation from scores of industrial executives in all parts of the United States began pouring into the Bureau of Mines at Washington, D. C.

Now totaling 76, the list of coordinators who will direct a staff of approximately 5,000 regional engineers—including some of the nation's foremost fuel experts—is expected to reach 300. These thousands of volunteers, mostly from industry, are serving without compensation to help the National Fuel-Efficiency Council and the Bureau of Mines achieve their campaign goal—a 29,000,000-ton reduction in the annual commercial and industrial consumption of coal and proportionate savings in other fuels.

COMPANIES

Walter Kidde Acquires INGAS

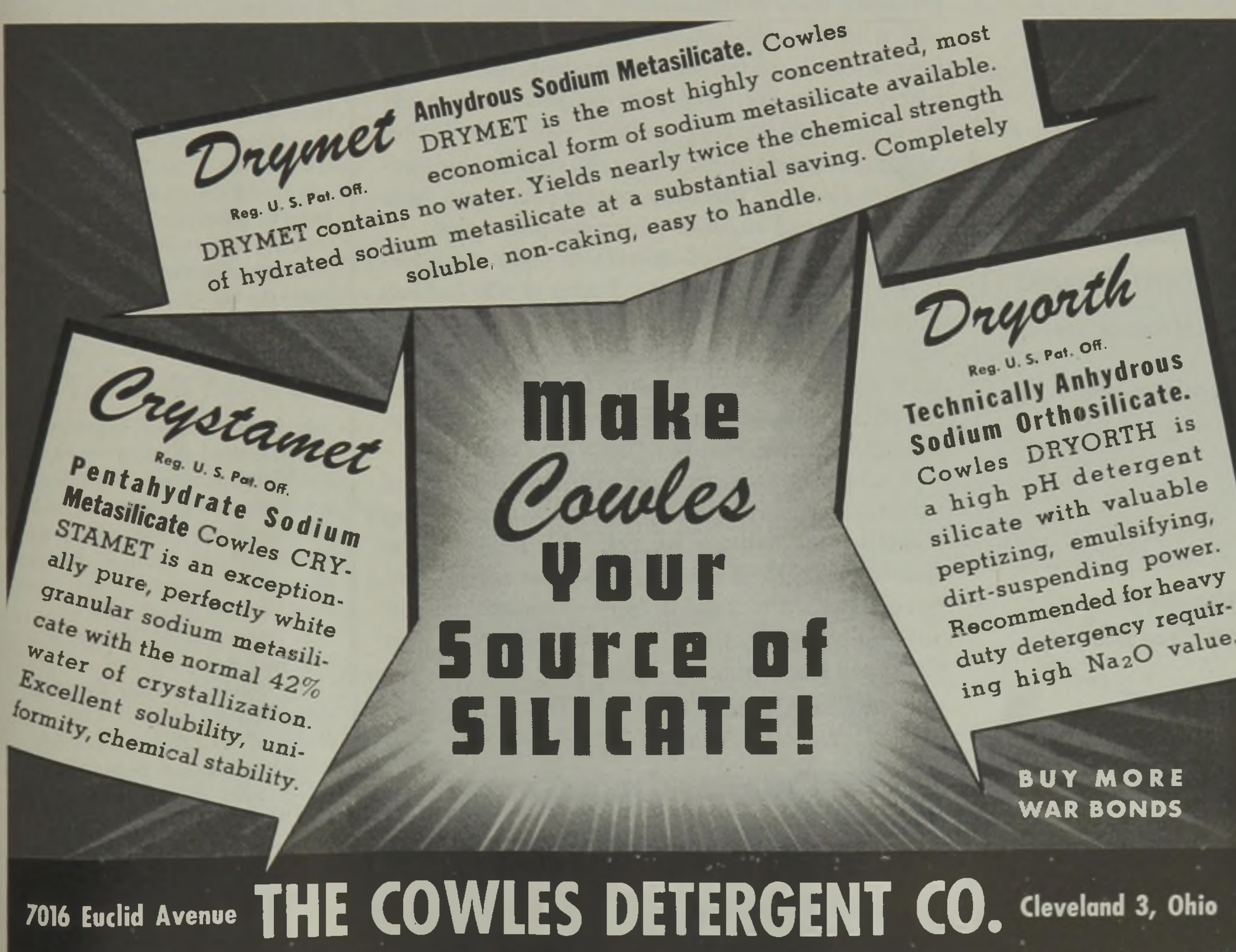
Purchase of the business assets and good will of the U. S. Fire Protection Company, makers of INGAS gas-generating systems, formerly of Hoboken and Milwaukee, is announced by Walter Kidde & Company, Belleville, N. J., pioneers in carbon dioxide equipment. Present government contracts will be fulfilled by Kidde. Interesting new applications for post-war use will be developed through the redesigning of the device to combat hazardous conditions in many manufacturing and processing industries where flammable materials, combined with vapors or dust, are of a combustible nature and highly explosive.

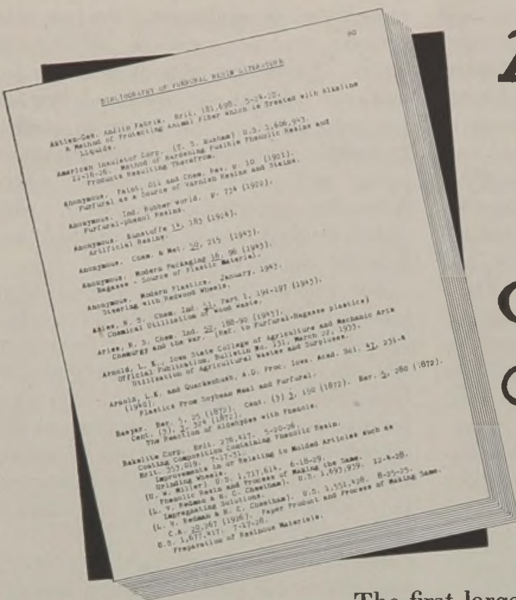
The systems produce an inert gas containing 12.9% carbon dioxide, 3% oxygen and the balance nitrogen compressed to 300 lbs. per square inch and piped to hazardous spaces, and may be widely used for fire and explosion prevention in the oil industry, in the manufacture of paints, varnish, film, rayon, in rubber factories, flour mills, and on grinding and conveying apparatus.

Research experiments are now under way which will offer interesting applications of this device in many new fields such as the processing of dehydrated foods and on units such as mixers, ovens, dryers, grinders or pulverizers.

Continental Can Enters Plastics Field

Continental Can Company, Inc., America's second largest manufacturer of metal containers and crown closures, and an im-





DO YOU KNOW ABOUT *Furfural* RESINS?

The first large scale use for Furfural was as an aldehyde reactant in the manufacture of phenol-aldehyde resins. Over the years this use has expanded, although curtailed somewhat at the present time. Just as soon as Furfural again becomes readily available, it is expected to expand further.

One of the outstanding characteristics of Furfural-phenol thermosetting resins is their extremely long or extended flow at lower molding temperatures. On the other hand, at higher temperatures these resins actually cure more rapidly and with less difficulties than the corresponding formaldehyde materials. Furfural-phenol molding materials do not give the excessive blistering, burning, and sticking usually found at higher molding temperatures. Other outstanding properties are chemical inertness, water resistance, heat resistance, and superior electrical properties.

Another material of interest to resin manufacturers is Furfuryl Alcohol. Furfuryl Alcohol has the unique ability of resinifying in the presence of acids or acidic materials and will also condense with other materials to form resins of value. Applications include coating compositions, impregnating materials, and molding materials.

A bibliography listing all available patent and literature references has just been compiled and issued as our bulletin No. 90. This bulletin consists of 20 pages of mimeographed references that have appeared to date. A copy will gladly be sent without obligation to anyone requesting it on their Company letterhead.

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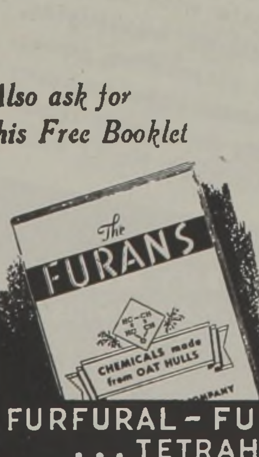

FURFURAL – FURFURYL ALCOHOL – HYDROFURAMIDE
... TETRAHYDROFURFURYL ALCOHOL ...

portant factor in the fiber container
has announced the formation of a pl
division, under O. G. Jakob, man
Continental has been engaged in the
duction of Marco-Board, a new syn
resin laminate, since early this year,
effective May 15th, acquired the bus
and manufacturing facilities of the I
old Molded Plastics Division of Rey
Spring Company, Cambridge, Ohio.

Headquarters of the new division
be located in New York City. It
comprise a Laminated Plastics De
ment handling Marco-Board, now
fabricated in Chicago and Jersey
plants and a Reynolds Molded Pl
Department handling the various pro
of the newly acquired Cambridge fac
While all of its Marco-Board outpu
the greater part of the Reynolds p
production will probably be devote
high priority military end use for the
ation of the war, an extensive inves
tion of post-war plastics markets i
ready under way.

Merck Opens West Coast Warehouse

Merck & Co., Inc., manufacturing c
ists, Rahway, N. J., has announce
opening of a west coast warehouse i
Angeles, California, on May 15, fo
service of customers in the State
Washington, Oregon, California, Ne
Montana, Idaho, Utah, and Arizona

Stocks of medicinal, nutritional, an
cal, industrial, and photographic cher
have been established at the Los An
warehouse which is located at 1855 I
trial Street. The Western division
office will continue to be located a
West Second Street.

G. A. Beauchamp, Jr., is Western
sion sales manager, and J. A. V
formerly of the company's St.
branch, is manager of the new warel

Du Pont Earnings Incre

E. I. du Pont de Nemours & Co. a
wholly-owned subsidiaries, in a repo
the March quarter, issued for publi
today, showed a net income of $17,24
equal to $1.38 a share, as compared
$14,739,314 or $1.16 a share, a r
about 17 per cent in the correspo
three months of last year.

A reserve of $33,865,000 was set
this year for taxes and renegotiatio
bility, compared with $30,984,000
initial quarter of 1943. Other charg
cluded $7,727,227 for depreciation a
solescence, against $9,246,136 last ye

Net sales in this year's quarter
$150,921,722, against $133,622,229
year, while operating income was $
344 against $9,657,322.

Included in the net was $7,500,
dividends on the company's common
holdings in the General Motors Co

Bagley Awarded Schoellkopf Medal

Presentation of the Jacob F. Schoellkopf medal to Glen D. Bagley of the Union Carbide & Carbon Research Laboratories, Niagara Falls, for his achievements in the field of research was made by Chairman F. Frederic Walker of the Western New York Section of the American Chemical Society at a dinner in Niagara Falls, Ont. Mr. Bagley was introduced by Vice President James H. Critchett of the Union Carbide Laboratories.

tion, or $2,500,000 more than the amount received from this source a year ago.

Surplus on March 31, last, amounted to $352,021,225, compared with $321,725,172 a year earlier.

Glickman Offices Moved

Chas. S. Glickman and Associates, consulting chemists, have moved their laboratories and offices to 39 West 38th St., N. Y. C. Mr. Glickman, consultant on waxes, polishes and chemical specialties and former research chemist for the West Disinfecting Co., will be assisted by Drs. Chas. Lankau, former chief chemist for the Egyptian Lacquer Co., and Jay Foster, former research chemical engineer with the U. S. Rubber Co. and E. I. duPont de Nemours Co. They will specialize in wax polishes, chemical specialties, automotive chemicals, lacquers, inks, alkyds, sanitary chemicals, synthetic waxes and substitutes for raw materials and industrial protective creams.

Sinclair Refining Expands Production

Sinclair Refining Company's six case Houdry fixed bed catalytic cracker at Corpus Christi, Texas, went on stream last week.

The unit charges a gas oil derived from Corpus Christi crude and has a charge stock capacity of about 11,000 barrels per stream day. It was originally designed for the Terminal Refining Corporation which undertook its construction as a DPC project. Late in 1942, Sinclair acquired the property and purchased all equity, investing its own capital in the completion and subsequent operation of the plant. Blending facilities are also installed for the production of finished aviation fuel.

The new Sinclair plant is the thirty-fourth catalytic cracking unit producing aviation base stock employing Houdry processes. It is the twenty-third Houdry fixed bed unit in operation.

Orbis Products Buys Catalin

In anticipation of a heavy post-war demand for important pharmaceutical and aromatic chemicals, Charles J. A. Fitzsimmons, president of Orbis Products Corporation, 215 Pearl St., New York, announces the purchase of the entire chemical plant of the Catalin Corporation of America, located at Matawan, New Jersey. This plant comprises 7½ acres of land upon which are 18 buildings of various sizes housing modern chemical equipment.

The Newark plant of Orbis Products Corporation will be retained and, as in the past, will be devoted to the production of essential oil derivatives, compounds, insecticides, and to the grinding of water soluble gums.

Company Notes

S. B. Penick and Co., botanical drug merchant and chemical manufacturer, New York, has purchased property at 209 Tenth Street, Jersey City, N. J.

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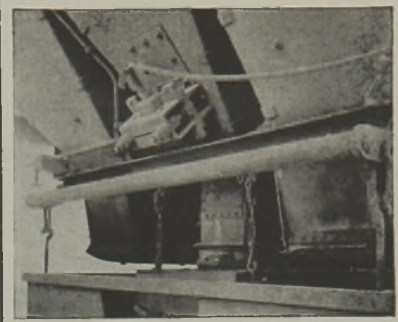

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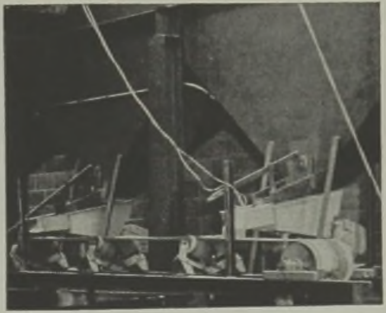

under those bins and hoppers to regulate their discharge by rheostat control of rate of flow.

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420 Lexington Homer City, Pa.





Announcement has been made by Union Carbide and Carbon Corporation of the election of the following presidents of subsidiary companies, reading from left to right: Dr. Joseph G. Davidson, president, Carbide and Carbon Chemicals Corporation, and Carbide and Carbon Chemicals, Ltd., James W. McLaughlin, president, Bakelite Corp., Stanley B. Kirk, president, The Linde Air Products Company, The Prest-O-Lite Company, Inc., Dominion Oxygen Company, Ltd., and Prest-O-Lite Company of Canada, Ltd., Arthur V. Wilker, president, Nation Carbon Company, Inc., and Canadian National Carbo Company, Ltd., Francis P. Gormely, president, Electr Metallurgical Company, Electro-Metallurgical Compan of Canada, Ltd., Haynes Stellite Company, Michiga Northern Power Company, and Union Carbide Compan of Canada, Ltd. Not shown are John D. Swain, pres dent, Electro-Metallurgical Sales Corporation and Joh R. Van Fleet, president, Vanadium Corporation.

The Chesapeake Chemical Company, Inc., which carries on the manufacture of anhydrous manganese chloride at 700 North Kresson Street, Baltimore, has installed additional machinery with the view to augmenting production. The president of the corporation is C. S. Hardester.

Amecco Chemicals, Inc., of Rochester, N.Y., has announced the appointment of D. H. Litter Co., Inc., New York City, as Eastern sales agents for their chlorinated paraffins.

The Holland Aniline Dye Co., Ho land, Mich., has changed its name t Holland Color & Chemical Co., to de scribe more accurately its present busines

Pittsburgh Plate Glass Compan Columbia Chemical Division, Barberto

U.S.I. CHEMICAL NEWS

June ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1944

Wide Potentialities Pictured for U.S.I.'s Ethyl Chloroformate

Product's Reactivity Facilitates Numerous New Organic Syntheses

Two factors are currently combining to rouse new interest in ethyl chloroformate (ethyl chlorocarbonate), a product which U.S.I. has been manufacturing on a commercial scale for many years. First of these is the broad range of synthetic possibilities opened up by recent investigation of the reactions of this unusual compound. Second is the lowered cost, resulting from improvements in equipment design and process control.

Major Uses

Among the older and better known uses of ethyl chloroformate are the production of flotation agents for ore refining and the synthesis of ethyl carbonate by a special process developed by U.S.I. Newer uses, demonstrating the extreme reactivity and versatility of ethyl chloroformate, include the following:

1. With ammonia it gives urethan; with hydroxylamine it gives N-hydroxy-urethan; with hydrazine hydrate it gives ethyl bicarbamate; with urethan or sodium urethan it gives ethyl imidodicarboxylate; with ethyl imidodicarboxylate it gives ethyl N-carbethoxy-imidodicarboxylate; with urea it gives ethyl allophanate and cyanuric acid; with guanidine it gives ethyl guanidine dicarboxylate; with sodium cyanamide or with cyanamide in concentrated caustic soda solution it gives ethyl cyanamidedicarboxylate.
2. It condenses with metallic sodium and ethyl iodide to give ethyl secondary-butyl ketone and other products.
3. It reacts with phenyl magnesium bromide to give ethyl benzoate and triphenylcarbinol; with ethyl magnesium bromide it gives triethylcarbinol; with alkyl magnesium bromides it also gives ethyl alkylcarboxylates.

(Continued on next page)

Other Chloroformates

Production of chloroformic acid esters of methyl, propyl, butyl, and amyl alcohols has been carried out successfully on a pilot plant scale in U.S.I.'s laboratories. While these products are not now in commercial production, inquiries concerning them will be welcomed.

Innovations in Chemical Usage Help Create New Paper Products

Finishing and Coating Patents Reveal Many Novel Applications for Solvents, Plasticizers, and Resins

Parachutes of rain-resistant paper "deliver the goods" to isolated troops. Paper paint containers "pinch hit" for tin cans. Waterproof paper "wraps" protect everything from aircraft engines to blood plasma. In scores of dramatic ways, new paper products take their places among the significant technological developments of the war.

Paper parachute at work.

In many present-day developments in paper finishing and coating, U.S.I. solvents, resins, and other chemicals are finding novel uses. Zein-alcohol solutions, for example, are used to waterproof wrapping paper. Sealing and coating processes utilize phthalates as plasticizers. In paper coatings, especially where oil and grease-proofing are required, U.S.I. alkyd resins are employed. And, of course, in a variety of processes, acetates, alcohols, and acetone are the key solvents.

Postwar Possibilities

In much of the progress promised for tomorrow, moreover, U.S.I. products seem destined to take an even more prominent part. Here are a few patents culled from recent literature which show the trend:

*A method to prevent discoloration of vinyl resin papers by heat entails the addition of the calcium chelate derivative of ethyl acetoacetate.

*For paper of high wet strength, a new product is added to the paper-making stock, and the mixture acidified with alum. The paper is then formed and heat-treated dry. The product involved is made by reacting glue and formaldehyde, and using ethyl alcohol to arrest the reaction just short of the gelling stage.

*Fusible, flexible, water-impermeable coatings for bread-wrapping paper are prepared using a neutral resin, diamyl phthalate, paraffin wax, and the reaction product of manganese oxide and dammar gum.

*Another moisture-proofing patent covers the treatment of regenerated cellulose with a mixture of ethyl cellulose, paraffin wax, ester gum, etc., using toluene and alcohol conjointly as the solvent.

*Still a third patent in this field includes the use of dibutyl phthalate as plasticizer for vinyl resin compositions.

(Continued on next page)

Predicts Adequate Supply of Super PYRO Anti-Freeze

Faced with the prospect of keeping the "old bus" going through another war winter, motorists will welcome U.S.I.'s recent announcement that Super PYRO can be expected to be available this Fall in about the same quantity as last year.

Particularly important in these days when new radiators, and even repairs, are difficult to obtain, Super PYRO affords an extra margin of safety in its high heat resistance and unique rust prevention features. Despite warm spells and sustained engine heat, Super PYRO stays on the job, seldom requiring replacement; it's always ready for sudden cold snaps.

Vitamin B_1 Repels Mosquitoes; Reduces Itching from Bites

Dramatic results have been obtained in the treatment of individuals severely affected by mosquito bites, according to reports in a recent issue of Minnesota Medicine. Tests showed that heavy initial doses of thiamin chloride, followed by smaller regular doses, not only reduce itching, but actually make the individual repellent to mosquitoes.

One case history was that of a man abnormally affected by mosquitoes. Before a fishing trip, he took three 40 mg. doses of thiamin. While other members of his party were bitten ferociously, he was bitten but a few times, and none of the bites were troublesome. Size of dosage in other cases varied widely, depending on the individual treated.

Preparing shells to be hurled against the Japs. Note the discarded paperboard containers in

Stabilizes Thionitrites in Diesel Motor Fuels

The effectiveness of thionitrites in improving the ignition properties of diesel fuels is well established. The difficulty has always been in the instability of the thionitrites after addition to fuel, where the presence of higher oxides of nitrogen tend to accelerate their decomposition.

Recently granted patents describe a method of stabilizing these thionitrites by the addition of small quantities of ethyl acetoacetate or similar compounds.

New Process Deodorizes Vitamin-Bearing Fats

Removal of objectionable tastes and odors from fat-soluble, vitamin-containing materials of the fish oil and fish liver group is the objective of a recently patented process.

The vitamin-bearing material or concentrate is first mixed with a natural antioxidant—containing substance such as vegetable oil. This mixture, dissolved in an alcohol, ester or ketone solvent, is cooled to a temperature at which layers form, separating the solvent concentrate from the insoluble residue.

Objectionable ingredients are then removed by heating the extracted concentrate, under reduced pressure.

Ivy Poisoning Responds to Extract Treatment

Excellent results have been obtained in the treatment of ivy poisoning by injecting an extract made by steeping powdered ivy leaves in absolute alcohol, according to a recent article in the Military Surgeon. The extract is said to retain its effectiveness and brilliant green color indefinitely.

"Tackifying" Synthetic Rubber

A new patent covers a method for imparting "tack" to certain types of synthetic rubber. The process involves the application to the surface of the rubber a solution of alkyl phthalyl glycolate in an organic solvent such as acetone, ethyl acetate, ethylene dichloride, or acetone and isopropyl chloride.

Ethyl Chloroformate

(Continued from preceding page)

4. With allyl iodide in the presence of zinc, it gives among other things triallylcarbinol.
5. With metal compounds of alkylacetylenes it gives ethyl alkylacetylenecarboxylates.
6. With alcohols or alcoholates it gives neutral alkyl carbonates—either mixed ethyl carbonates, or di-substituted alkyl carbonates; with quinine there results quinine ethyl carbonate.
7. With phenol it gives ethyl phenyl carbonates and ethyl salicylate.
8. With sodium sulphide there results dicarbethoxy sulphide; with sodium ethanethiol there results ethyl thiolcarbonate.
9. With ethyl sodium malonate it gives ethyl methanetricarboxylate; with ethyl sodium methanetricarboxylate it gives ethyl methanetetracarboxylate. With ethyl sodium acetoacetate there results much O- and a little C-ethyl carbethoxyacetoacetate; with ethyl sodium cyanoacetate it gives ethyl cyanomalonate; with sodium benzoate it gives ethyl benzoate and benzoic anhydride; with sodium ethylene glycol it gives diethyl ethylene dicarbonate, from which ethylene carbonate can be obtained; with potassium cyanate there results carbethoxy isocyanate, and, depending on the conditions, the tricarbethoxy derivative of isocyanuric acid, and also the triethyl, the diethyl carbethoxy, and the ethyl dicarbethoxy derivatives of isocyanuric acid.
10. It reacts with benzene in the presence of aluminum chloride to give ethylbenzene.
11. With bromobenzene and sodium amalgam it reacts to give ethyl benzoate.
12. With acetone and potassium cyanide there results O-carbethoxy-alpha-hydroxyisobutyronitrile.
13. With phenol carboxylic acids and alkali there result carbethoxy derivatives.

New Paper Products

(Continued from preceding page)

*In amino-acid-diamine-dibasic acid interpolymers used for coating paper, an alcohol-water mixture serves as the solvent.

*To improve the flexibility of abrasive paper, ethylene glycol is added to the bonding material.

*In a paper-coating composition comprised of cashew-nutshell liquid and urea-formaldehyde resin, butyl alcohol is used as the solvent. This coating is claimed to be especially suitable for lining the caps of food and other containers, and for electrical insulation.

TECHNICAL DEVELOPMENTS

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

Colored plastics can be produced by dipping acrylic and acetate plastics in a newly-developed dye, it is reported. The new dye is offered in 12 colors, including red, yellow and blue. **(No. 817)**

U S I

A paint and varnish remover, which comes as a water soluble, non-inflammable, semi-liquid material, is recommended by the manufacturer for use on metal, wood, plaster, and fabric. Because of the slow-drying property claimed for it, the new product should be good for large areas, while its run-proof properties recommended it for use on vertical surfaces. **(No. 818)**

U S I

A new sealing tape, said to be waterproof and suitable for use on various containers, has been developed. This new paper tape, when applied with the special solvent which comes with it, is claimed to become absolutely water-tight 72 hours after application. **(No. 819)**

U S I

A permanent ink, for use on glass and ceramic surfaces, is announced. The new product is applied with a writing pen or fine brush and may be stored in ordinary cans or bottles. The ink, when dry, is reported to be unaffected by soapy water and most solvents, and to be non-corrosive, non-inflammable, and non-poisonous. **(No. 820)**

U S I

A new synthetic rubber, reported to remain flexible at extremely low temperatures, is now being manufactured. In securing this cold resistance, however, some sacrifice of tensile strength and oil resistance is entailed. **(No. 821)**

U S I

A new lanolin replacement, suitable for use as a base in pharmaceutical and cosmetic manufacture, is announced. The new base can usually be employed without changing formulas or processes, says its maker. **(No. 822)**

U S I

A new disinfectant, of interest for use in surgical and gynecological procedures has been developed. Among the features claimed for the product is the fact that it can be used by pharmacists in preparing low-cost aqueous dilutions. **(No. 823)**

U S I

Repairs of rubber belts can be effected with sections of belting made from the new GR-S synthetic rubber, according to a rubber manufacturer. The synthetic and natural rubbers are joined by a vulcanized splice, using standard vulcanizing materials. **(No. 824)**

U S I

Protection against corrosion and fungi, for electric equipment, is said to be afforded by a new liquid compound which may be applied by brush or spray. The product is reported to have good adhesion, high dielectric strength, and an effective temperature range from minus 50 F to plus 350 F. **(No. 825)**

U S I

Cleaning and polishing copper, chrome, nickel and other surfaces can be accomplished in one operation, say the makers of a new acid-free metal polish. **(No. 826)**

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ACETIC ESTERS
- Amyl Acetate
- Butyl Acetate
- Ethyl Acetate

OXALIC ESTERS
- Dibutyl Oxalate
- Diethyl Oxalate

PHTHALIC ESTERS
- Diamyl Phthalate
- Dibutyl Phthalate
- Diethyl Phthalate

OTHER ESTERS
- *Diatol
- Diethyl Carbonate
- Ethyl Chloroformate

INTERMEDIATES
- Acetoacetanilide
- Acetoacet-ortho-anisidide
- Acetoacet-ortho-chloranilide
- Acetoacet-ortho-toluidide
- Acetoacet-para-chloranilide
- Ethyl Acetoacetate
- Ethyl Benzoylacetate
- Ethyl Sodium Oxalacetate

ETHERS
- Ethyl Ether
- Ethyl Ether Absolute—A.C.S.

RESINS
- Natural

ACETONE
- Chemically Pure

FEED CONCENTRATES
- *Curbay B-G
- *Curbay Special Liquid
- *Vacatone 40

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Ohio, announced the selection of the trade name "Allymer" for the complete line of Allyl Resin Monomers formerly known as Columbia esins and designated as C.R. 39, etc.

Wm. J. Roberts, Inc., Pittsburgh, Pa., will henceforth be known as Pioneer Chemical and Supply Co.

Fisher Scientific Company has established a new plant at 2109-2113 Locust Street in St. Louis, Missouri, for better service to laboratories in this part of the nation. Adequate stocks of modern laboratory appliances and reagent chemicals are on hand, and the plant has begun operation.

Stroock & Wittenberg, Division of U. S. Industrial Chemicals, Inc., is now an integral part of U. S. I.'s operations, and is being conducted under the name of U. S. Industrial Chemicals, Inc.

The Apex Chemical Co. has had construction of a laboratory and office building authorized by the War Production Board, at 200 South First St., Elizabeth, N. J.

M. Kali Manufacturing Company has occupied new buildings, in which are located the offices, laboratories and production machinery of this concern at 427 Moyer Street, Philadelphia 25, Pa.

Charles B. Chrystal Co., Inc., New York, N. Y., minerals, clays and colors, has removed its offices from 16 Hudson Street to 53 Park Place, where increased quarters and facilities will be available. Company warehouse and mills will be maintained in Jersey City, N. J., as heretofore.

Maas & Waldenstein Company, producer of industrial finishes, Newark, N. J., has practically doubled its present site, by purchase of an adjacent tract of land.

Selas Corporation of America (formerly The Selas Company), consulting and manufacturing gas engineers, Philadelphia, announces official change of its corporate name, as indicated.

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Rheologists Confer on High Polymers, Plastics

Reports on the rapid progress being made in controlling plastics were featured at the annual conference meeting of the Society of Rheology, held jointly with Polytechnic Institute of Brooklyn in the institute's auditorium, May 20th. The conference, led by internationally noted scientists, was on new methods of measurements to provide the practical man in the plastics industry with as exact formulas as those that have been developed by the metallurgist in the steel industry to make it possible for the manufacturers of plastics to produce new and better articles for the consumer.

Discussed at the conference was a specific example of a special custom-made material, polythene, which is scheduled to serve the homes of America after the war when television and frequency modulation sets are common. Polythene, which has been in use for the past 8 or 10 months, is a waxlike substance of great toughness and resilience, which can be made from coal or oil. This material was designed according to the wishes of the engineer and synthesized by chemists for use in high frequency equipment. It is a material now very essential in radio and radar reception.

Participating in this conference program on "Time Phenomena in Highpolymers" were a group of the outstanding leaders in the plastics field, including Dr. Raymond M. Fuoss, research chemist of the General Electric Company, Schenectady, N. Y., expert on the use of highpolymers in electrical insulation, who talked on "High Frequency Behavior of Polymers"; R. F. Boyer, a leading research chemist of the Dow Chemical Company, Midland, Michigan, "Transition Phenomena in High Polymers"; Dr. Turner Alfrey, research chemist at the Monsanto Chemical Company, Springfield, Mass., "Molecular Mechanism of Deformation and Flow"; and Dr. Robert Simba, assistant professor of chemistry at Howard University, Washington, D. C., who made the introductory re-

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marks and served as chairman of the conference.

Dr. Herman Mark, international authority on high polymers, who is president of the Society of Rheology and professor of organic chemistry at the Polytechnic Institute, led the discussion following the talks.

Russe Awarded Shipman Medal

The J. Shipman Gold Medal for distinguished service to the advancement of purchasing was awarded this year to Dr. Frederick W. Russe, director and vice president of Mallinckrodt Chemical Works, St. Louis, it was announced by Thomas D. Jolly, vice president, Aluminum Co. of America, Pittsburgh, at the annual banquet of the National Association of Purchasing Agents.

Controllers Institute Elects Members

Four new members from the chemical industry have been elected by the Controllers Institute of America: Theester A. Hamby, secretary-comptroller of American Creosote Works of La., Inc., New Orleans; J. M. Stonnell, comptroller of the Copolymer Corporation, Baton Rouge; Franklin C. Hill, assistant secretary and office manager of the Southern Wood Preserving Co., Atlanta, Ga., and Russell R. Fey, secretary-treasurer of the Chemical Products Corp., Cincinnati, Ohio.

Corbin Named to New Penn Salt Post

The Pennsylvania Salt Manufacturing Company announces the appointment as of May 6 of Gilbert H. Corbin, formerly field sales manager of its laundry and dry cleaning division, to be district sales manager in charge of the company's Minneapolis office.

War Improvements in Packaging Cited

Many substitutes in packaging will survive after the war in the proprietary medicine field said Dr. E. C. Merrill, United Drug Company, Boston, in an address before the scientific section of the Proprietary Association's 62nd Annual Convention in New York, May 15-17.

"In the field of packaging so much has been developed in the line of protection from water and moisture-vapor resistance of various materials, laminated cellulosic products and coatings galore, for the war effort that it is of little wonder that many of our methods of packaging will follow those improvements that have shown their worth in the protection of merchandise," Dr. Merrill said.

"The V-board container that does not disintegrate when wet was developed in the brief space of the early war period after the industry had sought for a method of treating paper over a period of thirty years to prevent it. Then there are the use of many new waterproof adhesives including urea formaldehyde and polyvinyl products, asphalts, starches, etc., the wax-dipped paperboard box replacing soldered tin plate for ordnance work, the protection of metal parts with paper and subsequently dipped in wax or sprayed with ethyl cel-

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Shortenings, Cooking Oils, Fats. Small quantities added to shortenings and similar products improve the smoothness and whiteness of the finished material.

Uses of MONOSTEARIN

Shortenings, Cooking Oils, Fats. This product also improves the smoothness and color of these materials and enables the incorporation of a small percentage of water.

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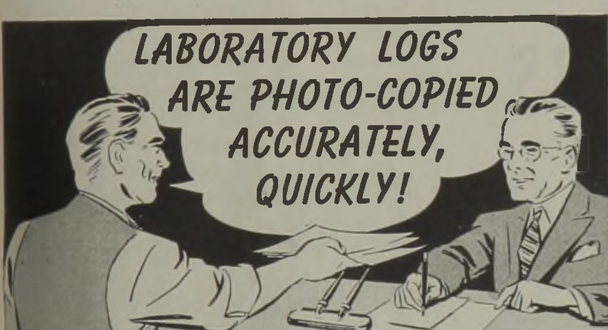

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Enzyme Destroying Penicillin Reported

Discovery that certain bacteria secrete a substance that destroys penicillin, and studies shedding light for the first time on the mechanism by which penicillin exerts its destructive effect on bacteria were reported at the annual meeting of the Society of American Bacteriologists in New York, May 5th.

Other investigations revealed the existence of a potent anti-bacterial factor in raw cabbage, onions and other plants.

The substance that destroys penicillin, named penicillinase, is an enzyme, a living catalyst or ferment secreted by the living cell. Bacteria that secrete this enzyme have been found to be resistant to the action of penicillin. Organisms susceptible to penicillin have been found not to contain penicillinase.

The destruction of penicillin by bacteria was reported by three groups of investigators: Drs. H. W. Woodruff and J. W. Foster of Merck & Co., Rahway, N. J., Drs. Amadeo Bondi, Jr. and Catherine Collins Dietz of Temple University School of Medicine, Philadelphia, and Drs. Alice T. Himes and Harold J. White of the American Cyanamid Company.

L. L. MALM has joined the technical staff of Industrial Rayon Corporation at Cleveland. Until recently Mr. Malm was sales manager of the Swenson Evaporator Company.

McCauliff Joins Glyco

The Glyco Products Company, Inc., Brooklyn, New York, through its vice president, Mr. E. Rosendahl, announces the appointment of Eugene McCauliff as technical sales director of the company. Dr. McCauliff has recently been engaged in consulting and advisory activities for the chemical industry.

PERSONNEL

Harker Leaves WPB Chemicals Bureau

Harvey M. Harker, deputy chief of the Aromatics and Intermediate Section of the WPB Chemicals Bureau, has resigned to return to the Monsanto Chemical Company. He has been replaced by L. A. Schleuter, who was chief of the coaltar unit and administrator of order M-27.

Mr. Harker has been with the chemicals bureau for about two years, starting in May, 1942, in the intermediate unit of which he later became chief.

Carbide Directors Named

At the annual meeting April 18th, stockholders of Union Carbide and Carbon Corporation elected Ralph R. Browning, Paul P. Huffard, and Homer A. Holt to the board of directors. Mr. Browning has been associated with units of Union Carbide and Carbon Corporation for 31 years, and Mr. Huffard for 35 years. Both have been vice-presidents of the corporation since 1939. Mr. Holt is a Charleston, West Virginia, attorney and was formerly governor of the state.

Du Pont Shifts Personnel

The du Pont Company has recently made several changes in personnel.

Dr. H. Wade Rinehart, chemist with the du Pont Company for the past eighteen years, has been appointed to the newly established position of personnel manager of the company's Rayon Technical Division.

E. L. Gartner has been appointed man-

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ager of the Metal & Ore Division, Grasselli Chemicals Department E. I. du Pont de Nemours & Company. V. R. Daub and L. C. Pejeau will act as assistant managers.

Leslie A. Vetleufer, a research group leader in the company's fabrics and finishes department, has been transferred to the personnel division, Wilmington, Del., and placed in charge of the company's college recruiting program.

Magnus Appoints Stanton

The appointment of Avery H. Stanton to the position of technical engineering consultant is announced by Magnus Chemical Company, Inc., Garwood, New Jersey. A graduate of the Massachusetts Institute of Technology, Mr. Stanton at one time was associated with Mason-Neilan Regulator Company, Boston, Massachusetts, and is well known in the pulp and paper industry.

Munson Heads Fifth War Loan Drive

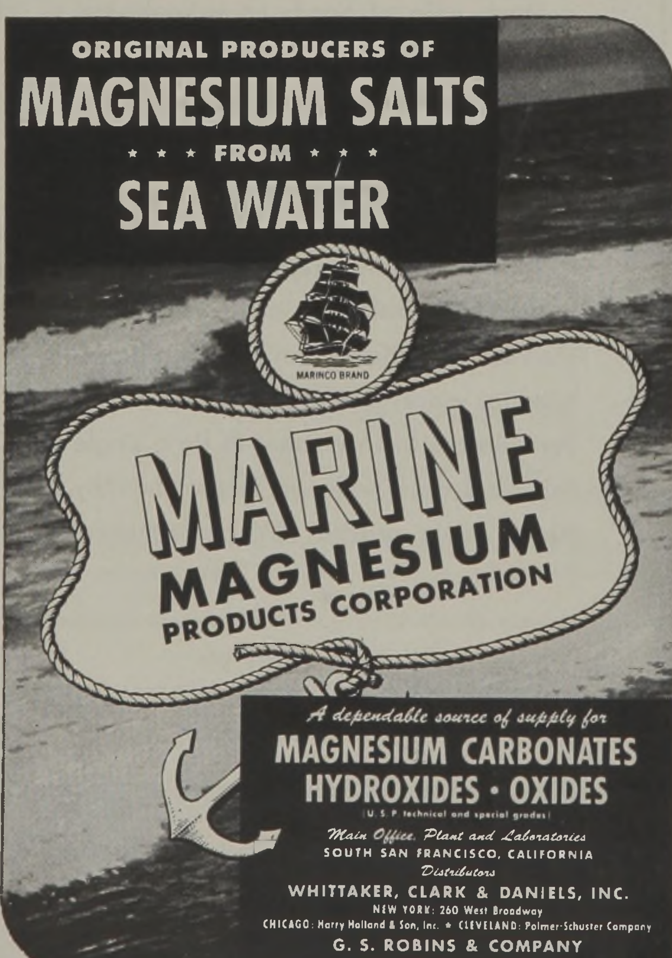
Charles S. Munson, center, president of the Air Reduction Company, is serving as the Chemical Industry chairman of the War Finance Committee of New York for the Fifth War Loan Drive. He is shown with W. R. Burgess, left, chairman of the Executive Committee of the W.F.C. of N. Y. and W. E. Cotter, right, director of the Commerce and Industry Division.

Monsanto Phosphate Division Changes Made

The promotion of E. A. O'Neal, Jr., to the position of production manager of the Phosphate Division of Monsanto Chemical Company has been announced by R. R. Cole, vice-president of the company and general manager of the division. O'Neal, who has been plant manager of Monsanto's Trenton, Michigan, plant since September, 1940, will make his headquarters at Anniston, Ala.

Dr. Arnow Named Research Director

Appointment of Dr. L. Earle Arnow as director of research has been an-



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nounced by Dr. W. A. Feirer, vice-president of Sharp & Dohme. Dr. Arnow has been directing the department of biochemistry in the medical-research laboratories of Sharp & Dohme for the past two years and succeeds Dr. Arnold D. Welch, who has been made professor of pharmacology in the School of Medicine of Western Reserve University, Cleveland.

SPEAKERS

Bruce Carr of the Electrochemical Department of the du Pont Company, addressed the western New York section of the American Institute of Chemical Engineers on the subject, "Aviation Gasoline Processes," in Niagara Falls, Ontario, on May 25.

L. W. Bass, director of the New England Industries Research Foundation, Inc., discussed the versatility of chemical engineering training which makes it ideal for careers in a wide variety of industrial fields at the May 19 meeting of the Junior Chemical Engineers of New York.

Foster D. Snell spoke at the annual meeting of the Student Affiliates of the American Chemical Society at Hofstra College on "Opportunities in Chemistry and Chemical Engineering."

George A. Sloan, president of the Nutrition Foundation, Inc., addressed the Institute of Food Technologists on May 29 on the recent progress and future possibilities in food research.

Sidney D. Kirkpatrick, editor of *Chemical and Metallurgical Engineering*, addressed the Chemical and Allied Buyers' Group of the National Association of Purchasing Agents in New York on May 29 on the topic, "Postwar Problems and Promises in the Process Industries."

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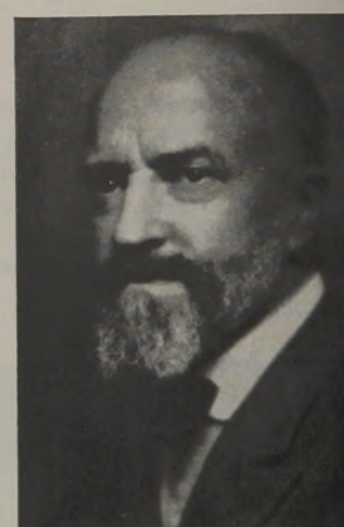
OBITUARY

William M. Grosvenor, Noted Chemist, Dead

Dr. William Mason Grosvenor of New York, retired chemist and chemical engineer, who had served as expert witness in more than 100 patent suits involving leading industrial firms, died May 30th in the Park East Hospital, after a long illness at the age of 70.



Born in St. Louis, he attended Root's Academy, Greenwich, Conn.; received a B.S. degree in 1893 from Polytechnic Institute of Brooklyn; did post-graduate work at Johns Hopkins University, and received, in 1898, a Ph.D. from the University of Pennsylvania.

From 1907 until 1940, when he retired, Dr. Grosvenor was a consulting chemical engineer and chemist in New York.

Dr. Grosvenor was chairman in 1915 of the Society of Chemical Industry. He was a member of the American Chemical Society, Association of Consulting Chemists and Chemical Engineers, American Institute of Chemical Engineers, Electrochemical Society, American Institute of Chemists, Professional Engineers Association, Société de Chimie et Industrie and the Chemists Club of New York.

Dr. Grosvenor was a member of the editorial advisory board of *Chemical Industries* magazine.

Besides his son, William M. Grosvenor, Jr., he leaves a widow, Mrs. Marie Dexter Grosvenor, and a daughter, Mrs. Ralph O. Ellsworth, of Poundridge, N. Y.

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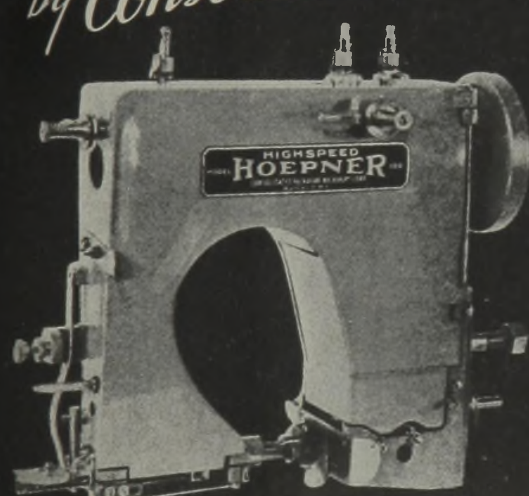

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WAR REGULATIONS SUMMARY

AMMONIA, ANHYDROUS AND AQUA—Producers are required to file Section 1 of Form WPB-1148 on or before the 10th day of the month before each calendar quarter, specifying total quantities without listing customers' names.

AMMONIUM SULFATE, INDUSTRIAL—Industrial ammonium sulfate has been allocated on a quarterly basis. Producers are required to file Section 11 of Form WPB-1148 on or before the 10th day of the month previous to the quarter for which allocation is requested. However, deliveries may be made without restriction to customers ordering 120 tons or less per quarter from all sources.

BALATA—Now exempted from allocation control by the Office of the Rubber Director. Rubber Order R-1, amended May 29.

BENZENE—Now controlled by General Allocation Order M-300. Order M-137 revoked.

CALCIUM CYANAMIDE, INDUSTRIAL—Producers are required to file Section 11 of Form WPB-1148 on or before the 10th day of the month before each calendar quarter, specifying total quantities without listing customers' names.

HEXAHYDRIC ALCOHOL—Now controlled by General Allocation Order M-300. Order M-270 revoked.

HI-FLASH NAPHTHA—Removed from under Order M-150 and placed under miscellaneous chemicals Order M-340. M-150 has been revised from an allocation order into a conservation order.

HYDROFLUORIC ACID—Small-order exemption for anhydrous hydrofluoric acid raised from 500 lbs. to 5 tons.

MENTHOL—Importers who contracted before April 17, 1944 to purchase menthol at prices above the ceiling which went into effect on that date, may apply for a special ceiling price on their resales. Amendment No. 1 to Order No. 13 under Maximum Import Price Regulation.

PHENOLIC RESINS—Anyone may now receive free samples of phenolic resins or phenolic resin molding compounds without specific authorization in any quantity, except for resins containing para tertiary butyl phenol and para phenyl phenol, in which case the quantity is limited to ten lbs. a month. Also one person may receive in any one calendar month up to 110 gallons (2 drums) of phenolic resins or molding compounds for experimental purposes, except those containing para tertiary butyl phenol and para phenyl phenol.

PHTHALIC ALKYD RESINS—Effective June 1, five new conservation measures will limit the amount of phthalic anhydride that can go into phthalic alkyd resins manufactured and controlled under Order M-139.

TOLUENE—Now controlled by General Allocation Order M-300. Order M-34 revoked. Deliveries of toluene to or by a government plant, previously exempt from authorization requirement, must now receive WPB approval.

XYLENE—Zylenes suitable for use by the Petroleum Administration for War have been shifted to General Allocation Order M-300 from Order M-150. All other types are covered under a newly revised M-150.

M. J. HAYES, formerly with George Uhe Co., announces his association with American Alkali and Chemical Co., 41 E. 42nd St., N. Y., as of June 1.

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HELMITOL, N. N. R.
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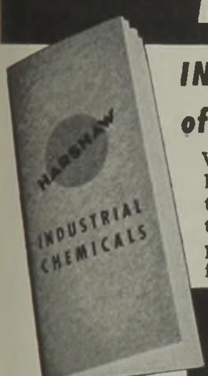

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CHEMICAL SPECIALTIES NEWS

Enzymes As Stain Removers

Enzyme digesters are used by spotters for the removal of stains such as blood, albumen, starch, etc. The enzymes break down these substances so as to render them soluble and removable by wet spotting. Enzyme cleaners usually consist of a mixture, with each ingredient designed to attack a particular type of substance. If kept under the proper conditions they are claimed to be very effective.

Voltax Appoints Vreeland

Milton T. Vreeland has been appointed general manager of the Voltax Company, manufacturer of paints, enamels and varnishes at Bridgeport, Conn. Mr. Vreeland was formerly associated with the Hilo Varnish Corporation and Glidden Company as industrial representative.

Cleaner for Plastics Developed

The increased use of transparent vinylite rigid plastic sheets and of other transparent plastic materials has created a need for efficient cleaning and scratch-removing solutions. One such solution, developed by Wilco Company, designed primarily as a cleaner and polisher for plastics, contains a very fine abrasive and protective waxes. When this product is applied to plastic surfaces, it removes the soil and leaves behind a microscopically thin film that retards the development of scratches, fogging, and static. The protective film markedly reduces the coefficient of friction of the plastic surface, thereby permitting wiping with a soft cloth with lessened danger of scratching. Another solution developed by this company is primarily designed for the removal of fine scratches and abrasions after they have developed. When the scratches have been removed, the cleaning job is finished through the use of the cleaner.

Lafkin, Watkins Resign From WFA

The resignation of two officials of the Fertilizer Division of the War Food Administration, who long have been associated with the work of the division in the distribution of fertilizer in the war program, was confirmed May 17. No successors have yet been announced.

W. F. Lafkin, who has been chief of the Fertilizers Orders Section of WFA, resigned May 12, to take effect next month at the expiration of his government leave. He is returning to the management of his company, the Golf & Lawn Supply Corporation, Scarsdale, N. Y. William F. Watkins, who has been chief of the Fertilizers Requirements Section of WFA, resigned May 14 and has accepted a position as assistant chief of the Conservation Programs Branch, Office of Production, WFA.

National Vitamin Foundation Organized

The National Vitamin Foundation was approved in principle by fifty representatives of the vitamin industry at a meeting in New York, May 23.

The purposes proposed for the organization were to make grants for research in the vitamin or related fields, the dissemination of information to the vitamin trade, medical profession and public with respect to the quality, purpose and uses of vitamins, adoption of terminology and standards of publicity practices in connection with the sale of vitamins and to confer and consult with medical societies, medical schools and health associations.

Fertilizer Production Increased

The War Production Board has announced that the production of superphosphate for fertilizer will meet the 1943-44 goal of 7,000,000 tons, and set a much higher goal for the farm year starting July 1.

Swedish Paint Research Laboratory Established

It is reported that a number of companies engaged in the paint and varnish industry in Sweden have established the Swedish Paint and Varnish Industrial Research Laboratory. It will conduct technical and scientific research on paints, varnishes, and lacquers on co-operation with the Royal College of Technology and other institutions. The laboratory will also aid in the training of scientists and technologists for this work.

Harnden Heads Dowicide Division

Robert C. Harnden has been named head of the Dowicide Division of the Insecticides Department of The Dow Chemical Company, it has been announced. Dowicides include a family of special germicides, fungicides and disinfectants used in the processing or manufacture of such widely varied products as lumber, paint, textiles, leather, germicides, adhesives and paper.

Austin to Handle Dugas Products

Service and distribution in connection with Dugas fire extinguishers and "Plus-Fifty" Dugas Dry Chemical in the Montana and Wyoming districts will henceforth be handled by Ray Austin of Wyo-Mont Distributors, Billings, Montana, according to a recent announcement of the Dugas Engineering Corporation, Marinette, Wisconsin.

Mr. Austin is well known in the new Dugas territory he now serves, having been district manager of Dowell, Inc., covering Wyoming, Montana and Alberta, Canada, for a period of several years.

A. C. S. Paint Division Name Changed

At a meeting of the Executive Committee of the Division of Paint, Varnish and Plastic Chemistry of the American Chemical Society, it was proposed that the name of the division be changed to "Division of Protective Coatings and Plastics Chemistry." It was felt, reports W. H. Lutz, secretary-treasurer, that the proposed name more adequately defined the present interests of the division.

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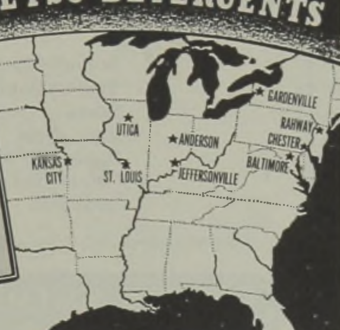

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CHEMICAL ECONOMICS & STATISTICS

Review of Potash Industry in 1943

New records in production and sales of domestic potassium salts were again made in 1943. Nearly a million and a half short tons of marketable potassium salts (1,428,840 short tons) containing 739,141 tons of equivalent potash (K_2O) were produced. A somewhat smaller quantity (1,401,271 tons) was sold. This according to reports from the producers to the Bureau of Mines, contained 732,151 tons of equivalent potash. Stocks in producers' hands at the end of 1943 were larger than in any of the three previous years.

Present producing capacity of the domestic potash mines is more than enough to care for normal domestic requirements under post-war peacetime conditions. Foreign competition will no doubt again be active, and the availability of foreign supplies will tend toward a decreasing demand for domestic potash in both the United States and foreign markets. However, exportation of food products to war-devastated countries may maintain production of potash at high levels for some time after cessation of hostilities.

Production Increases

The annual increase in the production of marketable potassium salts in the United States in the years since 1934 was again in evidence in 1943, and again it was a large one, although much less than the percentage increases in the last two years, being but 13 per cent over 1942. The approximate equivalent K_2O content, however, was only 9 per cent greater in 1943 than in 1942. Production in 1943, according to reports of the producers to the Bureau of Mines was 1,428,840 short tons, with an average K_2O content of 51.73 per cent, compared with 53.59 per cent in 1942. Production of equivalent potash (K_2O) in 1943 exceeded that of 1942 by 59,935 tons. Sales of potassium salts were nearly a million and a half tons (1,401.271 tons) in 1943, a 10 per cent increase over 1942. The contained equivalent potash (K_2O) was 732,151 tons, an increase of only 8 per cent over 1942. Production exceeded sales in 1943, and producers' stocks were larger at the end of the year than at the beginning. The average value per ton of the potassium salts sold increased from $17.98 in 1942 to $18.69 in 1943. Production of all types of marketable potassium salts listed below was larger in 1943 than in 1942. The increases ranged from a maximum of 32 per cent for manure salts to a minimum of 6 per cent for 60 per cent K_2O muriate.

Western Potash Industry

The western character of the domestic potash industry became still more pronounced in 1943 with the increased production of the Western States and the lessened output of the East. Practically all (99.9 per cent) of the 1943 output in terms of K_2O came from California, New Mexico, and Utah. About 82½ per cent of the equivalent K_2O production in 1943 came from the deeply buried Permian saline sedimentary deposits of New Mexico, and nearly 17½ per cent from the saline lake brines of California and Utah, whereas less than 0.1 per cent was recovered as a byproduct from manufacturing processes (cement and distillery operations in Maryland). The potash salts sold in 1943 were largely refined or processed products.

Potash Producers

The potash-producing companies in the United States in 1943 were:

California

The American Potash & Chemical Corporation, 122 East 42d Street, New York City (plant at Trona, on Searles Lake, Calif.).

Maryland

North American Cement Corporation, 41 East 42d Street, New York City (plant at Security, Md.).

U. S. Industrial Chemicals, Inc., 60 East 42d Street, New York City (plant at Baltimore, Md.).

International Minerals & Chemicals Corporation, 20 North Wacker Drive, Chicago, Ill. (mine and plant near Carlsbad, N. Mex.).

Potash Company of America, Carlsbad, N. Mex. (mine and plant near Carlsbad, N. Mex.).

United States Potash Co., Inc., 30 Rockefeller Plaza, New York City (mine and plant near Carlsbad, N. Mex.).

Utah

Bonneville, Ltd., 540 West Seventh South, Salt Lake City, Utah (plant near Wendover, Utah).

Four States Yield Domestic Potash

Merchantable potassium salts were produced in 1943 in four States—California, Maryland, New Mexico, and Utah. New Mexico was by far the largest domestic producer, furnishing 84 per cent of the total. California, though supplying much less than New Mexico, yields considerably more than the combined output of the other two States.

The American Potash & Chemical Corporation (122 East 42d Street, New York City), the only producer of potash in California in 1943, utilizing the complex alkaline brine of Searles Lake in the southeastern part of the State as its potassium-bearing raw material, produced both agricultural and chemical grades of potassium chloride as well as potassium sulfate.

Production in Maryland was confined to a few thousand tons of impure sulfate of potash from flue dust of a cement kiln near Hagerstown, and a small quantity of by-product potash-bearing material from an industrial alcohol plant at Baltimore.

Dominance of New Mexico Field

Mine production of potash salts in the Carlsbad region of New Mexico continues to increase, attaining new records an-

Potassium Salts Produced, Sold, and in Producers' Stocks in United States, 1939-43

	Production			Sales				Producers' stocks		
Year	Operators	Potassium salts (short tons)	Equivalent as potash (K_2O) (short tons)	Operators	Potassium salts (short tons)	Equivalent as potash (K_2O) (short tons)	Value f.o.b. plant	Operators	Potassium salts (short tons)	Equivalent as potash (K_2O) (short tons)
1939	6	546,757	312,201	6	634,014	366,287	$12,028,195	5	54,233	29,440
1940	7	658,249	379,679	7	677,892	393,058	12,562,050	7	35,060	16,370
1941	7	986,458	524,875	7	994,843	531,346	17,368,237	7	26,374	9,712
1942	7	1,267,455	679,206	7	1,277,317	680,831	22,962,518	7	14,158	6,041
1943	7	1,428,840	739,141	7	1,401.271	732,151	26,183,073	7	43,591	13,984

Potassium Salts Produced in the United States, 1942-43, by Grades

Potassium salts	(short tons) 1942	(short tons) 1943
Muriate of potash, 60-62 percent K_2O minimum	878,997	934,961
Muriate of potash, 48-50 percent K_2O minimum	85,680	99,137
Manure salts, run-of-mine	183,404	242,189
Sulfate of potash and sulfate of potash-magnesia	119,374	152,553
	1,267,455	1,428,840

nually. In 1943, the three companies operating in this area mined 3,433,243 short tons of sylvinite and crude langbeinite combined, almost 400,000 tons more than in 1942, when 3,035,549 tons were taken out. The average equivalent K_2O content of the mined salts decreased from 21.52 per cent in 1942 to 21.19 per cent in 1943. The average equivalent K_2O content of the sylvinite mined was 23.9 per cent in 1940; 22.9 per cent in 1941; 22.7 in 1942; and 22.6 in 1943.

All three companies mined sylvite (potassium chloride), and one—the International Minerals & Chemical Corporation—also mined langbeinite (a potassium-magnesium sulfate). The greater part of the mined production was sylvite, most of which was processed to yield 60 per cent or higher grade K_2O muriate. Production of merchantable potash salts in New Mexico in 1943 was 1,203,126 short tons (84 per cent of the total domestic production) with equivalent K_2O content of 609,638 tons (nearly 82½ per cent of the total production). Sales were 1,178,570 tons (84 per cent of the United States total), with an equivalent K_2O content of 604,414 tons (83 per cent of the domestic total), valued at $21,918,503. Muriate of potash was produced by all three companies. Potassium sulfate and potassium-magnesium sulfate (sulfate of potash-magnesia) were produced from crude langbeinite by the International Minerals & Chemical Corporation in the refinery at its mine near Carlsbad. Potassium sulfate was produced also by the Potash Company of America.

The magnesium chloride plant of the Defense Plant Corporation, adjacent to the refinery of the International Minerals & Chemical Corporation at its mine, was completed early in 1943, and operation started on June 15, 1943. This plant is operated, on a fee basis, by the International. The raw material is a waste potassium-magnesium-bearing brine, containing about 16 per cent magnesium chloride. The magnesium chloride is obtained by evaporation and selective crystallization. The dried product is shipped to Austin, Texas, for use as cell feed in the magnesium metal plant owned by the Defense Plant Corporation, but operated by the International company.

Search for Reserves in New Mexico

Late in February 1944, the Department of the Interior obtained bids for drilling certain potash areas in New Mexico near Carlsbad in further exploration for potash resources and to determine the amount and grade of the potash deposits near Government Well No. 23 in the Potash Reserve set up in 1931. This well, drilled several years ago, about 15 miles northeast of Carlsbad, in NW¼ sec. 35, T. 20 S., R. 29 E., Eddy County, New Mexico, disclosed an 11-foot bed of sylvite and halite, 5 feet of which contains more than 30 per cent K_2O. Drilling operations were started on the new wells by the Bureau of Mines in cooperation with the Geological Survey about March 1, 1944.

Bromine Production Sets Record in 1943

Producers' sales of bromine compounds established a record in 1943: 94,085,937 pounds of contained bromine valued at $19,107,065, compared with 65,880,935 pounds valued at $13,729,383 in 1942, according to the Bureau of Mines. The quantity of compounds sold in 1943 was 111,205,096 pounds. Figures for earlier years showing quantity of compounds are not available. There were 14 producers in 1943, the same 14 as in 1942.

Bromide and bromine in compounds sold or used by producers in the United States, 1938-43

Year	Pounds	Value
1938	33,324,116	$6,610,056
1939	37,882,005	7,611,400
1940	59,266,275	11,772,515
1941	68,317,019	$11,506,213
1942	65,880,935	13,729,383
1943	94,085,937	19,107,065

Most bromine enters the market as ethylene dibromide, an antiknock assister. The increasing tempo of the war has multiplied demands for motor fuels, and the growing output of high-octane gasoline has increased rather than diminished the need for antiknock fluids. Nearly all the ethylene dibromide used is made by the Ethyl-Dow Chemical Co. at Wilmington, N. C., and Freeport, Tex., from raw sea water, and the Dow Chemical Co. at Midland, Mich., from well brines. The Ethyl-Dow Chemical Co. began the construction of additional plant capacity at Wilmington, N. C., and Freeport, Tex., to meet the even heavier demands anticipated during 1944. Other bromine compounds, both organic and inorganic, are made by the following firms, from sea-water bitterns, dry-lake brines, and well brines: American Potash & Chemical Corporation, Trona, Calif.; J. Q. Dickinson & Co., Malden, W. Va.; The Dow Chemical Co., Midland, Mich.; Great Lakes Chemical Corporation, Filer City, Mich.; Liverpool Salt Co., Hartford, W. Va.; Michigan Chemical Corporation, St. Louis, Mich.; Morton Salt Co., Manistee, Mich.; Pomeroy Salt Corporation, Minersville, Ohio; Rademaker Chemical Corporation, Eastlake, Mich.; and Westvaco Chlorine Products Corporation, South Charleston, W. Va., and Chula Vista and Newark, Calif.

In addition to antiknock fluids, bromine is used in making fumigants, dyes, medicinals, and photographic reagents. Prices of bromine compounds in 1943 were nearly all identical with those of 1942. Ethylene dibromide was quoted over a range of 65 to 70 cents a pound during 1943, f.o.b. plant. Potassium bromide, National Formulary grade, granular, was quoted at 27 to 31 cents a pound; sodium bromide, same grade, was 27 to 30 cents (27 to 31 cents in 1942). Bottled elemental bromine in cases was 25 to 30 cents a pound.

The post-war outlook for bromine production appears good, owing to the direct connection with consumption of automobile and aviation gasolines.

Lithium Minerals in 1943

According to the Bureau of Mines, production of lithium minerals and compounds in 1943 was greater than in any preceding year since 1920. However, it was still insufficient to keep pace with demands. Shipments of spodumene were greater than the total sales of lithium minerals in 1942, but the production of lepidolite, amblygonite, and dilithium sodium phosphate decreased.

The shortage of spodumene concentrates which developed in 1942 because of inadequate milling facilities continued through 1943. Although the Solvay Process Co., plant at Kings Mountain, N. C. began operations on May 17, unexpected difficulties in milling practices arose, and problems of priorities for steel and machinery slowed the rebuilding of the Black Hills Tin Co. plant at Tinton, S. Dak. However, there has not been a shortage of ore. The requirements for lepidolite for use in the manufacture of boron silicate glass for electronic tubes and high pressure boiler gauges also exceeded domestic production, and it became necessary to import spodumene and lepidolite.

By December 1943 the Kings Mountain plant was operating at near maximum level, and the Black Hills plant began production on February 1, 1944. The decrease in the production of lepidolite, amblygonite, and dilithium sodium phosphate may be attributed in part to the emphasis placed by the War Production Board on the production of spodumene.

Prices for lithium ores produced in the United States for sale on the open market, as quoted by E&MJ Metal and Mineral Markets, in 1943 were as follows: Spodumene $5 per 20 pounds of contained lithia (Li_2O), 6 per cent minimum, $30 per short ton in carlots; amblygonite, 8 to 9 per cent (Li_2O), $40 to $50 per short ton f.c.b. mine; and lepidolite, 3 per cent

Shipments of lithium compounds from mines in the United States, 1939-43

Year	Short tons	Value
1939	1,990	$97,000
1940	2,011	80,679
1941	3,832	115,718
1942	5,405	$243,516
1943	8,155	314,660

(Li_2O), $24 to $25 per short ton, f.o.b. mines.

Although the increased demand for lithium minerals and compounds may be attributed to their use as bases of many essential war products, the majority of these products will have a postwar use, and it is reasonable to believe that post-war requirements for these minerals will be larger than in 1939, a peak pre-war year.

Chemical Production and Consumption in March

Statistics on the production, consumption and stocks of chemicals shown in the table at right supplement the 1941-1943 figures released February 7, 1944, in "Facts for Industry," Series 6-1-1. Figures for earlier months, information on the number of plants manufacturing each chemical, and a discussion of the limitations of the data are given in the above mentioned publication. The production figures represent primary production and do not include purchased or transferred material. The consumption statistics are for consumption only in the plants where each chemical is produced. The stocks figures represent the quantities of each chemical on hand at the end of the month at producing locations only.

Sodium Sulfates and Carbonates in 1943

Production of natural sodium sulfate in 1943 was handicapped by labor shortages and was 5 per cent less than in 1942, according to the Bureau of Mines. On the other hand production of natural sodium carbonate (all in California), in a vain attempt to meet West Coast demands, established a new record, increasing 10 per cent in quantity over 1942.

The following data relate to producers of natural sodium sulfate, carbonate, or both.

The American Potash & Chemical Corporation completed expansions in its Soda Products Plant at Trona, Calif., for the separation of sodium sulfate and sodium carbonate in the double salt, burkeite. The Arizona Chemical Co., 30 Rockefeller Plaza, New York City, produced sodium sulfate from well brines at O'Donnell and Brownfield, Tex., for the sulfate pulp market but experienced considerable production difficulty owing to the labor shortage. The Carthage Co., 8317 Beverly Blvd., Los Angeles 36, Calif., shipped trona produced ten years ago from Owens Lake by the Inyo Chemical Co. but never sold. The Desert Chemical Co., 4031 Goodwin Ave., Los Angeles, Calif., extracted sodium sulfate from well brines at its Dale Lake plant near Twentynine Palms, Calif. With additional plant capacity completed in 1942, it nearly trebled its sales of sodium sulfate. The Iowa Soda Products Co., Council Bluffs, Iowa (plant at Rawlins,

U. S. Production, Consumption and Stocks of Chemicals, March, 1944

Chemical and Basis	Units	March, 1944 (Preliminary) Production	March, 1944 Consumption in producing plants	March, 1944 Stocks at producing plants, end of month	February, 1944 Production	February, 1944 Consumption in producing plants	February, 1944 Stocks at producing plants, end of month
Acetylene:							
For use in chemical synthesis	M cu. ft.	329,681	77,280 (both acetylene items)	[1]10,754 (both acetylene items)	317,863	83,477 (both acetylene items)	11,333 (both acetylene items)
For commercial purposes	M cu. ft.	154,084			145,863		
Synthetic anhydrous ammonia (100% NH_3)	Short tons	43,242	39,537	2,884	42,963	38,514	4,559
Bleaching powder (35%-37% avail. Cl_2)	M pounds	4,673	1,392	1,395	[2]5,954	[2]2,313	[2]1,808
Calcium acetate (80% $Ca(C_2H_3O_2)_2$)	M pounds	1,056	(3)	316	1,055	(3)	244
Calcium arsenate (100% $Ca_3(AsO_4)_2$)	M pounds	3,392	(3)	8,203	3,957	86	8,812
Calcium carbide (100% CaC_2)	Short tons	68,653	(4)	24,988	63,729	(4)	22,414
Calcium hypochlorite (true) (70% avail. Cl_2)	M pounds	1,228	(3)	736	1,178	(3)	939
Calcium phosphate — monobasic (100% $CaH_4(PO_4)_2$	M pounds	6,064	(3)	5,375	5,370	(3)	5,340
Carbon dioxide:							
Liquid and gas (100% CO_2)	M pounds	30,008	2,493	4,344	24,559	2,145	4,089
Solid (dry ice) (100% CO_2)	M pounds	49,460	1,075	12,162	43,373	985	7,546
Chlorine	Short tons	108,744	62,169	6,572	101,375	[2]57,724	[2]8,398
Chrome green (C.P.)	M pounds	450	60	1,055	[2]512	[2]57	[2]1,108
Hydrochloric acid (100% HCl)	Short tons	29,475	16,469	2,428	28,591	17,092	2,942
Hydrogen	Millions of cuic feet	2,091	1,764	(4)	1,899	1,610	(4)
Lead arsenate (acid and basic)	M pounds	9,827	222	5,729	7,685	155	6,940
Lead oxide — red (100% Pb_3O_4)	M pounds	9,287	397	4,985	8,453	574	5,042
Methanol (natural) (80% CH_3OH)	Gallons	360,536	(4)	258,575	347,439	(4)	233,363
Methanol (synthetic) (100% CH_3OH)	M gallons	6,270	(3)	5,939	5,419	(3)	5,208
Molybdate orange (C.P.)	Pounds	163,994	11,763	162,185	124,379	1,095	119,950
Nitric acid (100% HNO_3)	Short tons	36,509	32,911	7,534	38,153	33,726	[2]7,961
Nitrous oxide (100% N_2O)	M gallons	11,567	......	3,719	8,492	......	3,218
Oxygen	S. T. P. M cu. ft.	1,696,487	41,402	(3)	1,539,403	35,988	(3)
Phosphoric acid (50% H_3PO_4)	Short tons	65,597	55,672	15,067	61,887	57,139	12,491
Potassium bichromate and chromate (100%)	M pounds	339	(3)	305	714	(3)	409
Potassium chloride (100% KCl)	Short tons	105,658	(3)	10,508	99,749	(3)	17,185
Potassium hydroxide potash) (100% KOH)	Short tons	4.016	824	2,394	3,362	773	2,014
Soda ash (commercial sodium carbonate):							
Ammonia soda process—							
Total wet and dry[5] (98%-100% Na_2CO_3)	Short tons	399,758	......	......	363,875	......	......
Finished light (98%-100% Na_2CO_3)	Short tons	218,657	51,804	20,493	201,714	45,749	21,611
Finished dense (98%-100% Na_2CO_3)	Short tons	126,886	2,189	6,717	113,011	4,796	8,028
Natural[7]	Short tons	16,726	......	2,023	13,831	......	2,573
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	15,089	(3)	4,922	13,774	(3)	4,655
Sodium bicarbonate and chromate (100%)	Short tons	7,069	(3)	839	7,088	(3)	1,064
Sodium hydroxide, liquid:							
Electrolytic process (100% NaOH)	Short tons	101,349	24,174	33,149	[2]94,279	[2]24,120	[2]36,809
Lime-soda process (100% NaOH)	Short tons	57.825	(3)	12,721	53,109	(3)	14.544
Sodium phosphate:							
Monobasic (100% NaH_2PO_4)	M pounds	2.513	(3)	690	2,266	(3)	510
Dibasic (100% Na_2HPO_4)	Short tons	4,850	(3)	849	4.639	(3)	653
Tribasic (100% Na_3PO_4)	Short tons	6.855	174	1,577	6,499	115	1,672
Sodium silicate (water glass):							
Liquid (40° Baumé)	Short tons	144,613	(4)	202,276	133,163	(4)	229,223
Solid (all forms combined)	Short tons	9,516	2,979	6,843	[2]8,281	[2]2,410	[2]8,840
Sodium sulfate:							
Glauber's salt and crude salt cake[7]	Short tons	65,178	7,054	72,930	62,529	6,636	71,430
Anhydrous (refined) (100% Na_2SO_4)	Short tons	6,408	(3)	6,571	5,767	(3)	5,733
Sulfur dioxide (100% SO_2)	M pounds	5,969	3,274	3,252	6,021	3,061	3.577
Sulfuric acid:[7]							
Chamber process (100% H_2SO_4)	Short tons	275.317	...... (both sulfuric acid items)	292,432 (both sulfuric acid items)	[2]284,104	.... (both sulfuric acid items)	[2]292,719 (both sulfuric acid items)
Contact process[8] (100% H_2SO_4)	Short tons	485.531			[2]453,003		
Net contact process[9] (100% H_2SO_4)	Short tons	438,867	......	......	[2]407,860	......	......

[1] Revised data beginning September 1943 will be published in an early issue of this series.

[2] Revised.

[3] Data cannot be published without disclosing the operations of individual establishments.

[4] Not available; see "Facts for Industry," Series 6-1-1.

[5] Total wet and dry production including quantities diverted for manufacture of caustic soda and sodium bicarbonate and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Facts for Industry," Series 6-1-1.

[6] Not including quantities converted to finished dense soda ash.

[7] Data on this material were collected in cooperation with the Bureau of Mines, U. S. Department of the Interior.

[8] Includes sulfuric acid of oleum grades. For contact process sulfuric acid, revised data for earlier months will appear in an early issue of this series.

[9] Excludes spent acid. For detailed explanation, see "Facts for Industry," Series 6-1-1.

Wyo.), continued its production of Glauber's salt for stock feed.

The Natural Soda Products Co., 405 Montgomery St., San Francisco, recovered sodium carbonate at Keeler, Calif., from Owens Lake, Inyo County. The company no longer precipitates sodium bicarbonate as the first raw material, but with the aid of flue gases it carbonates further to the sesquicarbonate, which is precipitated, calcined, pugged, and recalcined to yield a dense soda ash. Owens Lake became a profitable source of natural salts when the City of Los Angeles diverted the flow of Owens River from the lake via an aqueduct in 1915, permitting the lake to evaporate. During the period 1937-39 the City of Los Angeles flooded the lake by returning part of the flow of Owens River, and operations there were seriously curtailed until the lake evaporated once more, in 1941. The question of whether the City of Los Angeles has the right to flood the lake is pending before the courts and may determine the future of the two firms operating at Owens Lake.

Natural sodium sulfates and sodium carbonates sold or used by producers in the United States, 1938-43

	Sodium sulfates[1]		*Sodium carbonates*[2]	
Year	*Short tons*	*Value*	*Short tons*	*Value*
1938	80,210	$596,812	100,010	$1,235,328
1939	137,479	1,027,876	124,743	1,528,810
1940	187,233	1,528,633	130,034	1,629,283
1941	157,524	1,443,137	146,677	1,822,986
1942	175,033	1,669,983	150,619	2,145,289
1943	165,908	1,553,549	165,993	2,544,086

[1] 1938: Salt cake and Glauber's salt; 1939-42: Salt cake, Glauber's salt, and burkeite; 1943: Salt cake and Glauber's salt.
[2] 1938-41: Soda ash, bicarbonate, and trona; 1942-43: Soda ash and trona.

The Ozark Chemical Co., Mid-Continent Bldg., Tulsa, Okla., recovered sodium sulfate at its Monahans, Tex., plant, mostly for sale to sulfate pulp processors. The Pacific Alkali Co., 523 West Sixth St., Los Angeles (plant at Bartlett, Calif.), extracted soda ash and trona from Owens Lake brines for use in mining and metallurgy, cleansers, and glass. W. E. Pratt, Casper, Wyo., mined sodium sulfate near Casper and converted it to Glauber's salt for stock feed. The West End Chemical Co., 608 Latham Square Bldg., Oakland, Calif., increased its production of sodium carbonate from Searles Lake.

Production data of sodium carbonate produced by the ammonia-soda process for the last three years, according to the Bureau of the Census, were: 1941, 3,606,826 short tons; 1942, 3,788,583; and 1943, 4,407,618.

Domestic salt cake was quoted at $15 a short ton, bulk, works; anhydrous sodium sulfate at $1.70 to $1.90 per hundredweight, works; and Glauber's salt at $1.05 to $1.25 per hundredweight in 1943, according to the Oil, Paint and Drug Reporter. Soda ash, calcined sodium carbonate, was sold at $0.90 to $3.25 a hundredweight, depending on grade and other factors.

The principal uses of sodium sulfate are in the manufacture of kraft pulp by the sulfate process, glass, stock feeds, dye standardization, and as a flux in metallurgy.

The four producers of natural sodium carbonate in California were unable to supply West-Coast requirements in 1943, and substantial quantities were shipped in by rail from eastern alkali manufacturers at somewhat higher cost. Sodium carbonate is used chiefly on the West Coast in glass manufacture and cleansers. Substantial quantities are used in nonferrous metallurgy and as a precipitant of magnesium carbonate from sea-water bitterns. The post-war outlook for the industry appears good if water transport rates to the West Coast via the Panama Canal do not become so low as to permit competition with eastern producers.

Calcium Chloride In Demand in 1943

Despite labor shortages for rural roadwork, sales of natural calcium chloride (and calcium-magnesium chloride) were well-maintained in 1943, reaching 199,796 short tons (75-per cent basis), valued at $1,549,565, compared with 224,527 tons valued at $1,733,169 in 1942, according to the Bureau of Mines. There were 11 producers in 1943, 13 in 1942.

Calcium chloride is derived chiefly from three sources, sea-water bitterns, well brines, and byproduct liquors of the ammonia-soda process. Producers of the last-named material are not canvassed by the Bureau of Mines, but sales of calcium chloride from that source were estimated at 180,000 tons in 1943, compared with 175,000 in 1942. Probably 90 per cent of the total calcium chloride available from all sources is thrown away. The amount recovered depends on the market from year to year.

The following firms reported production of calcium chloride (and calcium-magnesium chloride) from natural brines in 1943: California Rock Salt Co., 2436 Hunter Street, Los Angeles 21, Calif., plant at Amboy, Calif.; J. Q. Dickinson & Co., Malden, W. Va.; The Dow Chemical Co., Midland, Mich.; Hill Brothers Chemical Co., 2159 Bay Street, Los Angeles 21, Calif., plant at Amboy, Calif.; Liverpool Salt Co., Hartford, W. Va.; Michigan Chemical Corporation, St. Louis, Mich.; Ohio River Salt Corporation, Mason, W. Va.; Pomeroy Salt Corporation, Pomeroy, Ohio, plant at Minersville, Ohio; Rademaker Chemical Corporation, Eastlake, Mich.; and Westvaco Chlorine Products Corporation, 405 Lexington Avenue, New York 17, N. Y., plants at Chula Vista, Calif., and South Charleston, W. Va.

Prices of calcium chloride, according to the Oil, Paint and Drug Reporter, were the same as in 1942 with the exception noted below: Flake, 77 to 80 per cent, carlots, delivered, $18.50 to $35.00 according to zone; solid, 73 to 75 per cent, $18.00 to $31.50 ($34.50 in 1942) a ton, carlots, delivered; and 40- per cent solutions, $7.50 a ton, tank cars, works.

Road stabilization generally accounts for about half the total calcium chloride consumption. Surfacing of airfields and roads in military camps at home and overseas has also stimulated demand. For example, the salt was used in stabilizing rolled sand fill on the Adak airfield in the Aleutians campaign, according to H. W. Richardson in "Journey to Attu and Back" (Eng. News Record, vol. 131, No. 16, Oct. 14, 1943, p. 4).

Most uses of calcium chloride depend either on its hygroscopic properties or the low freezing point of its solutions. Such uses include air conditioning, freeze-proofing of coal and ores, concrete curing, and many others. Chemically, calcium chloride is used to extract lithium chloride from spodumene by heating, and to make calcium-soap lubricants. Postponed roadwork and construction is expected to provide a good market for calcium chloride in post-war years.

Superphosphate Production Goal for 1944

The Chemicals Bureau of the War Production Board recently set a tentative production goal of 9,464,000 tons of normal superphosphate for the agricultural year beginning July, 1944, to keep pace with the increased demand for fertilizer required for expanded food and fiber programs. The production goal for 1943-44, which was set at 7,000,000 tons of normal superphosphate, will be met, bureau officials said.

New plants, most of which have already been approved, are expected to produce 650,000 tons of the 1944-45 total of normal superphosphate, WPB said, and existing plants will be asked to step up output about 28 percent.

Calcium (and calcium-magnesium) chloride from natural brines sold by producers in the United States, 1938-43

[In Terms of 75 per cent $(Ca,Mg)Cl_2$]

Year	*Short tons*	*Value*	*Year*	*Short tons*	*Value*
1938	96,470	$1,218.938	1941	165,932	$1.333.370
1939	108,441	1,307,717	1942	224,527	1.733,169
1940	99,536	998,241	1943	199,796	1,549,565

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MARKETS IN REVIEW

Chemical production continues at high levels.

Increased capacity offers problems in manpower.

More price slashes made in resins, sulfa drugs.

New consumers getting more chlorine.

Government nitrogen to be subject to discounts.

Mercury held by Metals Reserve may be liquidated.

Phthalic anhydride demands reach new peak.

Heavy Chemicals, Fine Chemicals, Coal Tar Products reviewed.

PRODUCTION and shipments of chemicals are holding at the high levels attained during the first quarter, as lessened volume in some divisions of the industry is accompanied by expansion in others. The carload movement of such things as phosphate and nitrogen fertilizers would be expected to lessen in May and June, for example, while shipments of alcohol, ammonia and acids are rising to meet military requirements.

The War Production Board estimate of a 7½ billion dollar volume last year for chemicals and related products will be exceeded, some industry economists believe, this year should the unfinished portion of the construction program for chemicals undergo completion. New chemical facilities in this program do not represent the need for additional capacity as much as they do changing requirements of the military services. The technology of modern war appears to be advancing much faster than most of us were able to visualize when we entered the conflict.

These new plants and facilities also may prove a problem. They are not all in the rubber and aviation fuel programs, and they will call for additional manpower—from common labor to a high order of technical training—which the industry may not be able to fully satisfy. This shows up the chemical manpower problem in a new light, and gives emphasis to demands that it be permitted to retain its chemists and engineering talent for fighting the war on the production front. Meanwhile, the Chemicals Division of the WPB stated definitely at the end of May that the output of chemicals has, in many instances, been seriously curtailed by the lack of technical and operating labor. Part of the difficulty is attributed to the competition offered by higher wage rates in non-chemical plants, partly to the difficulty in obtaining satisfactory wage adjustments.

Resins and plastics users are or will be the chief beneficiaries of further price reductions which have taken place in that group. During the past month, Carbide & Carbon Chemicals Corp., effected price cuts for its copolymers of vinyl acetate and vinyl chloride which brought their average to below 50¢ lb., compared with 52¢ in 1943, 55¢ in 1942, and 73¢ in 1938. The competitive possibilities of synthetic resins with rubber probably should not be considered only on the basis of cost, yet it is interesting to note that the vinyls which have many interesting postwar possibilities in the coatings field, have come down almost 40 per cent in price during the past six years.

And while the Government is the only buyer, rubber also has been coming down in manufacturing cost now that the program is nearing a peak with current production of 70,000 tons monthly. The inclusion of larger percentages of low-cost butadiene from petroleum butadiene and economically-made styrene has sent the average cost of G-S to around 30¢ lb. From the most authoritative source in the Government it is learned that GR-S is made from petroleum butadiene as cheaply as 13¢ lb. Once the natural rubber industry has been able to rehabilitate itself in the Far East, this product may be offered materially below its last open market price of 22¢ to 24¢.

The sulfa drugs are among other chemical products to experience new price slashes. Greater manufacturing economies have enabled producers to lower sulfathiazole USP and sulfathiazole sodium 50¢ lb. in 1,000-lb. lots to a new low price of $2.50 lb.

Chlorine consumers apart from those working directly or indirectly on war contracts apparently are not benefitting greatly from expanded production of this chemical. The most recent data show chlorine output was 108,744 short tons in March, against 101,375 in February, and 101,631 tons in March, 1943. These figures indicate that chlorine is being made at an annual rate that is some 85,000 tons larger than last year, or on the basis of the March production at around 1,304,928 short tons, not including the output of Government-owned plants. The pulp and paper industry and the bleachers in textiles and other fields may not benefit from chlorine expansion this year as long as the war is in progress. One reason is that its uses for the manufacture of some things has increased greatly; among them chlorinated ethylenes and ethanes, carbon tetrachloride and chlorobenzene. These activities alone required twice as much chlorine in 1943 as in 1940.

At the same time, chlorine consumption in the pulp and paper industry, one of its important outlets, declined from 191,600 tons in 1940 to 167,900 tons in 1943. Only negligible amounts of Cl entered the manufacture of magnesium, plastics and synthetic rubber in 1940. Last year, however, these were substantial.

Heavy Chemicals.— The large chemical manufacturers report inability to contribute any part of their production to inventories owing to a heavy movement for war purposes. The seasonal items are exceptions. The selling representative for the production of the TVA and Ordnance plants announced that for the new fertilizer year starting July 1, 1944, its $50 per ton price for ammonium nitrate would be subject to discounts of from 4 to 8 per cent on deliveries made from June through September. This move is designed to encourage early deliveries and enable consuming manufacturers in the fertilizer industry to keep plants in operation during the summer months. The alkalies continued to rule firm under heavy war demands. A tighter supply position also has developed for copper sulphate. It is reported that increased tonnages of the carbonate are entering the manufacture of copper naphthenate.

Fine Chemicals.— Quicksilver prices tumbled further during May to around $110 per flask, a decline of almost 40 per cent over the past three months. As an aftermath of the Government's withdrawal from the quicksilver market it is reported that the Metals Reserve Corporation holds a substantial quantity believed to be in the neighborhood of 100,000 flasks, and which may have to be liquidated at some time in the future. Synthetic vitamins are moving out in large volume to domestic consuming lines as well as for Lend-Lease shipment. The supply situation in Vitamin A oil-soluble has been adversely affected, and WPB officials have requested the drug and proprietary trades to either cut their use 25 per cent or lower the potency of products containing the product. Glycerin is mov-

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ing more freely to many consuming fields, and former restrictions on its use have been removed. It was estimated in Government quarters that current production of stabrine (or quinacrine) is, in terms of antimalarial activity, five times the maximum annual production of quinine in Java.

Coal Tar Products.—Expanded operations in synthetic resins would appear to explain a much increased movement of cresylic acid and the cresols. The coal tar acids generally exhibit a good deal of strength. Phthalic anhydride demands have reached a new peak, reflecting expansion in the production of the new insecticides and repellents and alkyd resins. Technical benzoic acid supplies appear to have dried up on more active calls from war plants. Benzol, toluol, xylol, continue the features of a strong coal tar and coke-oven chemical market, with shipments of these materials to synthetic rubber and aviation fuel plants attaining new record high levels.

Between the Lines

(*Continued from Page 862*)

clarified, basis 64 per cent tannin. The first is usually dissolved in hot water with addition of a chemical before it can be used for tanning. The clarified grade, when finely ground or powdered, is cold water-soluble and can be used directly. Ordinary solid extract makes up approximately 85 per cent of this country's imports, 15 per cent being clarified solid extract.

The tannin in the solid extracts varies between 62 and 68 per cent. The content, for pricing purposes, is determined by chemical analysis methods approved by the American Leather Chemists' Association, this protecting the tanner who is naturally interested in his cost per tannin unit. Most of the extract is shipped in solid form directly from piers to tannery, the majority of tanneries having equipment for liquefying the solid extract. About one-fourth of total imports of ordinary solid extract is liquefied by commercial establishments and shipped as "liquid quebracho extract, basis 35 per cent tannin" to tanners who prefer it in this form.

Clarified solid extract is reduced to powdered form by commercial grinders and sold as "ground or powdered clarified quebracho extract, basis 70 per cent tannin" to tanneries.

Wattle Extract

Similar in use to quebracho extract is wattle extract, also known as mimosa, from its derivation from the acacia shrub, and imported from South and East Africa. It is assuming increased importance in the tanning industry from the existing shortage of other vegetable tanning materials. Increased imports are expected to help in meeting the situation caused by conditions in the chestnut extract industry.

Wattle is imported both as bark and in concentrated solid extract form, the bark containing an average of 38 per cent tannin. However, it is processed in this country chiefly into liquid wattle extract. The solid wattle extract is manufactured from bark, in Africa, prior to import, but is either ground, powdered, or liquefied by domestic tanneries or supply firms. Imports in 1943 comprised 15,000 long tons of solid wattle extract and 5,600 long tons of wattle bark.

The South African product is more or less cultivated, the South African government exercising control over grading of exportable bark and extract. This bark is sold in three grades, "prime," "average," and "merchantable" which grades are promulgated by the Director of Forestry, Cape Town, South Africa, and are well-established. Incidentally these grades are recognized in domestic pricing regulations by OPA. The South African product is normally sold for import with a guarantee of 62 per cent tannin for solid, and for ground or powdered wattle extract the basis of sale is 66 per cent tannin, and 35 per cent for the liquid product.

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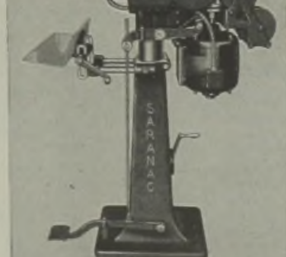

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Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
May, '42, $0.940 May, '43, $0.893 May, '44, $0.890

	Current Market		1944		1943	
			Low	High	Low	High
Acetaldehyde,99%.drs.wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv (*PC*) ..lb.	...	.07	...	.07	...	.07
ACIDS						
Acetic, 28%,bbls (*PC*) 100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. ......100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks. ....100 lbs.	...	6.93	...	6.93	...	6.93
Acetylsalicylic, Standard USP ....lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech, bbls. ......lb.	.43	.47	.39	.47	.39	.47
USP, bbls, 4,000 lbs. up lb.	...	.54	...	.54	...	.54
Boric, tech, bbls, c-l,....ton *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks. ..lb.	.03	.04½	.03	.04½	.03	.04½
Citric, crys, gran, bbls, lb. *b*	.20	.24	.20	.24	.20	.24
Cresylic 50%, 210-215° HB, drs, wks, frt equal gal.	.81	.83	.81	.83	.81	.83
Formic, Dom. cbys ......lb.	.10½	.11½	.10½	.11½	.10½	.11½
Hydrofluoric, 30% rubber, dms. ....lb.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks ...lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs....lb.	.25	.26	.25	.26	.25	.26
Muriatic, 18° cbys ...100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks ..100 lb.	...	2.25	...	2.25	...	2.25
Nitric,36°, cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks (*PC*) ...lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP ....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic, tech, bbls (*PC*) lb.	.26	.42	.26	.42	.26	.44
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks ....ton	...	16.50	...	16.50	...	16.50
Fuming (Oleum) 20% tks. wks ....ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls ......lb.	...	.70½	...	.70½	...	.70½
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.131	...	.131	...	.141
Butyl, normal, syn, tks (PC) ....lb.	...	.10¾	...	.10¾	.10¾	.14¼
Denatured, CD 14, c-l drs, (*PC, FP*) ....gal. *d*	...	.54½	...	.54½	...	.54½
Denatured, SD, No.1, tks. *d*	...	.50	...	.50	...	.50
Ethyl, 190 proof tks...gal.	...	17.60	...	17.60	...	11.90
Isobutyl, ref'd, drs ....lb.	...	.086	...	.086	...	.086
Isopropyl ref'd, 91%, dms ....gal.	.39	.66½	.39	.66½	.39	.66½
Propyl, nor, drs, wks gal.	.67	.70	.67	.70	.67	.70
Alum, ammonia, lump, bbls, wks ....100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99%, (*FP*) ....100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd dms wks lb.	.08	.12	.08	.12	.08	.12
Hydrate, light, (A) ....lb.	.14½	.15	.14½	.15	.14½	.15
Sulfate, com, bgs, wks, c-l ....100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs. wks ....100 lb.	2.35	2.50	2.35	2.50	1.75	2.50
Ammonia anhyd, cyl ......lb.	...	.16	...	.16	...	.16
Ammonium Carbonate, lumps, dms ....lb.	.08½	.09¼	.08½	.09¼	.08¼	.09¼
Chloride,whi,bbls,wks,100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks..lb.	.0435	.0850	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls..lb.	.27	.33	.27	.33	.27	.33
Perchlorate, kgs (A) ...lb.	.55	.65	.55	.65	.55	.65
Phosphate, dibasic tech, bbls ....lb.	.07¼	.08½	.07¼	.08½	.07¼	.08½
Stearate, anhyd, dms ...lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk (A) ton	28.20	29.20	28.20	29.20	28.20	30.00
Amyl Acetate (from pentane) c-l, drs, delv ....lb.	...	.15½	...	.18½	...	.18½
Aniline Oil, drs ....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls..lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs .....lb.	.15	.15½	.15	.15½	.15	.15½
Arsenic, whi, kgs (A) ....lb.	.04	.04¾	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; **y** Price given is per gal; **c** Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule, *a* Powdered boric acid $5 a ton higher; *b* Powdered citric is ½c higher;

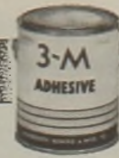
Current Prices

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks ....ton	55.00	65.00	55.00	65.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ....ton	77.00	90.00	77.00	90.00	77.00	90.00
Barytes, floated, bbls. ....ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines (A) ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	(A)	.15	(A)	.15	(A)	.15
Benzyl Chloride, cbys ....lb.	.22	.28	.22	.28	.22	.25
Beta-Naphthol, tech, bbls, wks ....ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots...lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ....ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	8.60	2.50	8.60	2.50	8.60
Borax, tech, c-l, bgs ....ton *i*	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.1895	.1945	.1755	.1945	.1575	.1840
Cadmium Metal (*PC*) ...lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ....ton	50.00	95.00	50.00	95.00	50.00	95.00
Carbonate, tech, c-l bgs, ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.58	.57	.58	.57	.58
Phosphate, tri, bbls, cl ..lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls ....lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl ....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) Zone 1, 52½ gal, drms ....lb.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more ....lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract (*FP*) (A) ....lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract ...lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs ....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude ....bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt Acetate, bbl (A) lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs (A) ..lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP*, *PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls.lb.	.19½	.20	.19½	.20	.19½	.20½
Sulfate, bbls,wks(A) 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ..ton	...	14.00	..	14.00	...	14.00
Cresol, USP, drs, (A)....lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ....ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks lb.	...	.61	...	.61	...	.61
Dibutylphthalate, drs ....lb.	.1780	.2450	.1780	.2500	.2060	.2300
Diethylaniline, lb drs ....lb.	...	.40	...	.40	...	.40
Diethyleneglycol,drs,lcl.wks lb.	.14½	.15½	.14	.15½	.14	.15½
Dimethylaniline, dms.cl.,lcl lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs ..lb.	.1875	.1925	.1875	.1925	.1875	.2050
Dinitrobenzene, bbls ....lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls ....lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms ....lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks ....lb.	.16	.20	.16	.20	.15	.20
Diphenylamine bbls ....lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs ...lb.	...	.35	...	.35	.35	.37
Ethyl Acetate. tks, frt all'd lb.	.1070	.1175	.1070	.1175	.107	.110
Chloride, drs ....lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms ....lb.	...	.0842	...	.0891	...	.0842
Glycol, dms, cl. ....lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines ....ton	...	37.00	...	37.00	...	37.00
Formaldehyde, c-l, bbls, wks (*FP*, *PC*) ....lb.	.0550	.0575	.0550	.0575	.0550	.0575
Furfural tech, dms, c-l,wks lb.	...	.12½	...	.12½	..	12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, bgs, wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.25
Glycerin (*PC*) CP, dms, c-l, ...lb.	...	.18¾	...	.18¾	...	.18¾
Saponification, dms, c-l, lcl. or tks ....lb.	...	.12¾	...	.12¾	...	.12¾

GUMS

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Gum Arabic, amber sorts bgs ....lb.	.12½	.13	.12½	.14	.13½	.17½
Benzoin Sumatra, CS ....lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo ....lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips ..lb.	...	.12	...	.12	...	.12
Macassar dust ....lb.	...	.07⅜	...	.07⅜	.07⅜	.11¾
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.23⅜	...	.23⅜	...	.23⅜
Ester ....lb.	.09½	.12	.09½	.12	.09½	.12
Karaya, bbls, bxs, dms, ...lb.	.18	.40	.18	.40	.14	.40

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums drs: kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works. f.o.b., wks. ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades *h* Lowest price is for pulp; highest for high grade precipitated; *i* Crys-



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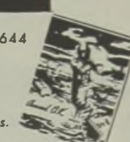

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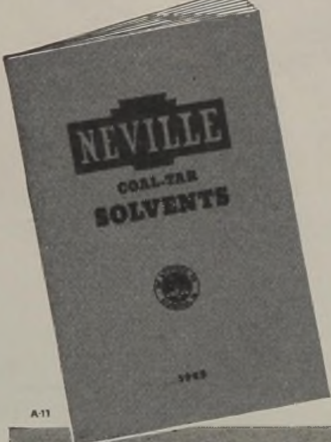

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	Current Market		1944 Low	1944 High	1943 Low	1943 High
Kauri, N Y (A)						
Pale XXX .... lb.	...	.65¼	...	.65¼	...	.65¼
No. 3 .... lb.	...	.22	...	.22	...	.30
Sandarac, cs .... lb.	1.40	nom.	1.40	nom.	1.40	nom.
Tragacanth, No. 1, cases lb.	4.50	5.00	4.00	5.25	4.00	5.25
No. 3 .... lb.	2.75	3.00	1.10	3.50	1.10	1.20
Yacca, bgs (*PC*) .... lb.	.06	.07¼	.06	.07¼	.06	.07¼

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Hydrogen Peroxide, cbys .. lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars .. lb.	2.00	2.10	2.00	2.10	2.00	2.10
Lead Acetate, cryst, bbls... lb.	...	.12½	...	.12½	...	.12½
Arsenate, St. bg, lcl .... lb.	.11½	.12	.11½	.12	.11½	.12
Nitrate, bbls .... lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4, lcl lb.	.09	.10¾	.09	.11	.09	.11
97% Pb_3O_4 bbls delv .. lb.	.09¼	.11	.09¼	.11	.09¼	.11
98% Pb_3O_4, bbls delv .. lb.	09½	.11¼	.09½	.11¼	.09½	.11¼
White, bbls .... lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basis sulfate, bbls, lcl lb.	.07¼	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk .. ton	6.25	13.00	6.25	13.00	6.25	13.00
Hydrated, f.o.b. wks .. ton	8.50	16.00	8.50	16.00	8.50	16.00
Litharge, coml, delv, bbls lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., (*PC*), bgs lb.	.04¼	.04¾	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks lb.	.06¼	.09¾	.06¼	.09¾	.06¼	.09¼
Chloride flake, bbls, wks c-l * .... ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls .... lb.	.15	.18	.15	.18	.14	nom.
Dioxide, Caucasian bgs, lcl .... ton	...	74.75	...	74.75	...	74.75
Methanol, pure, nat, drs gal *l*	.63	.76	.63	.76	.63	.76
Synth, drs cl .... gal. *m*	.34½	.40½	.34½	.40½	.34½	.40½
Methyl Acetate, tech tks .. lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl .... lb.	.32	.40	.32	.40	.31	.40
Ethyl Ketone, tks, frt all'd lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks ... gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks .... lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY ..... lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk .... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks ... lb.	.08	.09	.08	.09	.08	.09
Orthonisidine, bbls .... lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs ... lb.	...	.32	...	.32	...	.32
Orthodichlorobenzene, drms lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks .... lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, dms lb.	...	.09	...	.09	...	.09
Para aldehyde, 98%, wks lcl. .... lb.	...	.12	...	.12	...	.12
Chlorophenol, drs ...... lb.	...	.32	...	.32	...	.32
Dichlorobenzene, wks .. lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks (*FP*) .... lb.	.23	.24	.23	.24	.23	.24
Nitroaniline, wks, kgs .. lb.	.43	.45	.43	.45	.43	.45
Nitrochlorobenzene, wks lb.	...	.15	...	.15	...	.15
Pentaerythritol, tech, bl lb.	.29	.33	.29	.33	.29	.35½
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bls, wks .... lb.	...	.48	...	.48	...	.48

PETROLEUM SOLVENTS AND DILUENTS

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Lacquer diluents, tks, East Coast .... gal.	...	11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks .... gal.	...	.11	...	.11	...	.11
Petroleum thinner, 43-47, East, tks, wks ...... gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Rubber Solvents, standard, East, tks, wks .. gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks .... gal.	...	.09½	...	.09½	...	.09½

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Phenol, U.S.P., drs (A) .. lb.	.10½	.11¼	.10½	.11¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks (A) .... lb.	.13	.14	.13	.14	.13	.15½
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake, 88-92% .... lb.	.07	.07½	.07	.07½	.07	.07½
liquid, tks .... lb.	...	.02¾	...	.02¾	...	.0275
dms, wks .... lb.	.03	.03½	.03	.03½	.03	.03⅛
Potassium Bichromate csks *(*FP*) .... lb.	.09⅝	.10	.09⅝	.10	.09⅝	.10
Carbonate, hydrated 83-85% calc .... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Chlorate crys, bgs, wks (A) lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs .... lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks ...... lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans... lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate bgs, dom, blk unit Per Unit 60% K20 ... ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks (*FP*) dms ...... lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks (*PC*) gal.	...	.03¾	...	.03¾	..	.03¾
Pyridine, ref., drms ...... lb.	.45½	.46	.45½	.46	.45½	.46
R Salt, 250 lb bbls, wks lb.	...	.65	...	.65	...	.65
Resorcinol, tech., drms, wks lb	.68	.75	.68	.75	.68	.75
Rochelle Salt, cryst ...... lb.	.43½	.47	.43½	.47	.43½	.47
Salt Cake, dom. blk wks .ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.
* Spot price is ½c higher.

Current Prices

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Saltpetre, grn, bbls ...100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls ..lb. r	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots ....oz.	...	.32⅜	...	.32⅜	...	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks ....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl....100 lb.	1.05	1.13	1.05	1.13	...	1.13
Caustic, 76% flake drms, cl ....100 lb.	...	3.70	...	3.70	...	2.70
76% solid, drms,cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks ....100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, 60% tech, powd, flake, bbls, wks lb.	.05	.06	.05	.06	.05	.06
Benzoate, USP dms ....lb.	.46	.52	.46	.52	.46	.52
Bicarb, bbl, wks ...100 lb.	1.70	2.05	1.70	2.05	1.70	2.05
Bichromate,cks,wks(*FP*) lb.	...	.07¾	...	.07¾	...	.07¾
Bislfite powd, bbls, wks ....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35-40% bbls, wks ..100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, bgs, wks c.l. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks ....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l ....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs (A) ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% dom, cl. lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di wks ..100 lb.	6.00	7.25	6.00	7.25	6.00	7.25
Tri-bgs, cryst, wks 100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel, bbls, wks lb.	.10	.10¼	.10	.10¼	.10	.11
Pyrophosphate,bgswks c-l lb.	.0528	.0610	.0528	.0610	.0528	.0610
Silicate, 52°,drs. wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY ..lb.	.06½	.12	.06½	.12	.05	.12
Sulfate, Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, cryst c-l, bbls, wks ....100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks .....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs ....100 lb	...	4.08	...	4.08	...	3.47
Potato, bgs, cl ....lb.	...	.0637	...	.0637	...	.0637
Rice, bgs ....lb.	no stocks		no stocks		.09½	.10¼
Sweet Potato, bgs ..100 lb.	no stocks		...	.07½	...	.07½
Sulfur, crude, mines ....ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs ....lb.	.18	.30	.18	.30	.18	.30
Roll, bbls...........100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl lb.	.07	.08	.07	.08	.07	.08
tks, wks ....lb.	.04	.06	.04	.06	.04	.06
Talc, crude, c-l, NY .....ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY ......ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks ..lb.	no stocks		no stocks		no stocks	
Metal, (*PC*) (A) ......lb.	...	.52	...	.52	...	.52
Toluol, drs, wks ....gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) ....gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd ....lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate ....lb.	.25	.54½	.24	.54½	.24	.54½
Triethylene glycol, dms lcl lb.	...	.19½	...	.26	...	.26
Triphenyl Phos, bbls .....lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases ....lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs ......lb.	no stocks		.25	nom.	.25	.26
Bees, bleached, cakes....lb.	...	.60	...	.60	...	.60
Candelilla, bgs crude.. ton	.36	.46	.36	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton ....lb.	.83¼	.93¼	.83¼	.93¼	.83¼	.93¼
Xylol, frt all'd, tks, wks..gal.	...	.27	...	.27	...	.27
Zinc Chloride fused, wks..lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks..lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs, ..100 lb.	3.60	4.35	3.60	4.35	3.60	4.35

Oils and Fats

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Babassu, tks, futures ....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls ......lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY lb.	...	.39	...	.39	...	.39
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	...	.88	...	.90	...	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1510	...	.1510	...	.1530
Menhaden, tks ....gal.	...	.1225	...	.1225	...	.1225
Light pressed, drs .....lb.	.1208	.1210	.1208	.1307	.1305	.1307
Oiticica, liquid, tks ......lb.	...	.19¼	.21	.25	...	.25
Oleo, No. 1 bbls, NY ....lb.	.13¾	nom.	.13¾	nom.	.13¾	nom.
Palm, Niger, dms ....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks ....lb.	...	.13	...	.13	...	.18
Perilla, crude dms, NY(A) lb.	no stocks		...	.245	...	.245
Rapeseed, denat, bulk ....lb.	...	.1150	...	.1150	...	.1150
Red, dms ....lb.	.12¾	.13¾	.12¾	.14¾	.13¼	.14¼
Soy Bean, crude, tks, wks lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls ....lb.	...	.14¼	...	.14¼	...	.14¼
Turkey Red, single, drs ..lb.	.10	.14½	.10	.14½	.10	.14½

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Canadian Review

(*Continued from page 890*)

The new Research Enterprises unit is the only producer of the basic, optical grade material in the Dominion.

Lanolin Plant

A plant for the production of neutral wool grease, or technical lanolin, has been completed by the Wool Combing Corporation of Canada, Ltd., at Acton, Ontario. Output this year is scheduled to approximate 200,000 pounds.

This unit, the only Canadian lanolin producer, was established on the request of the Department of Munitions and Supply, and the centrifugal, rather than acid cracking system, is employed.

Normally the bulk of the Dominion's wool grease is imported from the United Kingdom, but recently some 300,000 pounds has been imported annually from the U.S.A.

At present no refined lanolin is manufactured in Canada, and shipments from England and the U.S.A. fall considerably short of demand.

1942 Chemicals Production

A final official report indicates Dominion production of chemicals and allied products for 1942 as amounting to $501.6 million, as compared with $304 million in 1941. Of this total, a miscellaneous sub-group which includes explosives and other war chemicals rose from $100 million to $230 million. In other words, these constituted in value nearly half the total output of 1942, as compared with only one-third in 1941.

Deducting these from the total, the remainder, which are predominantly for civilian consumption, increased from about $204 million to $241 million, or about 18 per cent.

Ammonium Nitrate Production

The total ammonium nitrate production of the three Canadian manufacturers amounted to 425,000 short tons from the time the war started to April 1 of this year, it is officially stated.

Of this tonnage, 130,000 tons has been exported to the U.S.A. for use as a commercial fertilizer, and 23,000 tons has been sold in Canada for the same purpose.

Base price for ammonium nitrate sold as fertilizer in Canada was $49.85 per ton, f.o.b. Toronto.

New Disinfectant Plant

A small plant for the manufacture of disinfectants has been established in Toronto by Baird and McGuire (Canada) Ltd., affiliate of the American organization.

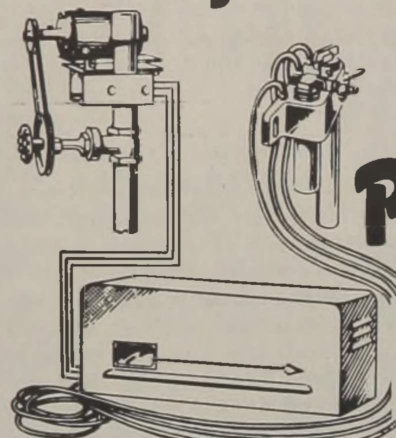
Most of the raw materials are of Canadian origin, and both black and clear high-coefficient disinfectants are being produced.

Hitherto the Dominion has been dependent mainly on English importations for the higher coefficient materials, although a fair volume of lower coefficient black disinfectants has been manufactured by the Barrett Co. Ltd., Montreal, for the past few years.

Chemical Exports Up

Canada's chemical export trade, which reached a peak of $86.4 million last year, has registered a further 22 per cent gain over 1943 for the first four months of this year. The increase is a general one, not confined to a few items, with explosives, but not ammunition, included in the total.

Density Controller for PULPS



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"WE"-EDITORIALLY SPEAKING

The day of invasion of western Europe has arrived just as we go to press this month. We hope that by the time this issue reaches you our men will have securely established themselves in Europe. We pray that our losses will be few and that the invasion will go so well that the end of the war will soon be more clearly in sight.

This was the day which had been awaited so anxiously. It was met with sober thought and a realization that it may well be one of the most significant days in human history. It marks the culmination of all the efforts of our armed forces, our industries, and our people for the past two and one-half years.

With few exceptions the home front has supported the effort up to its understanding of the requirements, but now that the day has come we realize that whatever our sacrifices and efforts have been they are small compared to the ordeal of the men on the beachheads. Such a realization should make us resolve that these men must have the utmost help we are able to give. Let us, therefore, persist in useful work and support the grim battle lines with every energy so that the day of victory will be hastened.

We recently came across a statement by Walter O. Hudson, secretary, Institute of Registered Architects, London, to the effect that it would take all the 10,000 architects in private practice five years to prepare plans for reinstating the bomb-damaged buildings of London.

This emphasized the fact that few of us have comprehended the tremendous destruction that has taken place during this war, not only in London but in all Europe. As a consequence there will be a great task of reconstruction.

As the only major industrial nation which will come out of this war with strong and undamaged production facilities, we can definitely expect to take part in some of this rebuilding and restoration, either through government or private business channels. It would seem like a good bet for industry to broaden its horizons on the foreign trade question.

Speaking of foreign trade we notice in many discussions that the question of how impoverished nations are going to pay for the products they need comes up. This is an important problem on which interest in foreign trade will eventually hinge. Many business men would prefer to concentrate on the American market where there is plenty of purchasing power. Many want to know if we are just going to keep lending money and credit to other countries, so that they can turn around and purchase products from us, or if they will achieve a real purchasing power so that a strongly based trade can develop.

In this connection we heard an interesting proposal by an economist recently. He proposes that the United States supply manufactured goods in return for raw materials. He believes that we should import raw materials and minerals which we already have and in excess of our present requirements. By stockpiling these minerals to replenish our diminishing natural resources we would be creating purchasing power in the countries from which we bought and insuring our supplies for future generations. He says that it would even be possible, although probably not economical, to import petroleum and pump it back into the earth.

A recent population report from the Bureau of the Census indicates that Americans are moving south and west. The moderate pre-war population shift to these areas has become a great migration as a result of wartime conditions. Three cities in California—Los Angeles, San Francisco and San Diego have picked up almost a million in civilian population, while New York alone has lost almost a million.

These shifts in population although likely to slow down after the war, indicate a trend that was started before the war in some sections. They are being studied by some companies as important factors in postwar manufacturing and marketing plans.

An electronic attendant for your post-war garage is planned by one of the aviation equipment manufacturers as one of its non-aircraft items. As you drive up to the garage this device will open the doors, turn on the garage light, turn on the house light, It's burglar-proof for only *your* car will be able to perform the open sesame function at *your* home; millions of combinations can be worked out. This electric helping hand has been opening doors at Midwest arms factories.

Strange as it seems there was no sugar until the 13th century; no coal until the 14th; no buttered bread until the 15th century; no potatoes or tobacco until the 16th; no tea or coffee until the 17th; no phones, gas or matches until the 19th century. Will our descendants look back and wonder how we got along without the things they will have?

Fifteen Years Ago

From Our Files of June, 1929

Germany's first plant hydrogenating black coal for a yield of synthetic gasoline starts operations this month.

The Leunawerke, of the German dye trust, is already producing around 50,000 tons synthetic gasoline annually from lignite, or brown coal.

Council of the American Chemical Society votes to recommend that the name of Josiah Willard Gibbs be included in the list of illustrious Americans in the Hall of Fame.

Hawley Bill, providing for tariff revision, is passed by the House of Representatives. During the debate in the House the proposed tax on blackstrap molasses was stricken from the measure.

General Industrial Alcohol Corp. formed by merging four companies is organized under the laws of Delaware. The companies forming the new corporation are General Industrial Alcohol Co., Inc., National Industrial Alcohol Co., Inc., Michigan Co., and Molasses Distributors Corp.

Manufacturing Chemists' Association and Synthetic Organic Chemical Manufacturers' Association hold annual meetings at the du Pont-Biltmore Hotel, Wilmington, June 6 and 7.

Sylvania Industrial Corp., New York, plans to erect a $1,000,000 plant at Fredericksburg, Va., in which to manufacture chemical specialties.

E. I. du Pont de Nemours & Co., Inc., announces formation of an agricultural extension section to its explosives department. It will study problems in connection with the use of explosives in agriculture, and aid farmers and others in the economical use of these products.

Monsanto Chemical Works acquires Rubber Service Laboratories Co. and its subsidiary, Elko Chemical Co., through exchange of stock.

Newport Chemical Works, Passaic, N. J., acquires business and assets of the Rhodia Chemical Co., New York.

Calco Chemical Co., Inc., Bound Brook, N. J., subsidiary of American Cyanamid Co., purchases plant and business of the Textile Chemical Co., Providence, and the sulfur dioxide division, King Chemical Co., Bound Brook, in addition to the purchase of the Crown Chemical Co. plant, Keyport, N. J.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 561, Nos. 3, 4—Vol. 562, Nos. 1, 2—p. 504

**Rubber*

Production of sponge-like or cellular rubber from aqueous dispersions. No. 2,346,055. Stanley Taylor and Donald Pounder to Dunlop Rubber Co., Ltd.

Improving the adhesion of rubber to fibrous materials and product thereof. No. 2,346,440. Edward Lessig and Edward Cunningham to The B. F. Goodrich Co.

**Textiles*

Textile treatment process which comprises impregnating a textile with 0.5% of a monofunctional acylating agent and 0.5% of a monomeric, non-polymerizable, substantially water-insoluble amine. No. 2,343,920. Robert Maxwell to E. I. du Pont de Nemours & Co.

Coloration of cellulose acetate textile material which comprises diazotizing thereon 4-nitro-4'-amino-2':5'-dimethoxy-azo benzene and coupling resulting diazo compound on material with N-di-ethyl-m-anisidine. No. 2,343,995. Henry Olpin and John Wright to Celanese Corp. of America.

Heat-stable textile fiber composed of vinyl resin resulting from conjoint polymerization of vinyl halide with vinyl ester of an aliphatic acid. No. 2,344,002. Edward Rugeley and William Quattlebaum to Carbide and Carbon Chemicals Corp.

Treating glass fiber thread which comprises impregnating thread with latex. No. 2,344,494. William Camp to The Clark Thread Co.

Improving fibrous materials. No. 2,345,110. Charles Graenacher, Richard Sallmann, Otto Albrecht and Jost Frei to the Society of Chemical Industry in Basle.

Manufacturing viscose threads of wool-like character. No. 2,245,345. Thedoor Koch to American Enka Corp.

Polymerization of synthetic resin impregnated fabrics. No. 2,345,541. William Scholze, Jr. to The Robertson Bleachery & Dye Works, Inc.

Acid viscose spin bath, for coagulating viscose filaments therein, containing a dissolved zinc salt and a dissolved, substantially stable, cation-active alkylene derivative. No. 2,345,570. Rudolph Bley to North American Rayon Corp.

Producing highly fatigue-resistant cotton cords and yarns which comprises treating cotton yarns with a dilute aqueous solution of an electrolyte. No. 2,346,126. Edward Lessig and Lewis Larrick to the B. F. Goodrich Co.

Preparing cotton for use as electrical insulation. No. 2,346,324. Thomas O'Donnell to Western Electric Co., Inc.

**Water, Sewage and Sanitation*

Sterilizing air which comprises contacting the air to be sterilized with triethylene glycol. No. 2,344,536. Stewart Coey and Joseph Spiselman to Research Corp.

Clarifying natural raw water which comprises separately dispersing therein a slurry of unflocculated sodium bentonite and ionizable material. No. 2,345,827. Hubert Olin.

Treating sewage which comprises adding ionizable material and a slurry of solium bentonite. No. 2,345,828. Hubert Olin.

Agricultural Chemicals

Insecticide comprising refined inactive carrier oils containing, as an active ingredient, a methyl substituted naphthalene. No. 2,347,265. Julius Hyman to Velsicol Corporation.

Combatting codling moth larvae infestations on pome fruit trees, with lead arsenate, and thereafter with compound containing the xanthone structure. No. 2,347,377. James Swaine to General Chemical Co.

Insecticidal and insectifugal composition containing as essential active ingredient a monophenoxy diphenyl ether and a carrier therefor. No. 2,347,393. Euclid Bousquet and Hubert Guy to E. I. du Pont de Nemours & Co.

Benzalmalononitrile as a pest-control agent. No. 2,347,573. William Moore to American Cyanamid Co.

Stable emulsion comprising a water insoluble polymeric organic film-forming material dispersed in a water phase containing an inherently water-soluble polyvinyl alcohol and a water soluble organic complex of the Werner type. No. 2,346,755. Charles Hemming to E. I. du Pont de Nemours & Co.

Forming fiberboard which comprises comminuting cottonseed hulls adding hull fiber, mixing phenolic resin therewith and subjecting to heat and pressure. No. 2,346,943. Fritz Rosenthal to The University of Tennessee Research Corp.

Preparing an improved livestock food from an agricultural roughage which includes ammonating said roughage. No. 22,477. Harvey Millar to The Quaker Oats Co.

Manufacture of hesperidin. No. 2,348,215. Ralph Higby to California Fruit Growers Exchange.

Manufacturing fertilizers and resulting fertilizer. No. 2,348,343. John Holbrook.

Producing alcohol from staroh and its congeners. No. 2,348,451. Leo Christensen to National Agrol Co., Inc.

Treating articles formed from denatured vegetable globulin with an aqueous saline halide bath. No. 2,347,677. Eric Fieldsend and William Boyes to Imperial Chemical Industries, Limited.

Treating wood to insure prolific growth of fungi Penicillia, and to activate wood so that it will produce in spirituous liquor in a relatively short time the same physical, chemical and biological phenomena as will occur over a period of years when spirituous liquor is treated with normal unactivated wood, comprising moistening tannin-containing wood with a growth-activating vegetable hormone. No. 2,347,783. Ernst Krebs.

Manufacture of starch products. No. 2,347,849. Joseph Seiberlich.

Cellulose

Manufacture of cellulose derivatives having affinity for acid dyestuffs. No. 2,348,305. Henry Olpin, Sydney Gibson and John Jones to Celanese Corp. of America.

Producing regenerated cellulose structures by extrusion of viscose in an aqueous sulfuric acid spinning bath the step which comprises incorporating in bath maganos sulfate together with zinc sulfate. No. 2,347,883. Norman Cox to E. I. du Pont de Nemours & Co.

Producing regenerated cellulose structures by extruding viscose in an aqueous sulfuric acid spinning bath the step which comprises incorporating in bath chromic sulfate together with zinc sulfate. No. 2,347,884. Norman Cox to E. I. du Pont de Nemours & Co.

Acetylation of cellulose. No. 2,348,001. Donald Gibson and William Shoemaker to National Vulcanized Fibre Co.

Ceramics

Frit composition for forming vitreous enamels containing silica, zirconium oxide, titanium oxide, phosphorous pentoxide, alumina, boric anhydride, soda and fluorine. No. 2,347,187. Leon Frost to The Titanium Alloy Manufacturing Co.

Producing bauxite ceramics. No. 2,347,685. John Heany to Heany Industrial Ceramic Corp.

Chemical Specialties

A sealer which comprises reclaimed rubber, asphalt, a mixture of rosin and a rosin soap, a finely divided clay, and material of the nature of short fibre asbestos. No. 2,347,211. Grant Merrill, and Gordon Hollingsworth, to Minnesota Mining & Manufacturing Co.

Lubricating composition comprising mineral lubricating oil and a sulphur treated oil and a stable oil-soluble halogen bearing organic ring compound containing a carbonyl radicle. No. 2,347,217. Carl Prutton and Albert Smith to The Lubri-Zol Development Corp.

Fly spray containing N-isobutylundecylenamide, pyrethrum and n-octyl thiocyanate. No. 2,347,260. Hubert Guy and Avery Goddin to E. I. du Pont de Nemours & Co.

Detergent composition comprising essentially an alkyl mono-nuclear aromatic sulfonate having at least 12 carbon atoms in the alkyl group, and a water-soluble alkyl ether of cellulose. No. 2,347,336. Herbert Seyferth to Allied Chemical & Dye Corp.

Printing ink adapted to dry quickly to a non-smudging deposit under heat. No. 2,347,436. Frank Root to Ellis-Foster Co.

Removal of undesirable tastes and odors from fat-soluble vitamin-containing materials and stabilization of said materials against oxidative changes, which comprise mixing a fat-soluble vitamin-containing material with a tomato product. No. 2,347,462. Loran Buxton to National Oil Products Co.

Saponification of a fat containing a fat soluble vitamin, with preservation of the vitamin. No. 2,347,565. Vaman Kokatnur to Autoxygen, Inc.

Lubricating oil composition containing a lubricating oil and a di-(dihydroabietyl) dithiophosphate. No. 2,347,592. Elmer Cook and William Thomas, Jr., to American Cyanamid Co.

Abrasive composition containing diamond dust, beeswax, rosin and shellac. No. 2,347,597. Adolph Ehrlich.

Chemical seasoning of wood with aqueous solutions of hygroscopic organic chemicals the step which consists of incorporating a water-soluble chlorophenolate to prevent growth of microorganisms in and on residues of the hygroscopic chemical. No. 2,347,635. Frank Smith to The Dow Chemical Co.

Joining two surfaces together by applying in a separate phase, boric acid and a predominantly starchy amylaceous adhesive dispersed in water with an alkaline fluidity increasing agent, and bringing said surfaces together. No. 2,346,644. Hans Bauer, Jordan Bauer, and Don Hawley to Stein, Hall Manufacturing Co.

Impregnating a fabric belt to provide increased strength, softness and flexibility comprising soaking belt in aqueous dispersion of a starch gum, an ungelatinized tuber starch, an ungelatinized cereal-starch, and an hygroscopic, water miscible oil. No. 2,346,674. Otto Goepfert to Endless Belt Corp.

*Continued from last month (Vol. 560, Nos. 2, 3, 4—Vol. 561, Nos. 1, 2)

Printing paste comprising an acid-reacting aryl diazo salt and picolinic acid. No. 2,346,790. Swanie Rossander, Chiles Sparks and Carl Maynard, Jr., to E. I. du Pont de Nemours & Co.
Lubricant comprising mineral oil base stock, an aliphatic alcohol having at least 8 carbon atoms, and an oil-soluble metal salt of an alkylated phenol. No. 2,346,808. Carl Winning and John McNab to Standard Oil Development Co.
Removing hair and wool from skins and method of dehairing. No. 2,346,907. Edward Christopher to Industrial Patents Corp.
Printing composition comprising a film-forming material, a water-insoluble solvent for the film-forming material and a poly-anthrimide pigment. No. 2,346,957. Alexander Wuertz and Joseph Deinet to E. I. du Pont de Nemours & Co.
Typographic printing ink characterized by its ability to be set by addition of water to film and by improved printing characteristics. No. 2,346,-968. Francis Jeuck and Charles Rietz to Interchemical Corp.
Typographic printing ink characterized by press-stability under humid conditions, combined with ability to be set by addition of water to film of ink. No. 2,346,969. Francis Jeuck and Charles Rietz to Interchemical Corp.
Bitumen useful as a substitute for gilsonite in intaglio printing inks. No. 2,346,970. Wilbur Jones to Interchemical Corp.
Germicidal liquid containing substantially one part formalin to two parts solvents including methanol and acetone, formaldehyde, water, and hexamethylenamine. No. 2,347,012. Arthur Waugh.
Adhesive having delayed-hardening properties prepared from water, a water-soluble formaldehyde-urea reaction product, a substance selected from magnesium oxide, magnesium hydroxide, zinc oxide and zinc hydroxide, and an ammonium salt of a strong acid. No. 2,348,244. William Dearing to Libbey-Owens-Ford Glass Co.
Lubricant composition comprising an E.P. agent and chlorinated materials selected from sulfur, sulfurized materials and a compound of antimony and bismuth. No. 2,348,317. Stanley Waugh to Tide Water Associated Oil Co.
Salt water pit lining comprising a mixture of bitumen, soil, and sawdust. No. 2,348,320. Joseph Becker to The Atlantic Refining Co.
Wet-proof cigarette paper consisting of cigarette paper coated with aluminum stearate. No. 2,348,324. Allen Bond, Jr. to Brown and Williamson Tobacco Corp.
Liquid lubricating oil composition comprising a petroleum lubricating oil, a minor proportion of a mixed calcium salt of an alkyl phenol sulfide and an alkyl ester of salicyclic acid. No. 2,348,461. Willard Finley and James Kirk to Sinclair Refining Co.
Typographic printing ink characterized by production of films on paper which are inert and water-resistant under paraffin, and which do not affect sealing properties of paraffin, comprising pigment dispersed in a vehicle, whose non-volatile constituents consist of sulfonated fatty material, and a mixture of a hydrogenated rosin and talloil. No. 2,348,594. Dominic Bernardi to Interchemical Corp.
Normally plastic shoe bottom filler comprising comminuted cork, fibers, rosin and a rubber cement. No. 2,348,674. Howard Dodge and Russell Bush to The General Tire & Rubber Co.
Producing a tub size from a corn starch containing substantial amounts of alpha amylose. No. 2,348,685. Rolland Smith and Herbert Gardner to Stein, Hall Manufacturing Co.
Pencil for laundry marking containing a colorless fluorescent dyestuff dispersed through the pencil body and having affinity for textile fabrics. No. 2,347,644. Francis Sell to The National Marking Machine Co.
Flexible abrasive article comprising a backing sheet and abrasive particles bonded with a blend of a heat-convertible synthetic resin and a volatile organic solvent solution of a film-forming thermoplastic resin. No. 2,347,662. Richard Carlton and Byron Oakes to Minnesota Mining & Manufacturing Co.
Recovering from distillers' slop a dry product in form of discrete particles capable of retaining their original form upon exposure to atmospheric humidity. No. 2,347,669. Wolcott Dennis to U. S. Industrial Chemicals, Inc.
Liquid cleaning and polishing composition comprising paraffin wax, stearic acid and a starchate emulsifying agent. No. 2,347,679. Kenneth Gaver to The Komel Corp.
Mothproofing composition containing a substance chosen from the group consisting of a guanidine rosinate and a guanidine abietate. No. 2,347,688. David Jayne, Jr. to American Cyanamid Co.
Composite article composed of a highly compacted mixture of powdered bagasse and powdered gilsonite. No. 2,347,697. Constance Levey.
Crank case lubricating oil composition comprising a solvent refined mineral lubricating oil normally tending to corrode bearings of crank case and an oil-soluble stabilizing agent to inhibit such corrosion, said agent comprising a tri-trialkanolamine phosphite. No. 2,347,814. Truman De Villiers to Cities Service Oil Co.
Air seal composition for pneumatic tires comprising water, salt, alcohol, and linseed meal. No. 2,347,925. Noel Owens to Film-O-Seal Co.
Composition useful as additive to mineral oil lubricants and method of preparing and using the same. No. 2,348,044. William Whittier and Joseph Stucker to The Pure Oil Co.
Mold-facing sand comprising sand, and bentonite, pitch, and sea-coal. No. 2,348,155. Connor Shanley.

Coal Tar Chemicals

Preparing refined anthracene and derivatives thereof, wherein anthracene component in crude anthracene is separated in form of an anthracene-maleic complex. No. 2,347,228. Charles Winans to Koppers Co.
Production of hydrocarbons by thermal treatment of carbonaceous materials of a higher molecular weight at temperatures of more than 200° C., which comprises employing a catalyst. No. 2,347,231. Fritz Stoewener and Friedrich Becke.
Treating liquid hydrocarbons to produce a coke of high density. No. 2,347,076. Arthur Boynton and Urban Stallings to Knowles Fuel Process Corp.
Treating tar. No. 2,348,699. Malcolm Tuttle to Max B. Miller & Co., Inc.

Coatings

Manufacturing wrinkle coating compositions, comprising adding to a wrinkle varnish base including a bottom drier and a top drier, a texture modifying agent comprising linseed oil fatty acids and a solvent therefor. No. 2,347,303. William Waldie to New Wrinkle, Inc.
Manufacturing wrinkle coating compositions, comprising adding to a wrinkle varnish base including a bottom drier and a top drier, a texture modifying agent comprising a mixture of fatty acids of linseed oil and China-wood oil and a solvent therefor. No. 2,347,304. William Waldie to New Wrinkle, Inc.
Container closure and lining composition, a stable aqueous dispersion made by milling cellulosic fibres into rubber to coat the fibres with rubber and then working resulting mass with water and a dispersing agent selected casein, glue, gelatin, karaya, sea moss and algin. No. 2,347,618. Kenneth Tator to Dewey & Almy Chemical Co.
Treating coal in bulk with a solution of urea-formaldehyde resin of the water-soluble cold-setting type with resultant formation of an adherent weather and water resistant protective covering thereover. No. 2,346,650. Leopold Bornstein.
Forming corrosion resistant coatings on aluminum by an aqueous solution of a potential condensation product of urea and formaldehyde having boric acid and ammonium hydroxide. No. 2,346,658. Joseph Brennan and Leona Marsh.
Preventing ice accretion on exposed surfaces of aircraft comprising applying an undercoating of a solution of solid, completely polymerized glycerol phthalate and a finishing coating of a solution of glycol stearate in ethylene glycol. No. 2,346,891. George Stuart Adlington.
Manufacturing composite plasterboard which comprises applying to a liner a coating comprising an aqueous mixture of a water-setting cementitious material with a water-diffusible adhesive. No. 2,346,999. John Sandford and Victor Lefebure to Imperial Chemical Industries, Ltd.
Protective coating for concrete pavements. No. 2,348,365. George Sandenburgh, one-half to William Pindell.
Providing a cellular refractory lining for interior surfaces of a heated furnace, which comprises: forming aqueous dispersion of finely divided solid material consisting of divided refractory material and containing a highly colloidal argillaceous material. No. 2,348,395. Leonard Larson to Kennecott Corp.
Adhesive and coating material which is a solution of highly polymeric vinyl isobutyl ether in benzine and acetone. No. 2,348,447. Eugen Bock.
Electrical conductor provided with adherent continuous coating of synthetic linear crystalline polyamide. No. 2,348,536. Wallace Gordon to E. I. du Pont de Nemous & Co.
Opaque sheet material, printable with both drying oil inks and solvent-type inks, containing ethyl cellulose of ethoxy content, an opacity producing pigment and an ethyl cellulose plasticizer of hardness index greater than 100. No. 2,348,672. William Collings and Toivo Kauppi to E. I. du Pont de Nemours & Co.
Composition for coating sheet materials comprising microcrystalline wax and an aluminum soap of a higher fatty acid. No. 2,348,687. Allen Abrams and George Forcey, Winfred Graebner, Alfred Heald, and George Rumberger to Marathon Paper Mills Co.
Container for packaging hot flowable materials congealable upon cooling to a solid condition, formed from a sheet material provided with an adherent, continuous, flexible, thermoplastic coating, said coating being formed from a composition comprising miscrocrystalline wax. No. 2,348,689. Allen Abrams, Donald Davis and George Forcey, George Rumberger and Charley Wagner to Marathon Paper Mills Co.
Producing weather-proof siliceous coatings upon asbestos cement slabs. No. 2,347,684. Lloyd Hatch and Maurice Buzzell to Minnesota Mining & Manufacturing Co.
Coating composition comprising a bodied and reacted mixture of a resinous ester of pentaerythritol and mixtures of penaerythritol and polypentaerythritols with a rosin acid, maleic acid, and linseed oil. No. 2,347,923. Frank Oswald to Hercules Powder Co.

Dyes, Stains

Dyeing artificial fibers made from conjoint polymers of vinyl halides with vinyl esters of aliphatic acids. No. 2,347,508. Edward Rugeley and Theophilus Feild, Jr., to Carbide and Carbon Chemicals Corp.
Metallizable azo dye. No. 2,346,922. Oliver Johnson to E. I. du Pont de Nemours & Co.
2, 2-dichlorotolidine disulfonic acid, azo dye intermediate. No. 2,346,941. William Reynolds to E. I. du Pont de Nemours & Co.
Leuco sulphuric acid esters of the anthraquinone series yielding by acid oxidation in substance and on the fiber yellow to orange shades of good fastness. No. 2,347,027. Eduard Besler to General Aniline & Film Corp.
Dyeing nylon. No. 2,347,143. Clifford Wilcock to Courtaulds Limited.
Mono-azo dyestuffs. No. 2,347,928. Gerald Bonhote, deceased, by Marcelle Bonhote and Ernst Henzi to Society of Chemical Industry in Basle.

Equipment

Water softening apparatus. No. 2,347,201. Lynn Lindsay.
Method of and apparatus for treating liquid. No. 2,347,318. William Gurney to The Permutit Co.
Supporting structure for an electron image device including a power supply, an electron gun, electron focusing means and electron image means. No. 2,347,328. Ladislaus Marton to Radio Corp. of America.
Method of pulverizing resinous and thermoplastic materials. No. 2,347,-464. Charles Cuno to The Lehon Co.
X-ray apparatus for obtaining powder diffraction patterns. No. 2,347,-638. Dan McLachlan, Jr., to American Cyanamid Co.
Liquid density determining device. No. 2,346,721. Ross Bassinger.
Light-polarizing device comprising a sheet of a transparent plastic material having suspended a multiplicity of fibers having dichroic material incorporated therewith, said fibers being oriented in parallel relation. No. 2,346,766. Edwin Land to Polaroid Corp.
Air filter comprising a porous structure the pores of which contain glyceryl ammonium sulfate. No. 2,347,031. Martin Cupery to E. I. du Pont de Nemours & Co.
Spectrophotometer accessory, a sample holder adapted for use with those spectrophotometers of flickering-beam type which have an integrating sphere with at least one opening for admission of light into sphere and a sample mounting window opposite said opening. No. 2,347,066. William Shurcliff to American Cyanamid Co.
Spectrophotometer attachment for absorbing specular reflection. No. 2,347,067. William Shurcliff to American Cyanamid Co.
Improved condenser for condensing zinc metal vapors formed in an elec-

tric arc smelting furnace. No. 2,348,194. Roland Crane and Melville Perkins to American Smelting & Refining Co.

Process of an apparatus for treating sulphuric acid containing dissolved nitro bodies. No. 2,348,328. Fred Chapman and Ralph Peterson and Clifford Woodbury to E. I. du Pont de Nemours & Co.

Apparatus for separating gas and liquid. No. 2,348,357. Asbury Parks.

Continuous method of recovering mineral values from a mass containing an element capable of forming a water-soluble alkali compound with sulphur. No. 2,348,360. Howard Reed.

Apparatus for cultivating of anaerobic and microaerophilic organisms. No. 2,348,448. John Brewer to Kimble Glass Co.

Suspendeometer for comparing relative capacities of fluids, such as well drilling fluids, to support rock fragments, weight material, sand and like. No. 2,348,520. William Cardwell, Jr., to Standard Oil Co. of California.

Apparatus for measuring pressure of gaseous medium in a partial vacuum. No. 2,348,607. Joe Clark to National Research Corp.

Rotary kiln for extraction of mercury from its ores. No. 2,348,673. Charles Degner.

Device for centrifugally separating solid particles from gas. No. 2,347,731. Jean Boivie.

Process for producing alumina. No. 2,347,736. Elbert Fisher to Marlew Fisher.

Temperature control system in combination with a chemical reaction vessel. No. 2,347,763. Willard Bixby to The B. F. Goodrich Co.

Apparatus for recovery of hydrocarbons from a partially depleted hydrocarbon-bearing formation that is penetrated by a well bore. No. 2,347,769. Wilbur Crites to Phillips Petroleum Co.

Heat exchange unit comprising a single length of extruded aluminum stock having a central flattened seamless tube section and two lateral fins thinner than the tube section and homogeneous therewith. No. 2,347,957. William McCullough.

Apparatus for compounding a mixture by delivery measured ingredients comprising a plurality of metering units each having ingredient supply means and electrically controlled metering means for measuring and subsequently delivering its respective ingredient. No. 2,348,149. Albrecht Reinhardt, Matthijs Boissevain, Ascher Shapiro, and Charles Cady to International Business Machines Corp.

Explosives

Manufacture of explosives. No. 2,347,660. Jerome Burtle to Western Cartridge Co.

Food Chemicals

Separation of corn kernels into their constituent substances. No. 2,347,215. Ellis Pattee to National Distillers Products Corp.

Producing glutamic acid which comprises hydrolysis of a proteinaceous substance with a mineral acid and subsequent neutralization treatment of resulting hydrolyzate to obtain glutamic acid. No. 2,347,220. Paul Shildneck to A. E. Staley Manufacturing Co.

Producing extract of vanilla from the crude drug. No. 2,347,322. William Jackson.

Preserving citrus fruit juices which comprises expressing juice from fruit, adding salt. No. 2,347,339. Gray Singleton.

Preserving from oxidative deterioration a comestible in form of solid particles containing substances susceptible of turning rancid, the method which comprises maintaining an electric discharge zone under partial vacuum. No. 2,347,486. Felix Kiefer.

Treatment of yeast, which comprises subjecting yeast to vigorous aeration in a medium containing a sugar, a yeast assimilable nitrogen source and a phosphate. No. 2,346,671. John Enright and Herbert Foote to Standard Brands, Inc.

Filtering liquid egg material. No. 2,346,682. Benjamin Harris.

Effecting the partial removal of calcium and phosphate ions from acidified liquid milk products by contact with a reactivated spent exchange material. No. 2,346,844. Maurice Hull to M & R Dietetic Laboratories, Inc.

Antivitamin. No. 2,348,425. Esmond Snell to Research Corp.

Making a carotene concentrate. No. 2,348,443. Harold Barnett.

Dry vitamin preparation comprising a gelatin matrix having discrete particles of an oil containing an oil-soluble vitamin dispersed therein and also a water-soluble acid vitamin and an alkaline substance. No. 2,348,503. Harden Taylor to The Atlantic Coast Fisheries Co.

Mixing coloring material with oleomargarine, by enclosing the oleomargarine and coloring material within a translucent flexible container. No. 2,347,640. Leo Peters.

2-methyl-3-phytyl-1,4-naphthoquinone, a vitamin. No. 2,348,037. Sidney Thayer, Stephen Binkle and Ralph McKee, and Donald MacCorquodale and Edward Doisy, to President and Board of Trustees of St. Louis University.

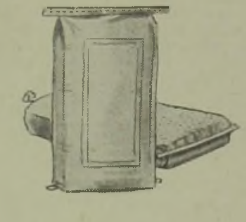
**Industrial Chemicals—Inorganic*

Composition for refractory structures comprising zirconium oxide, water dispersible colloid and a monohydroxyl base. No. 2,347,225. Eugene Wainer to The Titanium Alloy Manufacturing Co.

Purification of crude hydrochloric acid contaminated with dissolved nitrogen oxides the step of adding to the acid a sulfamate. No. 2,347,257. Frank Frost, Jr., to E. I. du Pont de Nemours & Co.

Drying a calcium hypochlorite product, which comprises subjecting a plastic slurry of calcium hypochlorite simultaneously to evaporation and agitation. No. 2,347,402. George Day to The Mathieson Alkali Works, Inc.

Silicate composition to be used in manufacture of corrugated paperboard

We honor

. . . The Chemical Industry. When the last shot is fired, when this war is won, when the medals of honor are handed out to the industries that made Victory certain . . . The Chemical Industries will be most deserving.

We are proud

. . . of the fact that many of these chemical producers have depended upon Raymond Multi-Wall Paper Shipping Sacks for handling, packing and shipping of crushed, granulated and powdered chemicals. We are proud that Raymond Shipping Sacks are playing an important role in our fight for total Victory.

THE RAYMOND BAG COMPANY, MIDDLETOWN, OHIO which comprises a liquid adhesive silicate having incorporated an aromatic mono sodium sulphonate. No. 2,347,419. James Lander to Diamond Alkali Co.

Making high purity manganese which comprises electrolyzing an aqueous solution containing a soluble manganese salt. No. 2,347,451. Paul Ambrose to Chicago Development Co.

Preparing a metallic oxide by thermal reaction of oxygen with a metallic halide. No. 2,347,496. Irving Muskat and Alphonse Pechukas to Pittsburgh Plate Glass Co.

Making a water-softening material which comprises treating coffee particles with sodium hydroxide solution in presence of metallic aluminum, and then treating the coffee particles with an alkali metal silicate solution. No. 2,346,909. Svein Dahl-Rode.

Preparing a zinc resinate in the form of a high melting point, permanently refusible, resin-like product. No. 2,346,992. Robert Palmer and Edwin Edelstein to Newport Industries, Inc.

Preparing a zinc resinate in form of a high melting point, permanently refusible product capable of forming a stable, non-gelling solution. No. 2,346,994. Robert Palmer and Edwin Edelstein to Newport Industries, Inc.

Preparing a stable, non-gelling solution of a zinc-calcium resinate capable of being isolated in form of a high melting point, permanently refusible, resin-like product having a conchoidal fracture. No. 2,346,995. Robert Palmer, Anthony Oliver, and Edwin Edelstein to Newport Industries, Inc.

Recovering solids from solution. No. 2,347,073. Herman Beekhuis, Jr., to The Solvay Process Co.

Container containing hydrogen sulphide vapor, made of steel containing arsenic effecting an increase in its resistance to corrosion by this vapor. No. 2,347,916. Clifford Larrabee.

Utilizing an electron beam for the study of an electron-opaque surface, comprising making an electron-transparent positive replica of said opaque surface. No. 2,347,965. Edward Ramberg to Radio Corp. of America.

Making a magnesian refractory, which comprises mixing with a composition that is mainly of magnesia, magnesium ammonium fluoride. No. 2,347,968. Donald Ross.

Fluorine compounds represented by formula $CF_3(CH_2)_nNH_2$, in which n is a digit from 1 to 5. No. 2,348,321. Anthony Benning and Joseph Park to Kinetic Chemicals, Inc.

Process of separating intermixed divided materials. No. 2,348,344. Colin Holmes to The Birtley Co., Limited.

Restoring lost operating efficiency of used electrolytic polishing bath which contained originally sulfuric acid, phosphoric acid, water, and nickel salts dissolved anodically during use. No. 2,348,359. Henry Pray to Battelle Memorial Institute.

Preventing landslides due to water absorption by underground bentonitic strata comprising injecting into said strata a low viscosity mineral oil containing an oleophilic surface cation active wetting agent. No. 2,348,458. Victor Endersby to Shell Development Co.

Increasing the sodium carbonate to sodium sulphate ratio of solutions containing a greater ratio of sodium carbonate to sodium sulphate than that of burkeite and containing sufficient sodium carbonate and sodium sulphate that substantial amounts of both burkeite and sodium carbonate monohydrate will be precipitated upon saturation with sodium chloride. No. 2,348,164. Leroy Black, Elliott Fitch, and Henry Suhr, to American Potash & Chemical Corp.

Anodically polishing stainless steel, characterized by immersing said steel in an electrolyte consisting of glycine, water, 85% ortho-phosphoric acid and 96% sulphuric acid. No. 2,348,517. Glenwood Beckwith to The American Steel & Wire Co. of New Jersey.

Quaternary ammonium compound and method of making same. No. 2,348,613. Melvin De Groote and Bernard Keiser to Petrolite Corp. Ltd.

Fireproof structural shape comprising basic magnesium carbonate incorporating reinforcing material, said basic magnesium carbonate being strongly bonded by formation in situ by conversion from self-setting normal magnesium carbonate. No. 2,348,614. August Dinkfeld and Thomas Pond to Johns-Manville Corp.

Removal of a light scale from stainless steel products, which comprises removing the greater part of the oxide content of outerlying scale by subjecting the scale-covered metal to cathodic treatment in a bath of fused sodium hydroxide. No. 2,347,742. Walter Keene to Rustless Iron and Steel Corp.

Industrial Chemicals—Organic

Reversible emulsion of water in oil, the active emulsifying ingredient of which comprises chiefly a cationic surface active fatty amino compound. No. 2,347,178. James Fritz and Edwin Robinson to National Oil Products Co.

Making polymeric sulphides which comprises reacting a mixture of a dithiol and a diene hydrocarbon containing only ethylenic unsaturation. No. 2,347,162. Donald Coffman to E. I. du Pont de Nemours & Co.

Laying a composite surfacing material which comprises forming a base of plastic bituminous material, working a coating of finely divided rubber particles into surface of said bitminous material and forming a layer of a surfacing material including an inert aggregate and a binder of an alkyd resin and a modifier. No. 2,347,233. Clyde Abernathy, one-half to Archie Blades.

Water soluble sulfontation derivatives of 1, 2-anthraquinone-naphthcarbazoles which carry in one of the positions 4 and 5 an aroylamino-group of the anthraquinone series which contains not more than 5 condensed rings. No. 2,347,252. Edwin Buxbaum to E. I. du Pont de Nemours & Co.

Preparation of trimethylolnitromethane which comprises condensing mononitromethane with formaldehyde in an alkaline medium comprising a monohydric aliphatic alcohol. No. 2,347,312. Richard Cox to Hercules Powder Co.

Preparation of bubble-free cast objects of methyl methacrylate polymer of considerable thickness. No. 2,347,320. James Hiltner to Rohm & Haas Co.

Preparing aliphatic polyhydric alcohol terpene ethers of reduced odor. No. 2,347,337. Donald Sheffield to Hercules Powder Co.

Producing polyhydroxy derivatives of unsaturated organic compounds characterized by containing a triple bond between two adjacent carbon atmos. No. 2,347,358. Nicholas Milas & Rsearch Corp.

Preparing a pyridine carboxylic acid from a heavy metal salt selected from ammonia-soluble heavy metal salts of pyridine monocarboxylic and dicarboxylic acids. No. 2,347,410. Alfred Hawkinson and Arthur Elston to E. I. du Pont de Nemours & Co.

Separation of mineral oil into fractions which comprises extracting with a mercapto-substituted carboxylic acid. No. 2,347,432. Orville Polly and Alva Byrns to Union Oil Co. of California.

Stabilizing an aqueous solution of an organic peracid which comprises incorporating therein stabilizing amounts of a pyrophosphate. No. 2,347,434. Joseph Reichert, Samuel McNeight and Arthur Elston to E. I. du Pont de Nemours & Co.

Preparing formamidine sulfinic acid. No. 2,347,446. Joseph Frederic Walker to E. I. du Pont de Nemours & Co.

Separating trioxane from an aqueous mixture in which it is present with formaldehyde. No. 2,347,447. Joseph Frederic Walker to E. I. du Pont de Nemours & Co.

N-(B-hydroxyethyl) hydroxyacetamide. No. 2,347,494. Frederick Meigs to E. I. du Pont de Nemours & Co.

Production of mixed structures, foils, films and filaments from polyamides and cellulosic material, which process comprises mixing a solution of a polyamide in mineral acid with an alkaline solution of the cellulosic material. No. 2,347,525. Kurt Thinius.

Filament- or film-forming polyamide formed by condensing hexamethylene diamine with adipic acid and 28% of formic acid. No. 2,347,545. Henry Dreyfus and Robert Moncrieff and Charles Sammons to Celanese Corp. of America.

Production of a high molecular weight polyhydric alcohol from the natural fatty oils and substances. No. 2,347,562. William Johnston to American Cyanamid Co.

Reduction of nitro compounds selected from saturated nitro hydroxy aliphatic alcohols and saturated aryl nitro hydroxy aliphatic alcohols to corresponding amino compounds. No. 2,347,621. John Tindall to Commercial Solvents Corp.

A diester of bis-(2-carboxyethyl)-ether and a nontertiary monohydric aliphatic ether alcohol. No. 2,347,627. Herman Bruson to The Resinous Products & Chemical Co.

Organic phosphorus compounds. No. 2,347,633. Gennady Kosolapoff to Monsanto Chemical Co.

Recovery of unsaturated aldehydes from mixtures containing same in presence of water. No. 2,347,636. LeRoy Spence and Frederick Robinson to Rohm & Haas Co.

Continuous process of separating mineral oil into fractions. No. 2,346,639. Chester Andrews and Merrell Fenske to Rohm & Haas Co.

Production of olefins and aromatic hydrocarbons. No. 2,346,642. Dale Babcock and Arthur Larchar to E. I. du Pont de Nemours & Co.

Producing isobutene and normal butenes. No. 2,346,657. Herman Bloch and Raymond Schaad to Universal Oil Products Co.

Suppressing the catalytic effect of metal compounds on hydrocarbon distillate by a metal-free condensation product of an orthohydrocy aromatic aldehyde and a primary alkane mono-amine. No. 2,346,662. Joseph Chenicek to Universal Oil Products Co.

Suppressing the catalytic effect of metal compounds on hydrocarbon distillate by adding a condensation product of an orthohydroxy aromatic aldehyde and a primary alkanol amine. No. 2,346,663. Joseph Chenicek to Universal Oil Products Co.

Sur-refining a phenol containing approximatel .02 of sulphur. 2,346,664. Ben Bennett Corson to Koppers Company.

Organic dihydroxamic acid wherein the two hydroxamic acid groups are separated by a chain of at least four carbon atoms. No. 2,346,665. Martin Cupery to E. I. du Pont de Nemours & Co.

Producing organic oxygen-containing compounds which comprises reacting propane with carbon monoxide in presence of anhydrous aluminum chloride and hydrogen chloride. No. 2,346,701. Herman Pines and Vladimir Ipatieff to Universal Oil Products Co.

Vulcanizing oil of the genus coffea, which comprises: reacting with elemental sulful, and adding sulfur chloride to produce a solid rubbery mass. No. 2,346,702. Herbert Polin and Albert Nerken.

Molded urea-formaldehyde condensation product. No. 2,346,708. Leonard Smidth.

Preparing alpha-benzoylaminoanthraquinones. No. 2,346,726. Edwin Buxbaum to E. I. du Pont de Nemours & Co.

Alkali metal salts of sulfuric acid esters of anthraquinone compounds. No. 2,346,771. Frank Lodge, Arthur Lowe and William Tatum to Imperial Chemical Industries, Ltd.

Manufacture of 5-chloro-quinizarin. No. 2,346,772. Ralph Lulek and Edwin Buxbaum to E. I. du Pont de Nemours & Co.

Separating and recovering a diethylene glycol monoalkyl ether from a mixture containing an alkylene glycol. No. 2,346,783. Argyle Plewes to Carbide and Carbon Chemicals Corp.

Textile fiber size comprising a mineral oil aqueous emulsion of a polymerized terpene hydrocarbon resin. No. 2,346,791. Alfred Rummelsburg to Hercules Powder Co.

Hydrogenated rosin material selected from the group consisting of hydrogenated rosin and hydrogenated rosin esters. No. 2,346,793. Emma Schultz and William Shaefer to Hercules Powder Co.

Bis-(2, 4-dialkylphenol)-4-alkyl phenol sulphides and salts thereof. No. 2,346,826. Elmer Cook and William Thomas, Jr., to American Cyanamid Co.

Interpolymerizing a monomeric vinyl ester of a saturated monocarboxylic acid. No. 2,346,858. Charles Mighton to E. I. du Pont de Nemours & Co.

Stable rosin product of relatively high melting point, hydrogenated polymerized rosin acid. No. 2,346,920. Irvin Humphrey to Hercules Powder Co.

Stable rosin product of relatively high melting point, a hydrogenated polymerized rosin ester. No. 2,346,921. Irvin Humphrey to Hercules Powder Co.

Condensation product. No. 2,346,926. Eugene Lieber to Standard Oil Development Co.

Impregnating a fibrous material with a liquid ester of a rosin acid selected from the group consisting of abietic acid and hydrogenated abietic acid, and thereafter saturating with asphaltic material. No. 2,346,954. Abraham Miller to Hercules Powder Co.

Preparing monochloromonobromomethane and dibromomethane by exchange of chlorine for bromine in chlorinated methane. No. 2,347,000. Otto Scherer and Franz Dostal and Karl Dachlauer.

Improving articles of cellulose acetate having an acetate content of at least 59 per cent. No. 2,347,001. Robert Schnegg.

Recessing glass stock comprising applying a recessing solution comprising an aqueous solution of a mixture of sulphuric acid and hydrofluoric acid. No. 2,347,011. Victor Walker to AlnCin, Inc.

Impregnating composition for textile materials, containing in aqueous solution octadecyl-oxymethyl-pyridinium chloride and a thermosetting condensation product selected from urea-formaldehyde and urea-thiourea-formaldehde condensation products. No. 2,347,024. Leo Beer.

1-(4'-methoxyphenylamino)-5-hydroxynaphthalene-7 sulphonic acid. No. 2,347,042. Richard Fleischhauer and Adolf Muller to General Aniline & Film Corp.
Purifying crude sodium carbonate containing sodium sulphate. No. 2,347,052. Leland Hobson to General Electric Co.
Production of selenium salts of dithiocarbamic acids, the improvement which comprises reacting a secondary amine and carbon disulphide with selenium dioxide in alcoholic solution. No. 2,347,128. William Russell to R. T. Vanderbilt Co., Inc.
Removing unoxidized hydrocarbons from a saponifiables-free mixture of unoxidized hydrocarbons and unsaponifiable oxidation products resulting from liquid-phase controlled partial oxidation of a mixture of essentially saturated aliphatic hydrocarbons of mineral origin. No. 2,348,191. James Camelford to Alox Corp.
Manufacture of oxygenated derivatives of cyclopentano polyhydrophenantheren series. No. 2,348,221. Willy Logemann and Hans Dannenbaum to Schering Corp.
Manufacture of p-nitroaryl-disulphimides. No. 2,348,226. Erik Schirm to The Hydronaphthene Corp.
Separating meta-xylene and para-xylene from mixtures thereof. No. 2,348,329. Percy Cole and Granville Burtt to Allied Chemical & Dye Corp.
Arsanilic acid azo sulphonamide compound. No. 2,348,417. Frederick Proescher and Vladimir Sycheff to Research Corp.
Copolymerizing a mixture consisting of a terpene and an alicyclic hydrocarbon containing a conjugated system of double bonds having between 5 and 8 carbon atoms, whereby a resinous product is obtained characterized as being alkali resistant and having a melting point between 58° C. and 134° C. No. 2,348,565. Emil Elsmere to Hercules Powder Co.
Terpene derivative, reaction product of a polyhydric alcohol and a condensation product of maleic anhydride with a material selected from the monomers and polymers of acyclic terpenes. No. 2,348,575. Alfred Rummelsburg to Hercules Powder Co.
Detecting circulation of drilling fluid in a well bore which comprises introducing an identifiable substance into entering stream of fluid which substance is composed of benzidine, water, and montmorillonite clay. No. 2,348,639. Jolly O'Brien.
Protecting a fuel tank formed of a magnesium-base alloy against corrosive attack by hydrocarbon fuel containing tetra-ethyl lead antiknock fluid in contact with aqueous condensate normally present in tank which comprises introducing sodium silicate as sole inhibiting agent into tank. No. 2,348,678. Percy George to The Dow Chemical Co.
Separation of di-isopropyl amine. No. 2,348,683. James McKenna to Sharples Chemicals, Inc.
Making 3,4-dimethyl-aniline which consists in selecting 4-bromo-ortho-xylene and ammonolysing it. No. 2,347,652. Walter Wisansky to American Home Products Corp.
Isomerizing piperylene. No. 2,347,667. David Craig to The B. F. Goodrich Co.
A water insoluble substance selected from oils, bituminous substances and waxes emulsified with a product comprising an aqueous colloidal suspension of sodium starchate. No. 2,347,678. Kenneth Gaver to The Komel Corp.
New composition of matter including oil and dispersed pigment emulsified with an alkali metal starchate. No. 2,347,680. Kenneth Gaver to The Komel Corp.
Azo compounds. No. 2,347,704. James McNally and Joseph Dickey to Eastman Kodak Co.
Derivative of tropic acid amide. No. 2,347,722. Wilhelm Wenner to Hoffmann-La Roche, Inc.
Tropic acid amide derivative and manufacture thereof. No. 2,347,723. Wilhelm Wenner to Hoffmann-La Roche, Inc.
Straight chain aliphatic compounds containing two carbylamine groups No. 2,347,772. Henry Dreyfus to Celanese Corp. of America.
Linear polymeric isothiourea and salts thereof. No. 2,347,827. Madison Hunt to E. I. du Pont de Nemours & Co.
Products selected from 2-trifluoro methyl-anthraquinone and its chlorine substitution products. No. 2,347,846. Otto Scherer to General Aniline & Film Corp.
Esters of terpene compounds. No. 2,347,929. Joseph Borglin to Hercules Powder Co.
Product of reaction of a polymer of an acyclic terpene having three double bonds per molecule and a material selected from the a,B-unsaturated organic acids and acid anhydrides. No. 2,347,970. Alfred Rummelsburg to Hercules Powder Co.
Solvent for removing carbonaceous deposits from internal combustion engines comprising cresol and dibutyl phthalate. No. 2,347,983. William Backoff and Norman Williams to The Pure Oil Co.
Diazinyl carboxy-alkyl sulphides and salts thereof. No. 2,347,992. Gaetano D'Alelio and James Underwood to General Electric Co.
1-arylamino-6-(alpha-anthraquinonyl-amino) antharquinones. No. 2,348,013. Ralph Lulek and Edwin Buxbaum to E. I. du Pont de Nemours & Co.
Preparing copolymers of vinyl chloride and vinylidene chloride. No. 2,348,154. Winfield Scott and Raymond Seymour to Wingfoot Corp.
Acyclic a-vinyl acetoacetic ester compounds of general formula CH_3CO—CR^1 ($CH{=}CH_2$) —$COOR_2$ wherein R_1 is selected from hydrogen and alkyl and R_2 is alkyl. No. 2,348,159. Hanns Staudinger and Karl Tuerick to The Distillers Co. Limited.
Sealing off porous formations in oil wells comprising injecting into formation a treating solution of acaroid resin in a water miscible solvent. No. 2,348,484. Howard Lawton to Shell Development Co.

Leather

Treating natural leather, which comprises applying a composition whose active components consist of a blow fatty oil and a water-insoluble liquid ester containing at least 9 carbon atoms. No. 2,347,712. Edwin Robinson and Ralph Porter to National Oil Products Co.

Medicinals

N-(amino-benzene-sulphenyl)-nitro-so-anilines and salts thereof, and method of preparing them. No. 2,347,242. William Braker and William Lott to E. R. Squibb & Sons.
Mineral acid precipitated pollen antigen. No. 2,347,435. George Rockwell to Eli Lilly & Co.
Increasing the potency of a fat-soluble vitamin concentrate selected from the group consisting of vitamin A, vitamin D and vitamin A and D concentrates. No. 2,347,461. Loran Buxton to National Oil Products Co.
Material for making surgical implants comprising a thermoplastic of the methyl methacrylate type having incorporated a solid water soluble chemical having germicidal properties. No. 2,347,567. Edward Kresse.
Manufacture of a new crystalline cardiac glucoside. No. 2,346,753. Max Hartmann and Emil Schlittler to Ciba Pharmaceutical Products, Inc.

Metals, Alloys

Light armor plate characterized by a high ballistic limit having a body portion formed from a plate which is a substantially silicon and nickel free alloy and comprising carbon, chromium, manganese, and a metal chosen from molybdenum and tungsten and the remainder substantially iron. No. 2,347,375. Albert Stargardter to The Eastern Rolling Mill Co.
Electrodeposition of bright copper which comprises electrolyzing a solution containing copper cyanide, alkali metal hydroxide, alkali metal sulfocyanide, and alkali metal cyanide. No. 2,347,448. Christian Wernlund to E. I. du Pont de Nemours & Co.
Electrodeposition of copper from fused baths. No. 2,347,450. James Young to E. I. du Pont de Nemours & Co.
Alloy for permanent magnets comprising iron, nickel, cobalt, and a balance of copper. No. 2,347,543. Walter Dannohl and Hans Neumann.
Reducing chromium contents of pig iron containing at least .1% chromium. No. 2,347,557. Johannes Haag.
Electrochemical process for cleaning metal wherein metal to be cleaned is cathode in a descaling electrolytic bath containing a substantially insoluble anode and a soluble anode of a metal which is deposited as a protective film on said metal to be cleaned. No. 2,347,572. Fred Martin and John Clark to Caterpillar Tractor Co.
Estimating molybdenum content of scheelite or calcium tungstate by visual color of its fluorescence. No. 2,346,661. Ralph Cannon, Jr. and Kiguma Murata.
Producing a lithiated furnace atmosphere. No. 2,346,698. Harold Ness to Metallurgical Processes Co.
Anodically polishing copper, which comprises making the copper the anode in a solution comprising phosphoric acid, and water. No. 2,347,039. Charles Faust to Battelle Memorial Institute.
Alloys, having good corrosion resisting properties, containing manganese, chromium, and copper. No. 2,348,207. Reginald Dean and Clarence Anderson to Chicago Development Co.
Extruded cable sheath formed of a lead base alloy containing copper in amounts sufficient to improve resistance to creep and fatigue but not sufficient to prevent extrusion, characterized by the inclusion of tin and lead. No. 2,348,333. Gabriel D'Eustachio to General Cable Corp.
Treating tin coated copper articles used for handling milk whereby small minute openings in the tin coating are sealed by plating indium on said tin coating. No. 2,348,358. Albert Phillips and Albert Smith, Jr., to American Smelting & Refining Co.
Alloy of copper, zinc and maganese containing not more than 0.05% iron and free from the oxides of aluminum and silicon. No. 2,347,706. Cresap Moss to Chicago Development Co.
Workable alloyed composition adapted to be magnetized to serve as a permanent magnet comprising nickel, aluminum, vanadium, cobalt, and iron. No. 2,347,817. Oscar Finch and John White to Bell Telephone Laboratories, Inc.

Paint, Pigments

Producing local color effects upon textile materials containing cellulose acetate yarns, the step of locally applying a paste comprising a substance capable of effecting color change and, as thickening component, starch that has been heated in water containing mineral acid. No. 2,347,289. George Seymour to Celanese Corp. of America.
Forming an iron-silica ceramic pigment. No. 2,347,630. Carl Harbert to The Harshaw Chemical Co.
Converting Barton litharge, a mixture of yellow litharge and red litharge together with some metallic lead, to substantially pure red litharge. No. 2,347,131. Ralph Seabury and Robert Daily to General Motors Corp.
Manufacture of red litharge. No. 2,347,132. Ralph Seabury and Robert Daily to General Motors Corp.
Recovery of excess sprayed enamel paint material which comprises subjecting excess sprayed enamel paint material to treatment with water to form a sludge containing pigment and the associated vehicle. No. 2,348,625. Harry Hoffman.

Paper, Pulp

Making coated paper having a cast surface which comprises applying an aqueous coating composition comprising a solution of protein adhesive, ammonia and a compound of a metal taken from the class of zinc, copper and cadmium. No. 2,346,812. Donald Bradner to The Champion Paper and Fibre Co.
Applying by gravure to paper a uniform non-cracking coating of an aqueous alkali silicate solution. No. 2,347,047. Albert Gessler and Dominic Bernardi to Interchemical Corp.
Preparing an improved sulphonated abietic acid composition. No. 2,348,200. Douglas Fronmuller and Berwyn Thomas to The Institute of Paper Chemistry.
Adhesive paper having on one side a thin, dry, remoistenable, substantially non-hygroscopic adhesive film comprising a water-soluble polyvinyl alcohol. No. 2,348,220. Bernard Kline to The Western Union Telegraph Co.
Paper having a sizing of urea formaldehyde resin including aluminum sulphate and a light sensitive coating applied over said sizing, said sizing rendering paper non-absorbent and non-curling in presence of water. No. 2,348,686. Clarence Van Epps to The Lauxite Corp.
Heat-sealable label having base of porous sheet material coated with composition comprising microcrystalline wax, an aluminum soap of a higher fatty acid and ester gum. No. 2,348,688. Allen Abrams and George Forcey, Winfred Graebner, Alfred Heald, and George Rumberger, to Marathon Paper Mills Co.

Petroleum Chemicals

Dehydrogenation of a paraffin hydrocarbon having at least two carbon atoms per molecule to form unsaturated hydrocarbons and free hydrogen. No. 2,347,256. Frederick Frey to Phillips Petroleum Co.

Converting normal paraffins of at least 4 carbon atoms to the molecule into branched chain paraffins. No. 2,347,266. Vladimir Ipatieff and Louis Schmerling to Universal Oil Products Co.

Producing highly paraffinic synthetic oils. No. 2,347,274. Almer McAfee and Edward Dunlay to Gulf Oil Corp.

Fixed bed catalytic hydrocarbon conversion system wherein a plurality of catalyst beds are connected for both individual and parallel flow. No. 2,347,299. Ernest Thiele to Standard Oil Co.

Treatment of mixtures of hydrocarbons and hydrofluoric acid. No. 2,-347,317. James Gibson to Phillips Petroleum Co.

Effecting pyrolysis of gaseous hydrocarbons in metallic apparatus, the effectiveness of which becomes reduced during course of operation. No. 2,347,527. Byron Vanderbilt to Standard Oil Development Co.

Liquid lubricating oil composition comprising a petroleum lubricating oil and the calcium salt of an alkyl ester of salicylic acid. No. 2,347,546. Willard Finley to Sinclair Refining Co.

Liquid lubricating oil composition comprising a petroleum lubricating oil and a minor proportion of a calcium salt of an iso-alkyl ester of salicylic acid. No. 2,347,547. Willard Finley to Sinclair Refining Co.

Hardening asphaltic residues which comprises reacting maleic anhydride with a partially oxidized asphaltic petroleum residue containing unsaturated ingredients. No. 2,347,626. Theodore Bradley to American Cyanamid Co.

Removal and recovery of naphthenic acid constituents from a mineral oil. No. 2,346,734. Henry Dempsey to Standard Oil Development Co.

Generating an oil gas containing hydrogen from heavy hydrocarbon residues. No. 2,346,574. Charles Hemminger to Standard Catalytic Co.

Improved process for isomerizing normal paraffin hydrocarbons containing at least four carbon atoms per molecule. No. 2,346,768. Kenneth Laughlin to Standard Oil Development Co.

Producing normally liquid, saturated, branched chain hydrocarbons boiling within gasoline range by reacting a paraffin mixture containing isoparaffin and normal paraffin with a monoolefin. No. 2,346,770. Prentiss Lobdell and George Mateer to Standard Oil Development Co.

Fuel treating agent for coloring petroleum products comprising a combination of alkyl substituted diphenyl with a dyestuff. No. 2,346,780. John Orelup.

Abating the formation of foam in foamable materials comprising adding an agent comprising a partial ester of a polyhydric alcohol with a higher hydroxy fatty acid blended with a hydrophobic substance selected from animal, vegetable, and mineral oils and waxes. No. 2,346,928. Charles Lighthipe to National Oil Products Co.

Compounded oil comprising a hydrocarbon oil and a metal phenate containing a halogenated phenolic radical having more than ten carbon atoms. No. 2,347,152. Elmslie Gardiner and George Denison, Jr. to Standard Oil Co. of California.

Recovery of a catalytically active aluminum halidehydrocarbon complex from inactive aluminum halidehydrocarbon sludge formed during conversion of hydrocarbons in presence of an aluminum halide catalyst. No. 2,348,408. James Page, Jr. to Standard Oil Co.

Treating wax-bearing hydrocarbon oils to obtain therefrom oils having low pour points and good viscosity-temperature characteristics. No. 2,348,459. Bruno Engel to Aktiebolaget Separator-Nobel.

Removing pepper sludge from a petroleum hydrocarbon which comprises agitating hydrocarbon with a finely divided substance selected from filter aids of diatomaceous origin, and finely ground silica. No. 2,348,609. Charles Cohen to Standard Oil Development Co.

Isomerization of normal butane to produce substantial yields of isobutane which comprises subjecting normal butane to contact with catalyst comprising aluminum chloride and aluminum bromide. No. 2,348,700. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.

Converting normally liquid hydrocarbon mixtures into lower boiling products. No. 2,348,702. Louis Schmerling and Vladimir Ipatieff to Universal Oil Products Co.

Subjecting hydrocarbon oil at cracking temperature to action of a calcined mixture of precipitated silica, alumina and zirconia. No. 2,347,648. Charles Thomas and Edward Lee to Universal Oil Products Co.

Alkylating paraffinic hydrocarbons with olefinic hydrocarbons. No. 2,-347,790. Arlie O'Kelly and Dale Goldsmith to Socony-Vacuum Oil Co., Inc.

Method of converting oil. No. 2,347,805. David Bell to Kenyon Lee.

Process for dewaxing petroleum oil stocks in which stock to be dewaxed is dissolved in and diluted with a liquefied normally gaseous hydrocarbon diluent. No. 2,347,809. David Brandt to Cities Service Oil Co.

Process for dewaxing mineral oil stock in which a cold mixture of mineral oil and diluent is produced containing wax in the form of substantially distinct separable particles. No. 2,347,810. David Brandt to Cities Service Oil Co.

Reacting an alkaline polysulphide with a substituted paraffin hydrocarbon having a nitro group and one other radical reactive with alkaline polysulphides on the same carbon atom. No. 2,347,840. Edwin Nygaard to Socony-Vacuum Oil Co., Inc.

Manufacture of catalyst, finely divided hydrated silica which comprises adding an acid to a solution of an alkali metal silicate containing an alkylene polyamine. No. 2,348,072. Elmer Kanhofer to Universal Oil Products Co.

Synthesis of sulphur-bearing derivatives of high molecular weight. No. 2,348,080. Bert Lincoln, Gordon Byrkit, and Waldo Steiner to Continental Oil Co.

Petroleum Refining

Producing motor fuel of improved resistance to oxidation from sulphur bearing gasoline containing unstable unsaturated hydrocarbons produced by decomposition reactions. No. 2,347,216. Albert Peterkin to Houdry Process Corp.

Production of refined petroleum oil products of improved burning properties boiling in the kerosene, furnace oil, and light gas oil boiling ranges containing substantial quantities of emulsifying agents. No. 2,347,515. Albert Shmidl to Standard Oil Development Co.

In the catalytic conversion of hydrocarbons the improvement which comprises passing through the catalyst bed, a refractory liquid comprising a halogenated polynuclear compound. No. 2,346,652. Joseph Alther to Universal Oil Products Co.

Detecting petroleum deposits by determining amount of water and low boiling hydrocarbons present. No. 2,346,735. Patrick Dougherty and Paul Barton to Sun Oil Co.

Reactivation of solid contact catalysts employed in the conversion of hydrocarbons, the activity of which has been reduced by the deposition of oxidizable carbonaceous material thereon. No. 2,346,750. Jesse Guyer to Phillips Petroleum Co.

Recovering an aqueous hypohalous acid solution free from halide ions. No. 2,347,151. Chester Crawford and Theodore Evans to Shell Development Co.

Stabilized motor fuel comprising gasoline normally tending to oxidize in storage and an alkyl amino diphenyl amine to inhibit said oxidation. No. 2,348,290. Everett Gilbert to Tide Water Associated Oil Co.

Converting hydrocarbon oils by action of solid refractory siliceous catalysts in finely divided form, wherein a catalyst containing a magnetic element is dispersed in the oil vapors. No. 2,348,418. Willard Roesch and Frank Brueckmann to Standard Oil Co.

Alkylation of hydrocarbons. No. 2,348,467. Arthur Goldsby and Ernest Pevere, Louis Clarke and George Hatch to The Texas Co.

Heating of fluids. No. 2,348,512. Marion Barnes to Universal Oil Products Co.

Thermally and catalytically cracking, and coking a hydrocarbon oil to produce a substantial yield of high anti-knock gasoline. No. 2,348,531. Gustav Egloff to Universal Oil Products Co.

Refining a hydrocarbon oil to desulfurize it which comprises treating said oil with a contact agent comprising essentially chalk. No. 2,348,543. Harley Johnson.

Improving anti-knock characteristics of hydrocarbon distillates comprising gasoline fractions containing naphthenes having five carbon atoms in the ring. No. 2,348,557. William Mattox to Universal Oil Products Co.

Producing high anti-knock gasoline of relatively low olefin content. No. 2,348,576. Jean Seguy to Universal Oil Products Co.

Process for making aviation fuel. No. 2,348,599. Cecil Brown to Standard Catalytic Co.

Removal of mercaptan compounds from petroleum oils. No. 2,348,623. Amiot Hewlett and Henry Paulsen to Standard Oil Development Co.

Improved process of catalytic reforming in presence of hydrogen carried out under conditions such that there is a net production of free hydrogen therein. No. 2,348,624. Charles Hillman to Standard Catalytic Co.

Producing improved yields of motor fuels boiling within gasoline range and having improved octane number. No. 2,348,637. Richard Meinert to Standard Oil Development Co.

Fuel composition comprising a hydrocarbon fuel distillate and a resinous condensation product. No. 2,348,638. Louis Mikeska and John Zimmer and Jones Wasson to Standard Oil Development Co.

Conversion of hydrocarbon oils. No. 2,348,646. Edward Reeves to Standard Oil Development Co.

Cracking hydrocarbon oils. No. 2,348,647. Edward Reeves and Kenneth Kearby to Standard Oil Development Co.

Separating lower molecular weight normally gaseous hydrocarbons from mixtures containing them. No. 2,348,659. Brook Smith and Edward Morin to Standard Oil Development Co.

Stabilizing hydrocarbons. No. 2,348,681. Glen Houghland to Gasoline Products Co., Inc.

Conversion of hydrocarbon oil. No. 2,348,701. Louis Schmerling to Universal Oil Products Co.

Converting low molecular weight hydrocarbon gases into hydrocarbon of higher molecular weight. No. 2,347,682. Robert Gunness to Standard Oil Co.

Catalytic hydrocarbon conversion system employing a powdered catalyst containing fine and coarse particles substantially all of which are less than 200 mesh in particle size. No. 2,347,747. Ralph Melaven to Standard Oil Co.

Recovering hydrocarbons from hydrocarbon-bearing formation that is devoid of natural fluid energy and that penetrated by a plurality of input wells and at least one output well. No. 2,347,778. Willis Heath to Phillips Petroleum Co.

Treating crude oil to retain the natural volatile gases therein. No. 2,347,877. Gustav de Bretteville.

Treating hydrocarbon materials to remove organically combined fluorine. No. 2,347,945. Frederick Frey to Phillips Petroleum Co.

Catalyst comprising the product of a mixture of a carrier and an acid containing a phosphate radical. No. 2,347,955. Karl Korpi to Union Oil Co. of California.

Alkylating an isoparaffin for the production of isoparaffins of higher molecular weight. No. 2,347,999. Laverne Elliott and Lloyd Brooke to Standard Oil Co. of California.

Converting hydrocarbon oils wherein vapors of said oils are contacted at conversion temperature with a finely divided solid conversion catalyst in dense phase. No. 2,348,009. Everett Johnson and Vanderveer Voorhees to Standard Oil Co.

Manufacturing high anti-knock motor fuel hydrocarbons from a mixture of relatively light hydrocarbons containing normal butane, isobutane, isbutene, 1-butene and 2-butene. No. 2,348,017. Otto Miller to Standard Oil Co. of California.

Geochemical survey for petroleum deposits, which comprises taking samples of soil at spaced intervals and determining the sulphide content. No. 2,348,103. Arnold Beckman to American Geochemical Corp.

Conversion of hydrocarbon oils using solid contact material. No. 2,348,-156. Bruce Sheppard to Petroleum Conversion Corp.

Brine filter-skimmer chamber for closed crude oil emulsion treater tanks. No. 2,348,167. Ransome Erwin.

Photographic Chemicals

Making light-polarizing images. No. 2,346,775. Joseph Mahler to Polaroid Corp.

Making blueprints by the semi dry development process. No. 2,346,872. John Holden to Keuffel & Esser Co.

Additional patents on photographic chemicals, resins, plastics, rubber, textiles, water sewage and sanitation from above vols. will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES. Photostated copies of Canadian patents are available from the Commissioner of Patents, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published November 9, 1943.

Hollow metal article annealing and pickling apparatus. No. 416,225. John Curran.
Production of inorganic insulation on magnetic core by means of potassium permanganate. No. 416,237. Leslie Harold Paddle.
Paper surface coating method. No. 416,248. Arthur Ronald Trist.
Flexible nozzle for viscous liquid extrusion. No. 416,257. B. B. Chemical Co. of Canada, Ltd. (R. K. Nash)
Distensible blasting cartridge. No. 416,270. Canadian Industries, Ltd. (C. O. Davis, N. G. Johnson)
Heat transfer gas dehydration method. No. 416,283. Dominion Oxygen Co., Ltd. (Geo. R. Webster)
Thermionic amplifier. No. 416,293. Electrical and Musical Industries, Ltd. (Alan Dower Blumlein)
Quarternary ammonium compound. No. 416,297. J. G. Geigy A. G. (Jakob Bindler, Hans Schlapfer)
Lubricated valve design. No. 416,307. Mueller Ltd. (F. H. Mueller, W. J. Bowman)
Waterproofing compositions for textile materials. No. 416,329. Sandoz Ltd. (Alfred Rheiner, Ernst Stocker)
Process for production of cellular mortar or concrete employing sulphonated octyl alcohol. No. 416,366. Horace Keeble.

Granted and Published November 16, 1943.

Compact toilet kit design. No. 416,374. Elphege Belletete.
Dispensing container. No. 416,390. Chas. Montague Prescott.
Charcoal gas producer. No. 416,436. Companhia de Carris (Chas. A. Barton)
Creation of protective layer on magnesium and alloys by use of silicofluorides. No. 416,473. Magnesium Elektron Ltd. (Josef Martin Michel, Fritz Henneberger)
Manufacture of malonic ester derivative. No. 416,501. Winthrop Chemical Co., Inc. (Marie Kropp)
Electron multiplier. No. 416,511. Dennis Gabor.

Granted and Published November 23, 1943.

Process for titanium oxide pigment manufacture. No. 416,513. Isaac Ephriam Weber, A. N. C. Bennett.
Storage battery level control device. No. 416,531. Julius Sandusky.
Method to improve fastness to washing of cellulosic textile. No. 416,569. Courtaulds Ltd. (J. H. McGregor)
Dry cell battery design. No. 416,580. General Dry Battery of Canada Ltd. (Cyril P. Deibel)

Granted and Published November 30, 1943.

Electric welding process and apparatus. No. 416,648. Geo. D. Agnew.
Wood preservative consisting of sodium fluoride, potassium dichromate, dinitrophenol, bentonite, coal tar creosote and water. No. 416,657. Ernest Hofmann.
Drilling mud viscosity control by means of nigrosine. No. 416,680. American Cyanamid Co. (R. B. Booth)
Clear, transparent methyl-alpha-chloroacrylate vinyl acetate plastic. No. 416,694. Canadian Industries Ltd. (J. W. C. Crawford, Nancy McLeish)
Heat and light stable styrene-methyl-alpha-chloroacrylate copolymer. No. 416,695. Canadian Industries Ltd. (H. W. Arnold)
Interpolymer of methyl alpha chloroacrylate and diethyl fumarate. No. 416,696. Canadian Industries Ltd. (H. W. Arnold)
Formyl substituted ester preparation. No. 416,700. Canadian Industries Ltd. (D. J. Loder, W. F. Gresham, D. B. Killian)
Horticultural fungicide containing alkali metal salt of an arylamide of a salicylic acid. No. 416,710. Canadian Industries Ltd. (Benjamin Collie)
Chlorine gas purifying and drying process. No. 416,712. Canadian Industries Ltd. (Ivan Roy McHaffie)
Purification of diphenylamine. No. 416,717. Canadian Industries Ltd. (W. F. Felbert)
Chromium salt treatment to improve water insolubility of casein fibres. No. 416,786. Sandoz A. G. (Giampiero Comolli)
Process for cellulose derivative and textile preparation. No. 416,821. Paul Abel.
Electron tube design. No. 416,823. Felix Herriger.

Granted and Published December 7, 1943.

Bottle capping device. No. 416,839. Jean E. Laurin.
Silver coating process by evaporation of silver from rhodium foil base and deposition on article to be coated. No. 416,908. Duplate Canada Ltd. (Sydney Bateson)
Electric furnace for milling and fining of glass. No. 416,935. Pilkington Bros Ltd. (Yvan Peyches)
Sheet glass tempering apparatus. No. 416,968. Albert Quentin.

Granted and Published December 14, 1943.

Polishing material for tumbling barrel use. No. 416,970. Wm. G. Balz, L. R. Davidson.
Rock drill arc bit point. No. 416,976. Philip B. Brown.
Thread and yarn unwinding control device. No. 416,977. Jos. K. Cobert.
Steam generator. No. 416,982. Felix Holzknecht.
Automatic air valve. No. 416,986. Berthe Manny.
Method of recovering sulphuric and nitric acids from nitration mixture. No. 416,994. Paul Gosta Wallerius.
Dicyandiamide control of drilling mud dispersion. No. 416,998. American Cyanamid Co. (R. B. Booth)
Viscose thread production process employing cation-active long chain fatty pyridinium salt and Turkey Red Oil. No. 417,025. Courtaulds Ltd. (Leslie Rose, John Wharton)
Surface roughness measuring apparatus. No. 417,040. Kapella Ltd. (R. E. Reason, R. I. Garrod)
Gate valve design. No. 417,070. Sandilands Valve Manufacturing Co. Ltd. (Jas. Sandilands)
Improving wear resistance of textiles by resin impregnation. No. 417,085. Tootal Broadhurst Lee Co. Ltd. (R. P. Foulds)
Gas or steam purification system. No. 417,118. Jean Loumiet et Lavigne.

Granted and Published December 21, 1943.

Heat exchange apparatus. No. 417,120. John Herschell Johns, Edw. Cecil Mills.
Apparatus for coking finely divided material. No. 417,133. Thos. Malcolm Davidson.
Wooden suction box top impregnated with lanolin and paraffin. No. 417,150. Jean Proulx.
Quick drying, flexible, adhesive lacquer composition comprising pinewood resin, ethyl cellulose, and plasticizer, characterized by flowability and shock resistance. No. 417,155. Alexandre Szwarc.
Process to recover selenium from electrolytic copper refining slimes. No. 417,176. Canadian Copper Refiners Ltd. (Chas. W. Clark)
Phenol-formaldehyde moulding powder containing chloro-butadiene. No. 417,188. Canadian Industries Ltd. (Basil John Wood)
Sac like golf ball core containing gas producing chemicals such as ammonium chloride, urea, sodium nitrite, or sodium hypobromite. No. 417,247. Dunlop Tire and Rubber Goods Co. Ltd. (D. F. Twiss)
Casein or vegetable seed protein article manufacturing process. No. 417,259. Imperial Chemical Industries. (Andrew McLean)
Method of making improved graphite electrodes by metallic oxide chlorination and volatilization. No. 417,260. Imperial Chemical Industries. (Jos. Arthur Musgrave)
Manufacture of coloured photographic layer. No. 417,269. Latta Syndicate Ltd. (A. G. Tull)
Process of manufacturing insulated electric cable employing magnesia. No. 417,288. Solution Trust Ltd. (Jean Lepetit)

Granted and Published December 28, 1943.

Gas producing arrangement for motor vehicles. No. 417,316. Josaphat Alain.
Method of constructing resilient curved structures from flat resilient sheets without use of frames, moulds, or presses. No. 417,327. Norman Hart.

Granted and Published January 4, 1944.

Process and apparatus for melting and spraying thermoplastic resins. No. 417,495. Fritz Gfeller, Lamber Baiker.
Sterilization method employing ultraviolet rays, and including treatment of milk. No. 417,496. David Samuel Cronsioe, A. O. U. Gronvall.
Hair waving method comprising use of heat generating pads containing sodium chlorate, talc, aluminum filings, monohydrated copper sulphate. No. 417,499. Gladys Graham Barnett.
Preparation of stable colloids of metals or metalloids by bombardment with ultra-short electric waves. No. 417,507. Mauricio Goyberg.
Improved process for the manufacture of butter from milk or cream by carbon dioxide treatment. No. 417,521. James Senn.
Process to improve dyeing affinity of cellulosic material by formaldehyde-guanidine adipate treatment. No. 417,562. Courtaulds Ltd. (Jas. H. McGregor)
Improving resistance of protein fabrics to attack by formaldehyde, sulphuric, alkali metal sulphate treatment. No. 417,563. Courtaulds Ltd. (R. L. Wormell, C. L. Knight)
Textile colour printing method and machine. No. 417,607. Montreal Cottons Ltd. & Chas. Ashton Lister. (Geo. Hadlow Tillett)

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Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

406,883. Phillips Petroleum Co., Bartlesville, Okla.; filed Apr. 6, 1943; serial No. 459,674; for hydrocarbon chemicals; since Sept. 12, 1940.
406,989. Harry J. Esdale as Fuhl-Proof Co., Newark, N. J.; filed June 2, 1943; Ser. No. 461.093 for acrylic resin; since May, 1942.
458,462. Kelite Products, Inc., Los Angeles, Calif.; filed Feb. 10, 1943; for cleaning powder; since June, 1940.
459,983. The Celotex Corp., Chicago, Ill.; filed Apr. 19, 1943; for painters' materials; since Sept. 2, 1938.
462,872. Manuel Ontanon Delgada, Anahuac Colony, Mexico City, Mex.; filed Aug. 20, 1943; for lubricating oils; since June 2, 1942.
462,949. Hosdreg Chemicals, Inc., Huntington, Ind.; filed Aug. 23, 1943; for caulking and patching compounds; since May 1, 1943.
462,954. The Petrol Corp., Los Angeles, Calif.; filed Aug. 23, 1943; for paint in paste form; since Aug. 23, 1943.
464,298. Ansbacher-Siegle Corp., Brooklyn, N. Y.; filed Oct. 21, 1943; for resinous materials; since Apr. 30, 1943.
464,458. William R. Warner & Co. Inc., Wilmington, Del.; filed Oct. 27, 1943 for amino acid preparations; since Oct. 14, 1943.
464,462. American Instrument Co., Silver Spring, Md.; filed Oct. 28, 1943; for autoclaves and heat exchangers; since Aug. 30, 1943.
465,514. The H. D. Roosen Co., Brooklyn, N. Y.; filed Dec. 4, 1943; for synthetic drying oils; since Feb. 10, 1942.
465,839. Colonial Alloys Co., Philadelphia, Pa.; filed Dec. 17, 1943; for electrolytic baths; since Dec. 1941.
465,947. Eastman Kodak Co., Jersey City, N. J., and Rochester, N. Y.; filed Dec. 21, 1943; for photographic fixing powder; since Dec. 31, 1942.
466,129. G. D. Searle & Co., Chicago, Ill.; filed Dec. 28, 1943; for radiopaque solution for intravenous pyelography; since Dec. 10, 1943.
466,132. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Dec. 28, 1943; for detergent material; since Mar. 20, 1942.
466,249. Ansbacher-Siegle Corp., Brooklyn, N. Y.; filed Jan. 1, 1944; for resinous materials; since Apr. 30, 1943.
466,250. Ansbacher-Siegle Corp., Brooklyn, N. Y.; filed Jan. 1, 1944; for resinous materials; since Apr. 30, 1943.
466,337. Winthrop Chemical Co., Inc., N. Y.; filed Jan. 5, 1944; for chemo-therapeutic preparations; since Nov. 19, 1943.
466,428. Central Chemical Corp. of Md., Hagerstown, Md.; filed Jan. 10, 1944; for liquid asphalt and asbestos roof coating; since Nov. 23, 1943.
466,531. Industrial Raw Materials Corp., N. Y.; filed Jan. 13, 1944; for petroleum wax; since Dec. 11, 1943.
466,554. Thomas R. Shearer, Verona, N. J.; filed Jan. 13, 1944; for sealing or waterproofing cables; since May, 1938.
466,707. The Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed Jan. 19, 1944; for solvent emulsion cleaners; since July 7, 1943; since Aug. 10, 1943.
466,915. H. D. Justi & Son, Inc., Philadelphia, Pa.; filed Jan. 27, 1944; for acrylic materials; since Dec. 11, 1943.
466,929. Porocel Corp., Wilmington, Del., and Philadelphia, Pa.; filed Jan. 27, 1944; for bauxite; since Jan. 5, 1944.
466,947. Murphey Chemical Corp., N. Y.; filed Jan. 28, 1944; for washing powders; since Jan. 28, 1942.
467,163. Eric George Herbert Mauthner, London, England; filed Feb. 4, 1944; for rust removing preparations not containing oil; since Sept. 14, 1942.
467,241. Household Products, Inc., Stamford, Conn.; filed Feb. 7, 1944; for odor neutralizer; since Jan. 21, 1944.
467,286. Socony-Vacuum Oil Co., Inc., N. Y.; filed Feb. 8, 1944; for spar varnishes; since Jan. 3, 1944.
467,289. Coralite Dental Products Co., Chicago, Ill.; filed Feb. 9, 1944; for dental materials of methacrylate composition; since Nov. 9, 1943.
467,372. Hermann Loewenstein, N. Y.; filed Feb. 12, 1944; for synthetic resin sheeting; since Nov. 23, 1942.
467,420. Whi-Tex Co., St. Louis, Mo.; filed Feb. 14, 1944; for cold water paint and water-proofing agent; since Feb. 9, 1944.
467,423. The American Oil Co., Baltimore, Md.; filed Feb. 15, 1944; for anti-freezing liquids; since Oct. 11, 1943.
467,436. Sani-Toil Labs, Joplin, Mo.; filed Feb. 15, 1944; for cleaner; since Jan. 27, 1944.
467,501. Stauffer Chemical Co., San Francisco, Calif., and N. Y.; filed Feb. 17, 1944; for sulphur; since Apr. 5, 1941.
467,503. R. T. Vanderbilt Co., Inc., N. Y.; filed Feb. 17, 1944; for petroleum composition for compounding synthetic rubbers; since Jan. 26, 1944.
467,541. Socony-Vacuum Oil Co., Inc., N. Y.; filed Feb. 18, 1944; for lubricating oils; since Jan. 2, 1943.
467,542. Socony-Vacuum Oil Co., N. Y.; filed Feb. 18, 1944; for lubricating greases; since Jan. 17, 1944.
467,543. Socony-Vacuum Oil Co., Inc.; for insecticide spray; since Jan. 1, 1938.
467,583. Eric F. Wieneke as The Safety Cleansers Co., Saginaw, Mich.; filed Feb. 19, 1944, for cleansing compound; since Nov. 3, 1943.
467,615. A. Nash & Sons, Inc., Norfolk, Va.; filed Feb. 21, 1944; for floor cleaning compound; since 1940.
467,773. The Texas Co., N. Y., filed Feb. 25, 1944; for lubricating oils; since July 1, 1939.
467,818. Roche-Organon, Inc., Nutley, N. J.; filed Feb. 28, 1944; for estrogenic preparations; since Feb. 14, 1944.
467,859. Quaker Chemical Products Corp., Conshohocken, Pa.; filed Feb. 29, 1944; for solvent cleaners; since August 1937.
467,860. Quaker Chemical Products Corp., Conshohocken, Pa.; filed Feb. 29, 1944; for textile finishes; since November 1940.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, April 18 to May 9.

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