PEACETIME MARKETS for CHEMICALS page 49

Chemical Industries

The Chemical Business Magazine

Explosives Need Alkalies

Explosives are the major destructive agent of bullets, bombs, shells, mortars, grenades, mines, torpedoes. Important factors in the manufacture of this potent force are Solvay Alkalies and their related products . . . another example which proves, in war as in peace, alkalies are indispensable!

SODA ASH

CAUSTIC SODA

CHLORINE

AMMONIUM CHLORIDE

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CARBON TETRACHLORIDE

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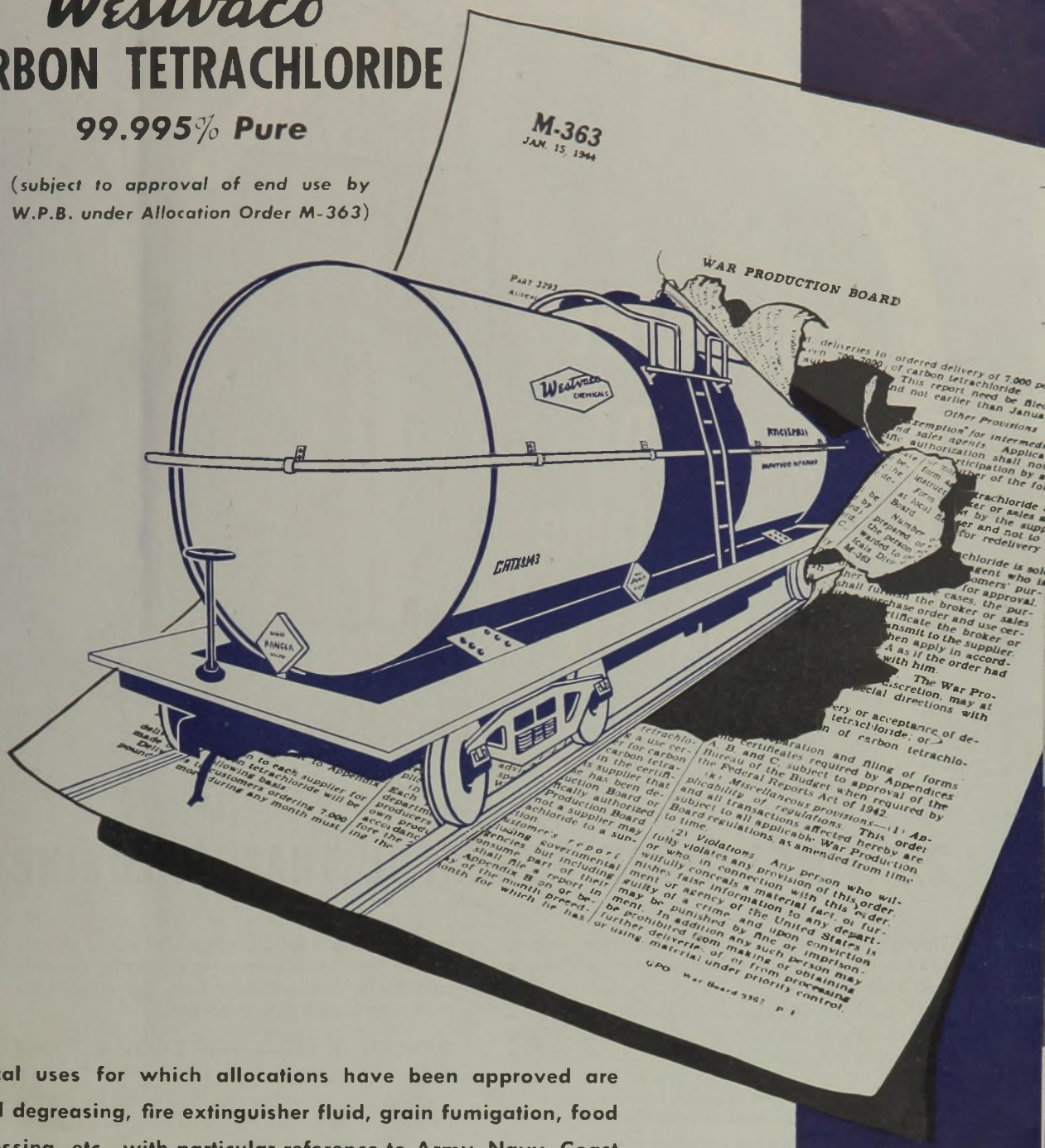

Typical uses for which allocations have been approved are metal degreasing, fire extinguisher fluid, grain fumigation, food processing, etc., with particular reference to Army, Navy, Coast Guard, Maritime Commission and Lend-Lease orders.

We are in a position to make prompt delivery in tank cars or drums, subject to W.P.B. allocation. Early receipt of certification of end use will expedite your shipment. Write, wire or phone.

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Westvaco CHEMICALS

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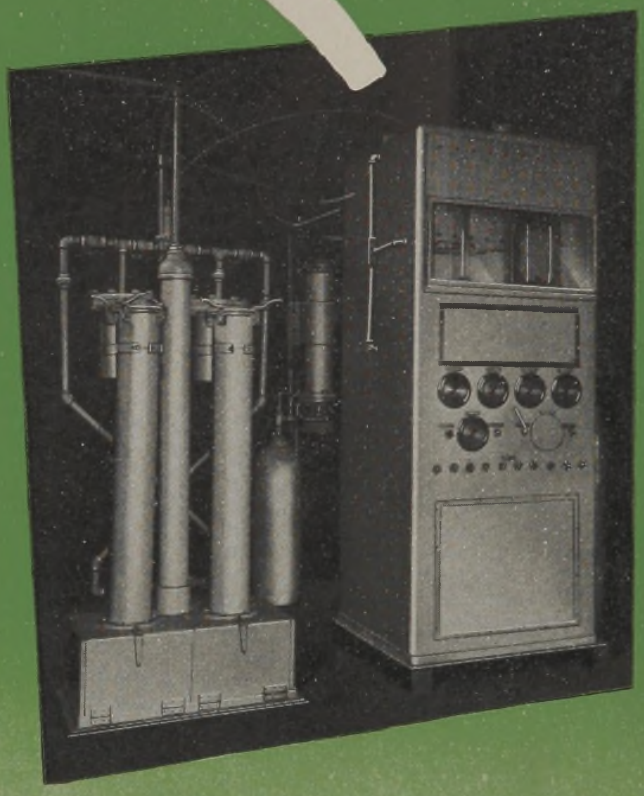

2½ TIMES MORE POWERFUL THAN CHLORINE

Through Mathieson's new chlorite-chlorine process, this powerful oxidizing and bleaching agent is now available to you.

Already proven to have remarkable values, chlorine dioxide opens new opportunities for definite processing improvements:

- ***in water treatment to remove tastes, odors.***
- ***in checking blue mold in citrus fruits.***
- ***in the processing and bleaching of starch.***
- ***in multiple bleaching of flour.***
- ***in bleaching of soap, paper, textiles and other materials.***

Controlled amounts of chlorine dioxide, without chlorine contamination, are secured by a safe and simple reaction. Equipment consists of a small generator filled with flaked commercial sodium chlorite and equipped with measuring devices for accurate control of chlorine and air flow. You simply generate chlorine dioxide as needed:

$$\underset{\text{sodium chlorite}}{2\ NaClO_2} + \underset{\text{chlorine}}{Cl_2} \longrightarrow \underset{\text{chlorine dioxide}}{2\ ClO_2} + \underset{\text{salt}}{2\ NaCl}$$

Our technical service department will be glad to furnish information on the use of chlorine dioxide in your particular operations.

Mathieson
CHEMICALS

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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. 55—NO. 1

July, 1944

Contents

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THE READER WRITES

Working Conditions Study

To the Editor of Chemical Industries:

I have read with much interest the article entitled "Survey of Working Conditions in the Chemical Industry" appearing in your May and June issues.

As I understand it, this article was brought about chiefly by Mr. Paul W. Hardy of Labor Relations Institute and with the cooperation of Chemical Industries. We would very much appreciate receiving three reprints of the article if they are available. Also, any additional information you have on the subject would be most welcome.

We wish to compliment you and Mr. Hardy for a very splendid job and wish to state that there is a very definite need for information of that nature in the chemical industry.

William R. Rinelli, *Manager*
Development Division
Ansul Chemical Co., Marinette, Wis.

Phenol Plant, Not Company, Involved in Catalin Sale

To the Editor of Chemical Industries:

The article entitled "Orbis Products Buys Catalin" on page 899 of your June issue is decidedly misleading.

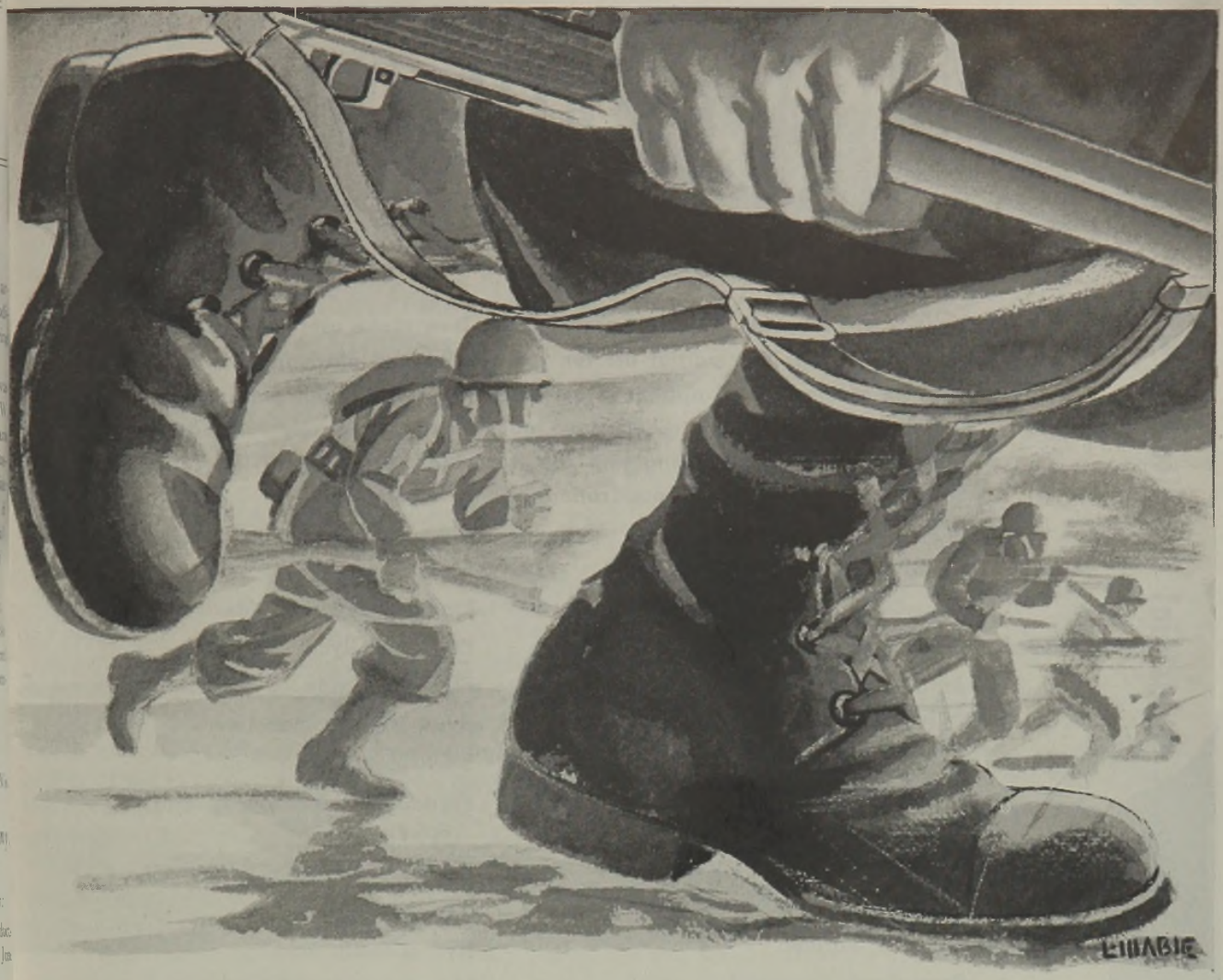
The facts of the case are these: The Catalin Corporation purchased in 1941 existing equipment at Matawan, New Jersey, and converted it to the production of phenol. During the period when phenol was extremely critical the unit was operated under contract for the U. S. Government, but during the latter part of 1943 the production of phenol was discontinued.

The plant was subsequently sold to Orbis Products Corporation and the sale in no way affected the production of our plastic materials or our corporate set-up.

E. S. Horsman, *Assistant Sales Manager*
Catalin Corporation
New York, N. Y.

Chemical Industries *regrets the implication in its June title. As Mr. Horsman indicates, the transaction did not affect the corporation or its principal plant at Fords, New Jersey.*—Editors.

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



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DOW INDUSTRIAL CHEMICALS

Dow Industrial Chemicals

Listings of industrial chemicals produced by Dow make useful ready reference material. Below is a partial list for you to clip and place in your files. The balance of the list will appear in a forthcoming issue of this publication. Dow industrial chemicals are readily available from strategically located plants. Watch for the second listing and clip it so that your files will be complete. See November issue of this publication for final listing.

Acetanilid Technical

Acetylene Tetrabromide

Ammonium Bromide

Aniline Oil

Anthranilic Acid, Sublimed and Technical

Barium Bromide

Benzoyl Chloride

Bis Phenol-A

Bromacetic Acid

Bromine, Purified

Bromoform, Technical

Cadmium Bromide

Calcium Chloride, Anhydrous, Flake, Liquid, Powder and Solid

Caustic Soda, Flake, Liquid and Solid

Chloroacetamide

Dowtherm A

Epsom Salt, Special for Stock Food and Technical

Ethyl Bromide

Ethyl Chloride

Ethylene Chlorbromide

Ethylene Glycol

Ethylene Oxide

Ethyl Monobromacetate

Ethyl Monochloracetate

Ferric Chloride, Crystals and Solution

Ferrous Chloride, Crystals

Hexachlorethane

Hydrobromic Acid

Magnesium Bromide

Magnesium Chloride, Anhydrous, Flake and Powder

Methocel (Dow Methyl Cellulose)

Methyl Bromide

Methyl Cyclohexane

Methyl Monobromacetate

Methyl Monochloracetate

Mining Salts

Monobrombenzene

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WASHINGTON

T. N. SANDIFER *reporting*

Contract Settlements • Surpluses • Butadiene Probe Industry Committees • Manpower

Contract Settlements

LATEST OFFICIAL REPORTS indicate that chemical operations so far this year are about 19 percent above those of last year. This fact, plus the present prospect of continued high-level activity in the industry for several months, offsets to some extent the uncertainty beginning to be manifest in war industry generally over the outlook.

Another offsetting factor is the undertone of caution heard here in more conservative quarters in all comments on the war in relation to present material demands. Cutbacks generally are expected to increase in proportion to the favorable progress of the war, and thus by Fall may be a predominant factor in some activities.

On the other side of the picture is the recent experience in tank output. At one time the use of this weapon was entering a phase where a number of plants were put in stand-by condition. Today these are being rushed back into production. Similarly, some time ago there was a general easing-off in explosives manufacture, and a number of bag-loading plants actually were put in stand-by condition. To use an expression current at the time, the country was up to its ears in explosives—if all the guns in commission were to fire a simultaneous barrage until the linings wore out in their barrels, we would still have all the powder we could use. That was the story, as heard here.

Explosives today are a major feature of chemical activity. If the war took a decisive, sudden turn, this situation obviously might be altered.

The principal concern reflected from the industry, as observed here, is that the Government is likely to be caught unprepared by any such definitive occurrence as a major crack-up in Germany. There are believed to be from 100,000 to 200,000 contracts in force between Government and prime contractors generally, manufacturing war materials. These in turn have entered into possibly more than 1,000,000 subcontracts. There is now in process of fabrication more than $10,000,000,000 worth of war materials.

Congress has passed the Contract Settlement Act of 1944, which at this writing is awaiting White House approval. It provides for creation of the Office of Contract Settlement, to be headed by a director. (A current prediction is that John M. Hancock, Bernard Baruch's partner in present postwar planning, will head this office.) The bill provides for a contract settlement board to work in an advisory capacity with the director, personnel of which will include the director and the heads of the War, Navy, Treasury, and other departments and agencies concerned. It provides for substantial termination settlements, and for necessary audits, etc., among numerous other matters.

Advisory Committee Merger?

REPORTS CURRENT AT THIS WRITING, of some amalgamation of activities of the numerous chemical industry advisory committees, it can be said, were not inspired by any such movement in the Chemicals Bureau, and industry sources usually well-informed on any development of this nature were equally skeptical of such a plan, if it exists. The best information now is that it may be in somebody's mind, but is a long way from fruition.

It frequently happens that such consolidations are a part of an overall policy evolved from some of the top desks of WPB or other agencies having these committees, but the opinion unofficially is that any such merger would have its difficulties.

Meanwhile there has revived some talk of Department of Justice interest in the work of industry committees generally, with the intimation that some transgressions may have been committed in the eyes of the D.J. No chemical committee is involved in any of this, according to informed persons here, but if the trend is definite, it can have a broad effect on all such services.

Some time ago the whole question of the relationship of these committees to the anti-trust laws, and other legal involvements, was raised by WPB itself, and an opinion of sorts obtained from the Department of Justice which on its face left the committee considerable scope within the law.

This ruling, informal or otherwise, was necessary in order to facilitate the committees' work, and if there is to be any tightening up of restrictions one effect foreseen here authoritatively is that it will discourage them from serving here at all.

The situation is still in the report stage, and no formal action of the department has been forecast. If it comes, it may be in the nature of a further opinion.

setting forth, perhaps in closer language, just what such committees may do.

Butadiene Background

THE PAST YEAR HAS BEEN MARKED by cancellations of petroleum refinery conversion projects originally planned to augment the raw material supply for the synthetic rubber program. From time to time official criticism was heard, implying that the fault lay with the companies, and even linking the delays in some instances to dark situations in the cartel field. The real explanation is just now coming out, through the action of the Gillette Senate committee in making public certain correspondence it has obtained on the subject.

One instance concerns the Eastern States Petroleum Company's butadiene plant at Houston, Texas. Following a meeting in July 1942 at which all refiners in the Texas Gulf area were urged to volunteer to convert their cracking plants into butadiene plants, this company busied itself with preliminaries and on September 11, 1942, submitted a formal proposal in line with the request of the Petroleum Administration for War, made at the previous meeting. Refiners incidentally were assured they would receive from the Government the full cost of conversion, together with an appropriate rental of their cracking plants so converted.

On July 1, 1943, this company was told to discontinue work on the purification part of the plant, then nearly completed, and also advised that there was a question as to the successful operation of the Standard Oil Company's plant design, which was being followed.

What had happened meanwhile is brought out in the correspondence before the Gillette committee:

The project as planned by the company would have cost $1,600,000. It was submitted September 11, 1942, approved October 29, 1942, after all the other independent companies who were willing to so convert had submitted their plans to PAW. Then, "on November 9, 1942, after we had in good faith acted upon the letter of intent from the Rubber Reserve Company, we were advised that Rubber Reserve would not go through with the project as outlined, but would convert it to a Defense Plant Corporation project," to be built as such, the money to be advanced by DPC, with a supply contract to be made with Rubber Reserve.

Some days later the company learned that, although it had been in the refinery construction and operation business, as both a major company and independent operator for many years, "we must employ an outside engineering firm to re-design the conversion of our plant for butadiene production." Moreover, the company was told whose designs it was to follow, a construction company named in the correspondence. From then on, "we had control over neither the design nor engineering details of construction of our plant," the company reported.

One month before the new plant was to have been finished, if the company had been allowed to proceed with its own plans, the engineers of the outside firm arrived on the job, so the correspondence charges,

meanw[illegible]n, which had been carefully worked up in collaboration with Petroleum Conversion Corporation. All pleas by the company to be allowed to go ahead with its own plans "met with complete and definite rebuff from both the PAW and DPC," it was stated.

In the end it was not until May, 1943 that the manufacturing plant was finished, instead of February as had been originally scheduled by the company plan, and instead of a cost of $1,600,000, the plant had cost up to then, $3,600,000.

Meanwhile, in March of that year, at a round-table of other refiners likewise told to follow outside plans, as well as Government agency representatives, it was realized that the design plans of the outside company "were ill-conceived, not based on experience, and definitely extravagant in use of money." However, they had been approved by PAW and DPC.

The arrangement was cancelled in December, 1943, but up to that event, the original company said, "we were never for one minute allowed to use our own experience and judgment in either the construction or operation of this plant."

As a sidelight on the delays occasioned by lack of equipment in some of these projects, this same company claimed it had obtained options on a large amount of equipment necessary for conversion. It lost most of this, so it was stated, in the 6 weeks' time it required for PAW and others to approve the project.

Space does not permit the same detailed experiences of other companies but the record is replete with priorities for materials going to other projects, unworkable designs, government versus private management of the project construction, and numerous other charges, all documented.

Manpower

SOME IDEA OF WHAT CHEMICAL MANUFACTURERS may count on from colleges this year is furnished by a statistical summary from the War Manpower Commission which shows in January of this year 520,192 full-time civilian students in institutions of higher learning, including graduate and undergraduate, of whom 357,785 were women. Of the men 22.1 per cent were in Class II and 18.7 per cent in IV-F, with the others not classified, possibly because of having not then reached their 18th birthday.

Of the total, there were, engaged in chemical courses in undergraduate classes, 6,647 students; 6,430 were men. In the graduate courses were 6,868, of which 6,650 were men.

Unfortunately the report does not indicate what has happened since. It was projected that by mid-year, substantial reductions in the number of male students in all categories would occur. In any event, allowing for the various losses through entering service, etc., except for the oncoming freshmen of another school year, it was estimated that the male civilian full-time student body in the institutions reporting in the survey would be not more than 60,400 when the spring college terms were completed.

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Covering an area of nearly thirty acres, Niagara Alkali Company's plant at Niagara Falls, N. Y., is one of the most modern and efficient of its kind in the world

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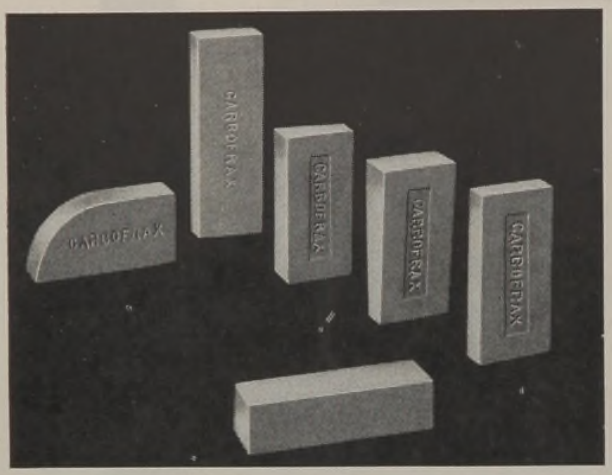

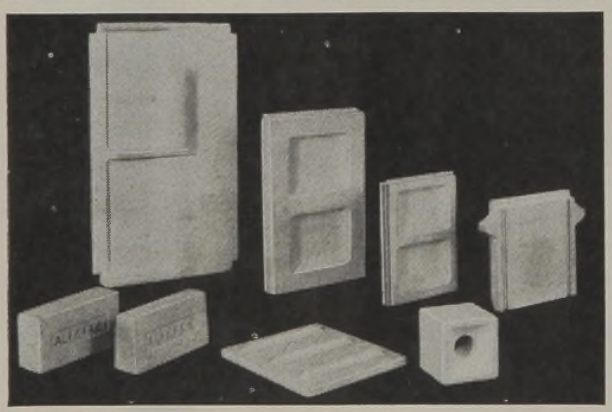

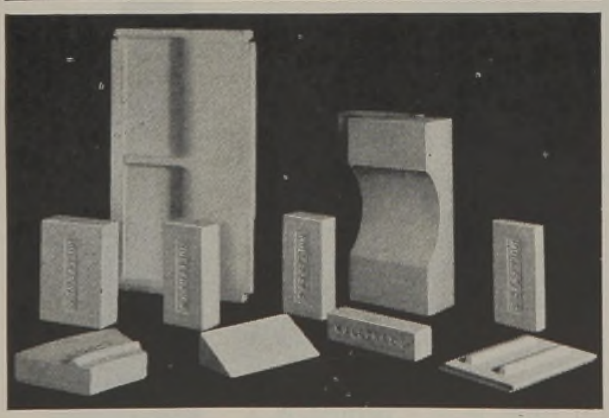

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"CARBOFRAX" (Silicon Carbide) in fu naces for the reduction and refining of non-ferr metals and in the heat treatment of both ferrous a non-ferrous metals. It is so employed because of high thermal conductivity, excellent refractorine minimum tendency to spall and outstanding sistance to mechanical abrasion.

"ALFRAX" (Electrically Fused Alumin Oxide) for thin wall muffles, retorts, hearths, pie pier walls and burner blocks. This product has thermal conductivity approximately three times t of fireclay, high hot strength, low electrical co ductivity and is chemically stable.

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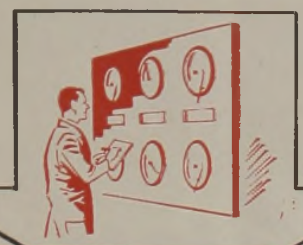

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B & A ACID SULFURIC, FUMING, 30% REAGENT
Clear, colorless, oily liquid; fumes in air; solidifies at 15°C. (59°F.)

Assay (free SO_3)	Min. 30%
Maximum Limit of Impurities:	
Non-volatile	0.005%
Nitrate (NO_3)	0.0001%
Arsenic (As)	0.00005%

B & A ACID SULFURIC, FUMING, 15% REAGENT
Colorless or slightly colored oily liquid; fumes in air.

Assay (free SO_3)	Min. 15%
Maximum Limit of Impurities:	
Non-volatile	0.005%
Nitrate (NO_3)	0.0001%
Arsenic (As)	0.00005%

Available in 1 lb. bottles, 9 lb. bottles, and cases of ten 9 lb. bottles.

Fuming Sulfuric Acid also available in these grades:
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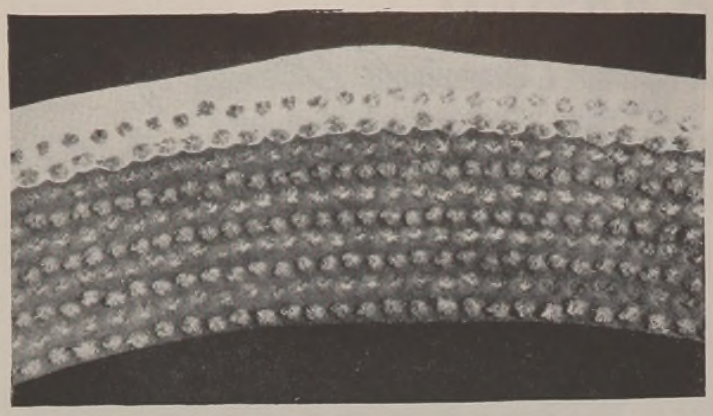


(*Above*) **CROSS-SECTION OF TIRE** shows tread at top, then breaker cord, breaker and cushion stock, skim stock, carcass cord.

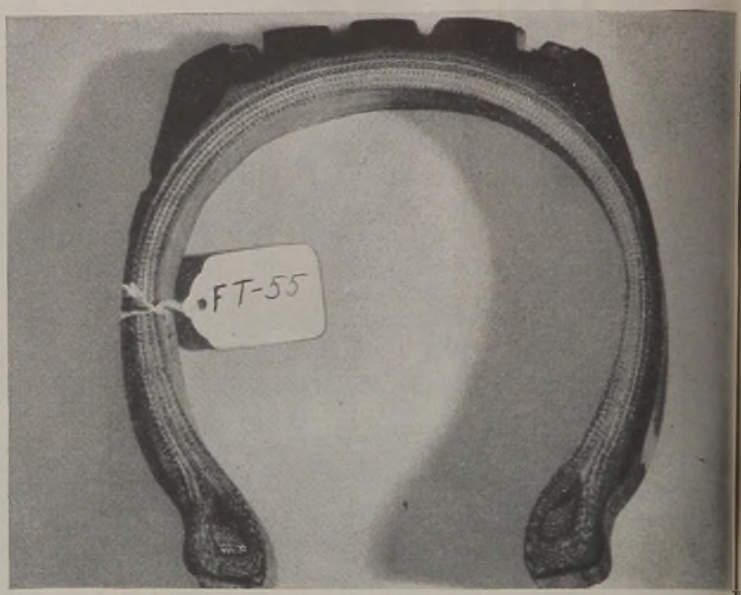
CAPTURED GERMAN TIRES ANALYZED BY MEANS OF INFRARED SPECTROSCOPY to determine accurately the percentage composition and type of rubbers. Tests were made by chemists in the Stamford Research Laboratories of American Cyanamid for the Army Ordnance Department, using colorimetric methods using visible light and by infrared spectroscopy.

Ten samples of carcass stocks tested showed natural rubber in all cases, varying in amount from 25% to 100%. Of an equal number of tread stocks analyzed, one was wholly natural rubber and nine were pure Buna S. Tubes contained from 75% to 100% natural rubber.

The tires were cross-sectioned, photographed, and labeled, as shown here. Wherever possible, samples of the tread, cushion, breaker, and carcass stocks were removed from each tire and subjected to the two analytical procedures.

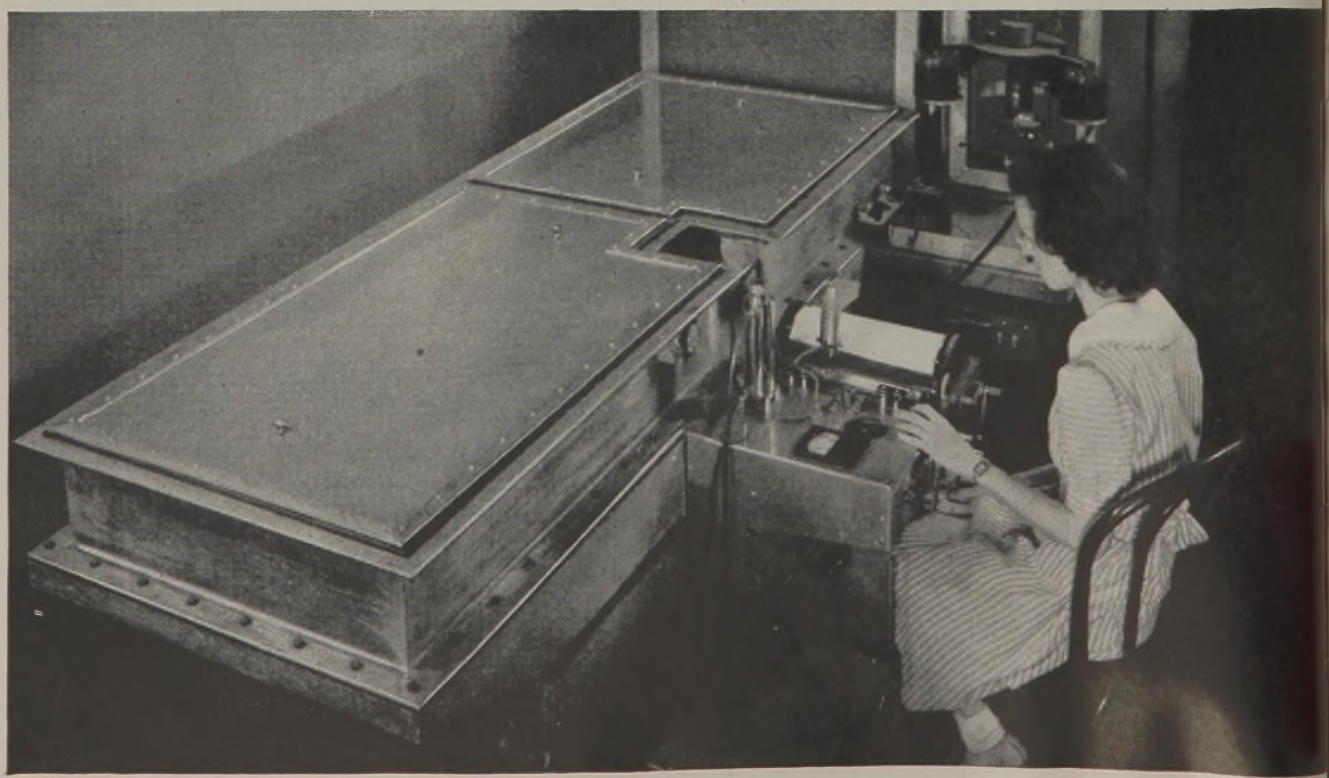
In the first, samples were subjected to an ultraviolet spectrochemical analysis, using a large Hilger E-1 spectrograph, to determine the metal content. Exact values for the phosphorus contents were determined through the use of another spectrochemical tool, the visible light spectrophotometer.

Analysis of the rubber by infrared spectroscopy was based on direct measurement of the strength of absorption bands unique to each component, and by comparison of the infrared absorption spectra of the unknown with those of a series of known prepared standards.

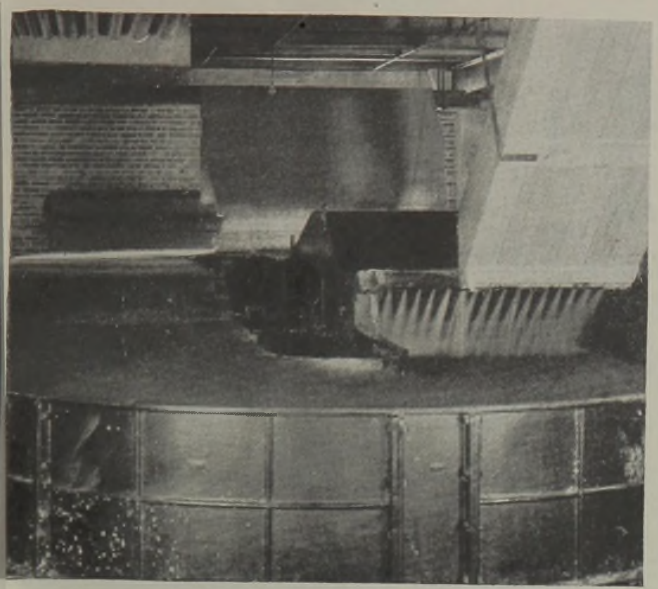


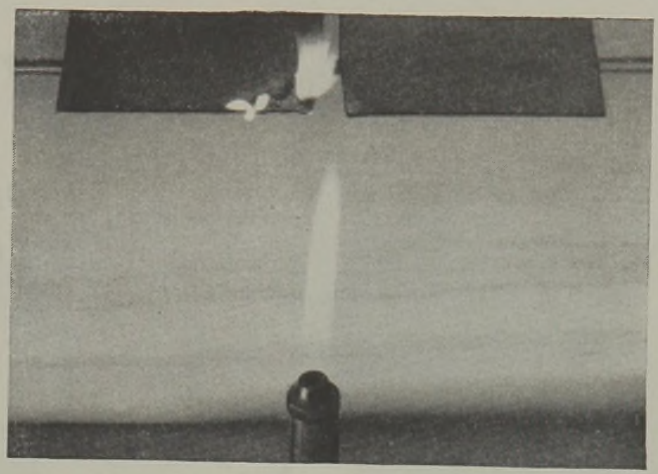
(*Above*) **FIRST STEP IN SAMPLING PROCEDURE** was to cross-section tires and label samples to ensure permanent record and ready identification.

(*Below*) **INFRARED SPECTROSCOPY** has proved extraordinarily useful in recent development in the chemistry of hydrocarbons.



On The Chemical Newsfront

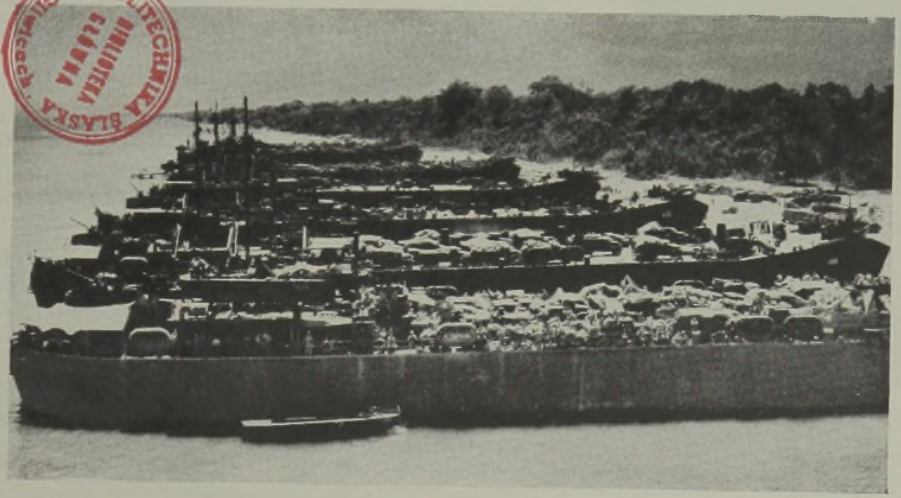




(*Above*) **FLAME RESISTANCE TEST** demonstrates the relative flame resistance of phenolic (left) and melamine (right) plastic laminates. As shown, the phenolic is burning, while the melamine, such as Cyanamid's MELMAC* laminating resins, fails to support combustion. Both samples have cellulose bases.

(*Above*) **CONSTANT CONTROL** throughout the manufacture of Cyanamid Palewood Rosin Size assures the paper manufacturer of a product of exceptional cleanliness which can be added at the beater with complete assurance of high quality performance. Palewood Rosin Size, comparable in color to high grade gum size, is only one of a complete range of Rosin Sizes produced by Cyanamid from gum or wood rosin in pale grades to more economical grades, available from convenient manufacturing and wholesale points.

(*Right*) **AMERICAN MEN AND MATERIEL** are being unloaded on fighting fronts all over the world from LSTs such as these on the beach at Cape Gloucester, New Britain. Supplies and equipment must be paid for with the help of your dollars invested in War Bonds. The Fifth War Loan drive is on. Put it over the top! "Back the Attack!—Buy More Than Before!"



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American Cyanamid & Chemical Corporation

(*A Unit of American Cyanamid Company*)

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

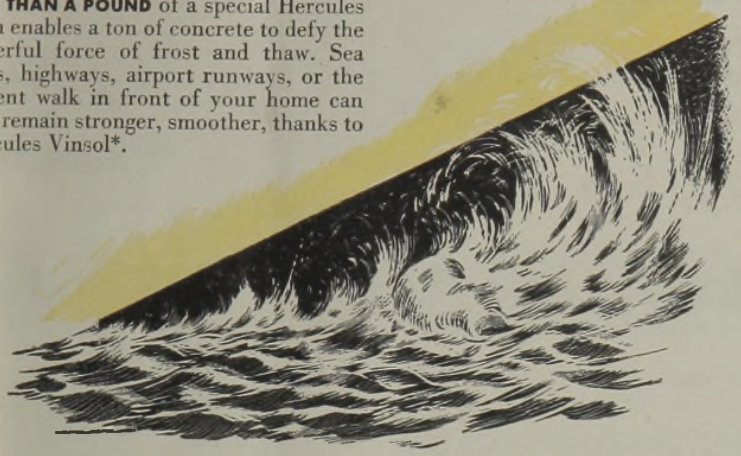
. . . A brilliant record in the field of research

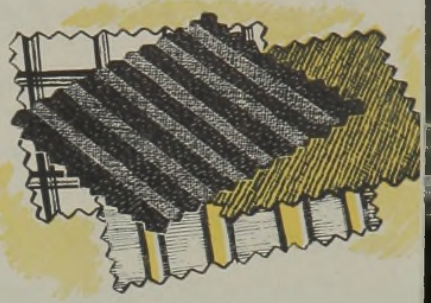
"Hercules outstanding record in the field of terpene and rosin chem was made possible by the teamwork of operating men and a labor staffed by industry-minded research chemists, physicists, and che engineers. They transformed wood rosin, wood turpentine, and l known pine oil into an array of purified products, tailor-made for sp purposes, that today are indispensable to scores of the nation's lea industries.

"A trip through this splendid laboratory is a thrilling experience. Her finds superb equipment, equalling the finest of the great American European universities."

DAVID DIETZ, *Science Editor of the Scripps-Howard Newspapers, Author, and Pulitzer Prize W*

SS THAN A POUND of a special Hercules sin enables a ton of concrete to defy the werful force of frost and thaw. Sea lls, highways, airport runways, or the ment walk in front of your home can w remain stronger, smoother, thanks to rcules Vinsol*.





SAVING TIME AND MANPOWER for the textile industry a tually every processing step is Hercules Yarmor* 302-W Oil. In one large textile mill alone, this specially designed pr cut a four-hour operation to two hours and with a cash sa

CONSERVING CRITICAL MATERIALS is but one important con tion of Hercules Poly-pale* resin to varnish resin produ This polymerized rosin is permitting savings of glycerin other scarce materials as high as 30% without sacrificing qu

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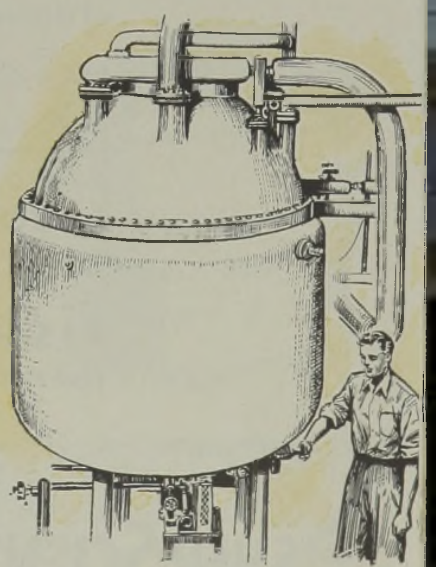

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OFFER ANSWERS TO MATERIALS PROBLEMS IN MANY INDUSTRIES

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Better Service for AMERICA'S LABORATORIES IN THE *Central States*

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Complete Stocks — Sales and Technical Service

Fisher Scientific Company has established in the City of St. Louis, Mo., a large and comprehensive distribution stock of laboratory apparatus and reagent chemicals. This new plant has a competent staff to render sales and technical service.

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(AS THEY NOW SERVE IN PROCESSING INDUSTRIES)

Will Help Re-locate

80,000,000 PEOPLE IN THE NEAR EAST

In the Near East, 80,000,000 people will move into planned-community areas, unprecedented in all the history of colonization, as to preparations and potentials.

Adequate water-supply and sanitation systems are assured to them. Certain food and other processing industries are planned for them.

WILSON *Pulsafeeders* will be key units in these systems, laboratories and industries, just as they are in similar flow-control lines all over the world.

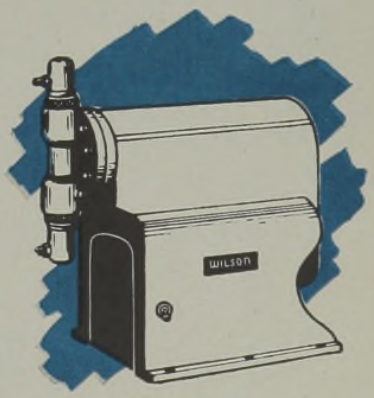
WILSON *Pulsafeeders* are the choice of these community-planning experts for the same reasons that they are the choice of maintenance experts for our armed forces, and of experts in medical, food, chemical, oil and other laboratories and industries, in which flow-control requirements for speed and accuracy are exacting. Their dependability, economy and efficiency are long-known and world-known.

Why not get detailed information concerning WILSON *Pulsafeeder* adaptability to your requirements?

WILSON PULSAFEEDERS—What They Are And What They Do

WILSON *Pulsafeeders* are eminently superior, almost infallible flow-controls to handle liquids of any nature in any pre-determined quantity from one cubic centimeter to four hundred or more gallons per hour. Accuracy, in most instances, is guaranteed at better than ⅛ of 1% through manually operated and/or automatic controls for single or multiple liquids. WILSON *Pulsafeeder* Systems are so flexible and adaptable, they satisfy an almost limitless range of requirements.

Let us send you details of their packless, positive-displacement piston action . . . of the absence of packing glands and breakable diaphragms . . . freedom of contact between working parts and flowing liquids. Let us tell you how they will meet your specific requirements for capacity, accuracy, economy, durability and dependability, as those requirements apply to chemical proportioning, food and other processing, laboratory work, water and sewage treatment . . . or to the handling of problem liquids such as acids, volatiles, slurries, etc., in mono- or multi-flow . . . and about our capacity to supply almost any need in Automatic Filling Machines because of our acquisition of Clevon Products Company.



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WILSON CHEMICAL FEEDERS, INC.

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ESTABLISHED 1923 . . . WITH EXPERIENCE IN ALLIED LINES SINCE 1914

For Your Notebook...

These typical reactions may suggest ways in which the NPs can help you:

ALIPHATIC NITROHYDROXY COMPOUNDS are suggested as sensitizers for rubber latices, mild oxidizing agents, high-boiling solvents and plasticizers, surface-active agents, and flotation agents. They may be prepared by the condensation of a nitroparaffin with an aliphatic aldehyde as shown by this type reaction:

$$\underset{\text{Nitroethane}}{CH_3CH_2NO_2} + \underset{\text{Formaldehyde}}{2HCHO} \xrightarrow[\text{catalyst}]{\text{basic}} \underset{\text{2-Nitro-2-methyl-1,3-propanediol}}{CH_2OHC(CH_3)NO_2CH_2OH}$$

AROMATIC NITROHYDROXY COMPOUNDS may be obtained by a similar type reaction:

$$\underset{\text{2-Nitropropane}}{CH_3CHNO_2CH_3} + \underset{\text{Benzaldehyde}}{C_6H_5CHO} \xrightarrow{KOH} \underset{\text{2-Nitro-2-methyl-1-phenyl-1-propanol}}{C_6H_5CHOHC(CH_3)NO_2CH_3}$$

MANY ESTERS showing promise as solvents and plasticizers may be made by reacting the nitrohydroxy compounds with organic acids. The following reaction of 2-Nitro-2-methyl-1-propanol illustrates the formation of these esters:

$$\underset{\text{2-Nitro-2-methyl-1-propanol}}{CH_3C(CH_3)NO_2CH_2OH} + \underset{\text{Acetic acid}}{CH_3COOH} \longrightarrow \underset{\text{2-Nitro-2-methyl-1-propyl acetate}}{CH_3C(CH_3)NO_2CH_2OOCCH_3} + H_2O$$

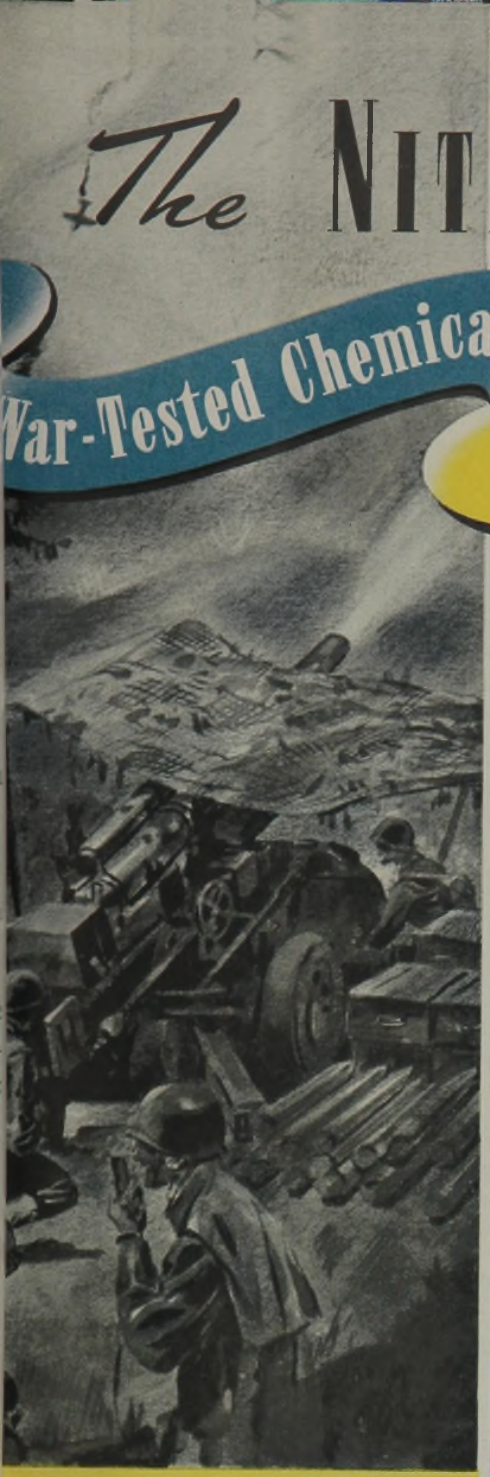
PRIMARY AMINES as raw materials for synthesis of pharmaceuticals, dyestuffs, rubber chemicals, emulsifying agents, and many others may be formed by the reduction of nitroparaffins as illustrated by this type reaction:

$$\underset{\text{2-Nitropropane}}{CH_3CHNO_2CH_3} + 3H_2 \longrightarrow \underset{\text{Isopropylamine}}{CH_3CHNH_2CH_3} + 2H_2O$$

(The foregoing reactions are taken from the technical and patent literature. Others are shown in the booklet—"The Nitroparaffins—New Worlds for Chemical Exploration." A copy will be sent you on request.)

The NITROPARAFFINS

War-Tested Chemicals for Postwar Products

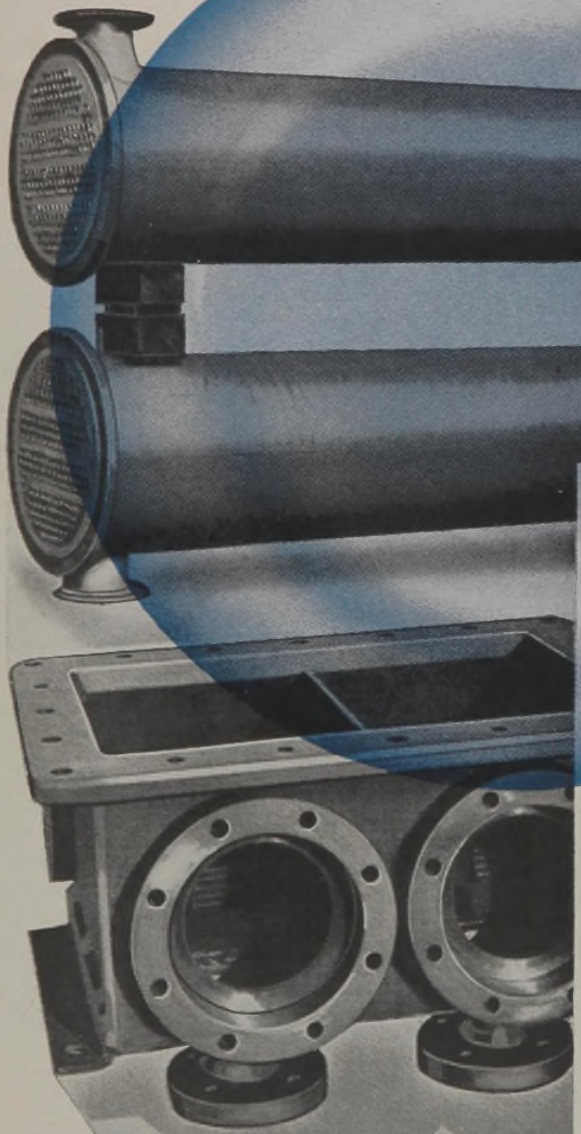


THE NITROPARAFFINS are war-tested chemicals. From Army raincoats to camouflage paints . . . from corrosion inhibitors to insecticides . . . the versatile and highly reactive Nitroparaffins are meeting the demands for modern warfare.

In the test of emergency the NPs are proving invaluable. They are opening the way to new processes and new syntheses and will provide the basis for important postwar production of civilian goods. Have you investigated the physical properties, reaction characteristics, and useful derivatives of the NPs? If you do not have samples or technical information on the Nitroparaffins, write our Technical Service Division.

FOR HIGHEST CORROSION RESISTANCE

NOOTER-FABRICATED



HASTELLOY

• • • A new nickel-base alloy of high strength recently developed for unusual corrosion resistance.

It is designed to withstand ferric chloride, hydrochloric acid, wet chlorine and other mineral acids, over a wide range of temperatures, concentrations and pressures.

Hastelloy is the economical solution to many corrosion problems; applied in isomerization reactors, fabricated piping, condensers, agitators, chlorinating equipment for the refining, chemical and processing industries.

The fabrication of Hastelloy alloys requires great skill. As pioneers in this difficult type of work, we offer you our knowledge and experience.

Our engineering department will be glad to work out your fabrication problems with you.

JOHN NOOTER BOILER WORKS CO.

Alloy and Bi-Metal Fabricators

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ARMY NAVY

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METHYL CHLORIDE CH_3Cl

99.5% PURE, Du Pont Methyl Chloride is a moderately priced chemical of value in organic synthesis and low-temperature solvent work. It is stable, low in moisture and insoluble residue. Du Pont Methyl Chloride is shipped as a liquefied gas in standard cylinders, single-unit and multiple-unit tank cars.

PROPERTIES OF METHYL CHLORIDE

Molecular weight	50.481
Color: vapor and liquid	none
Odor	faintly sweet, ethereal
Melting point	−97.6°C.
	−144°F.
Boiling point (760 mm)	−23.76°C.
	−10.76°F.
Specific gravity, liquid (Compared with water at 4°C.)	
−23.76°C.	1.000
21.11°C.	0.919
Viscosity, liquid	
−23.76°C.	0.310 Centipoise
Specific heat, liquid (average, −15° to 30°C.	0.376
Critical pressure (65.9 atm)	968.7 lb./sq. in. abs.
Solubility	
in water	slight
water in: 0.026% by wgt. (−23.76°C.)	
in alcohol, chloroform, mineral oils and most organic liquids	high
in glycerin	0.3% by wgt. (25°C.)
glycerin in	0.03% by wgt. (25°C.)

APPLICATIONS

LOW-TEMPERATURE SOLVENT—for a wide range of organic and inorganic substances, including many plastics, alkaloids, fats, waxes, oils, gums, dyestuffs, rubber and paraffin. Because of its excellent solvent properties, it can be used in organic syntheses, especially where the reagents used are immiscible or not mutually soluble. The Methyl Chloride can easily be recovered by distillation.

METHYLATING AGENT—in a variety of organic syntheses.

Organic derivatives of monovalent metals are methylated by reaction with Methyl Chloride:

$$R\text{-}Na + CH_3Cl \rightarrow R\text{-}CH_3 + NaCl$$

$$Na\text{-}C(COOC_2H_5)_2\text{-}H + CH_3Cl \rightarrow CH_3\text{-}C(COOC_2H_5)_2\text{-}H + NaCl$$

(malonic ester type synthesis)

Methyl Chloride, treated with magnesium in the presence of diethyl ether, yields the typical Grignard reagent:

$$CH_3Cl + Mg \rightarrow CH_3MgCl$$

As is well known, this organometallic halide can be reacted with aldehydes, ketones, esters, etc., to give methyl substituted carbinols.

With zinc and diethyl ether, Methyl Chloride takes part in the Reformatsky reaction. The product is treated with acid to yield a tertiary alcohol:

$$R\text{-}CO\text{-}R + CH_3Cl \rightarrow R\text{-}C(CH_3)(OH)\text{-}R$$

In the presence of sodium or zinc, Methyl Chloride enters into the synthesis of higher hydrocarbons by means of the Würtz or Frankland type syntheses:

$$R\text{-}Cl + CH_3Cl \xrightarrow[Zn \text{ or } Na]{} R\text{-}CH_3 + 2\,MCl \text{ or } MCl_2$$

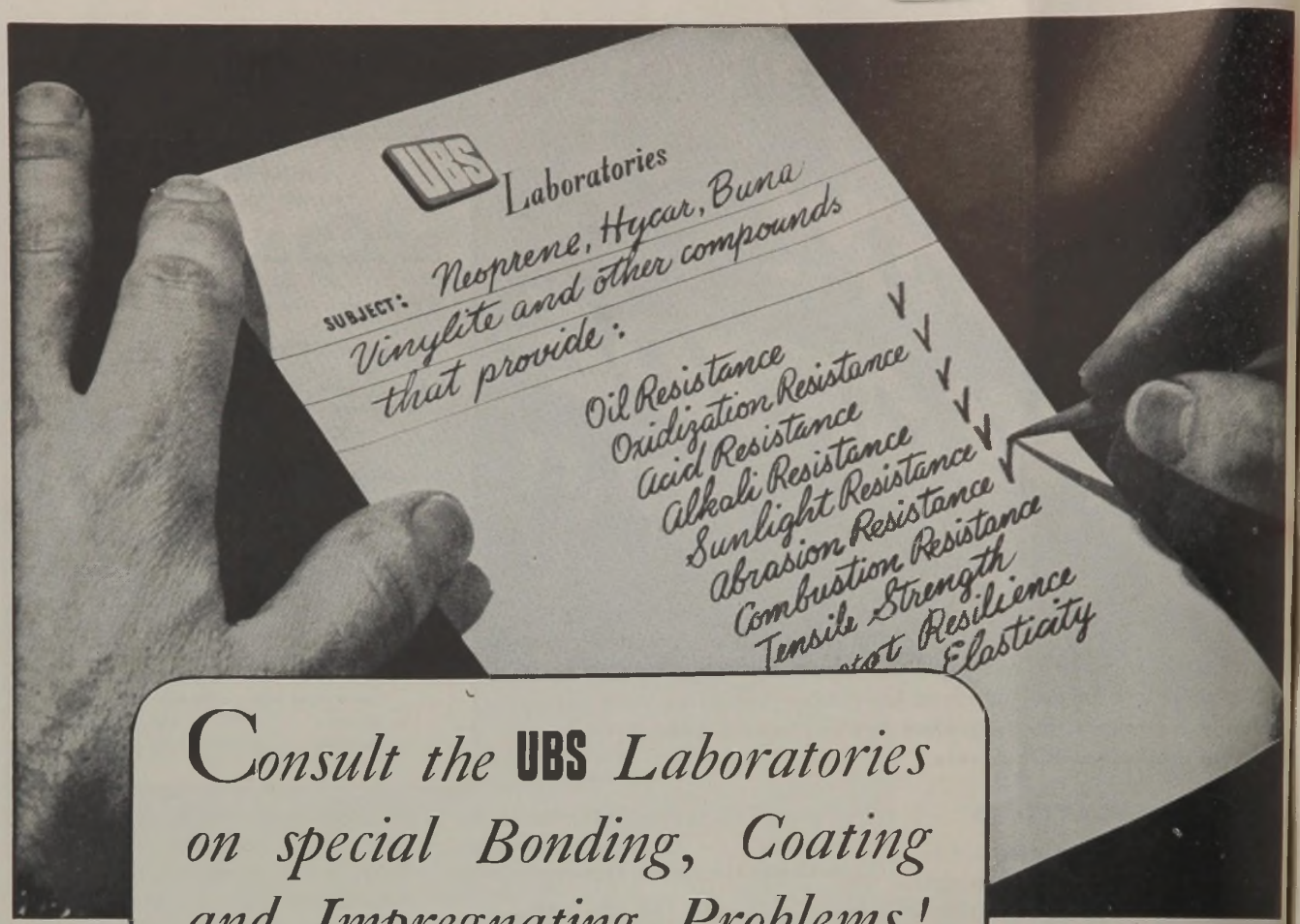
Many other important reactions in which Methyl Chloride may take part are to be found in the literature.

REFRIGERANT—as primary refrigerant in reciprocating and rotary compressors. Methyl Chloride finds extensive use also as a secondary coolant for special applications. Because of its stability, low volume displacement, low condensing pressure and other favorable features, Methyl Chloride has become one of the widely used refrigeration fluids.

ACTUATING FLUID—in a variety of temperature and pressure control instruments.

★ ★ ★

Investigate the many possible uses for high-purity Du Pont Methyl Chloride in your future development work. At present, supplies of Methyl Chloride are available for military and essential civilian use. Limited quantities can be obtained, however, for research and development purposes. For complete data, write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.



Consult the **UBS** *Laboratories on special Bonding, Coating and Impregnating Problems!*

No matter what the problem may be — *bonding neoprene, rubber and other coated or moulded parts to any ferrous or non ferrous metal; corrosion proofing chemical tanks and equipment; laminating leather belting; coating magneto parts; combining or coating fabrics; impregnating paper; cementing various materials together; insulating wire and other articles; etc.* — you will find the UBS Laboratories equipped to provide the one best formula to suit your needs. Longtime specialists in the field of industrial Bonding, Coating, and Impregnating Compounds, the UBS Laboratories not only know thoroughly the compounding advantages and limitations of all the latest synthetics, but even have developed an original synthetic latex and synthetic rubber of their own. *Write today, describing your Bonding, Coating, or Impregnating Problems.*

UBS developed adhesives are being used in the manufacture of inflatable Army and Navy Equipment, where weather and chemical resistant seams of high tensile strength are required.

UBS developed compounds are being successfully used to coat magneto parts and for cementing gaskets, where oil resistance is of great importance.

UBS developed adhesives and coating compounds are being widely used on Army delousing bags, protective clothing, etc., where acid resistance and flame resistance are of paramount importance.

UBS developed compounds are being used for chemical tank linings and to corrosion proof chemical handling equipment, where acid resistance and alkali resistance are primary factors.

Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

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UNION BAY STATE *Chemical Company*

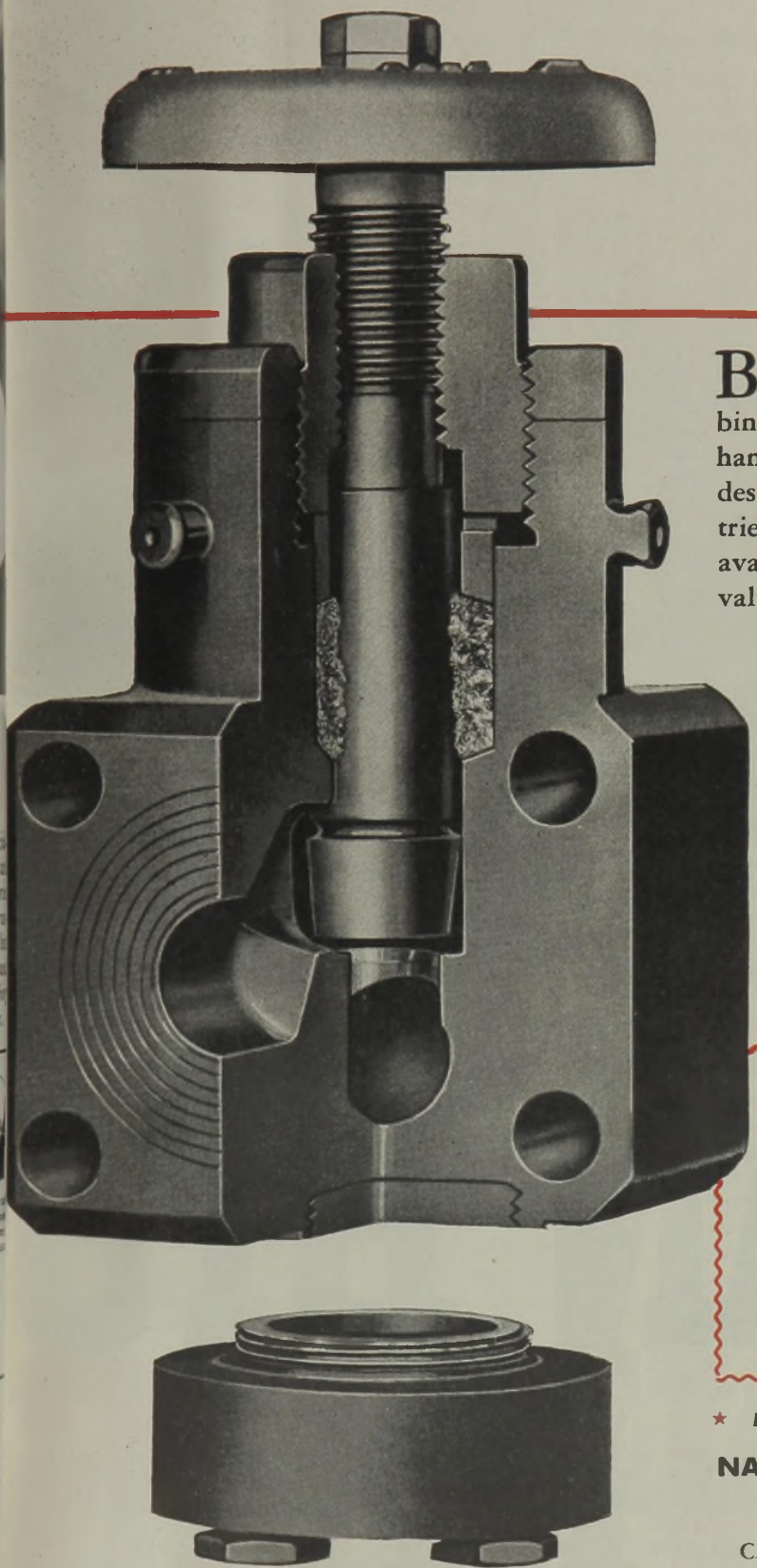
Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

AND NOW . . . a Globe Valve built of

KARBATE
TRADE-MARK

Corrosion-Resistant Material



BRAND NEW, and unsurpassed in its combined chemical and physical properties for handling highly corrosive fluids . . . expressly designed for the chemical and process industries . . . this "Karbate" globe valve is now available in 1″ and 2″ sizes. There is no other valve with all of its features:—

- **Resistant to practically all corrosive chemicals**
- **Unaffected by extreme thermal shock**
- **Fluids contact "Karbate" material throughout**
- **Light and small—short face to face dimension**
- **Self-lubricating**
- **Available with steam-heating adapter**

Remember, too . . .

in addition to valves, "National" Carbon, Graphite, and "Karbate" pipe, fittings, and pumps are available in a wide range of sizes for the fabrication of complete conveying and heat transfer systems of practically any design. Your inquiries are cordially invited. Write National Carbon Co., Cleveland 1, Ohio, Dept. 27-G.

★ BUY UNITED STATES WAR BONDS ★

NATIONAL CARBON COMPANY, INC.
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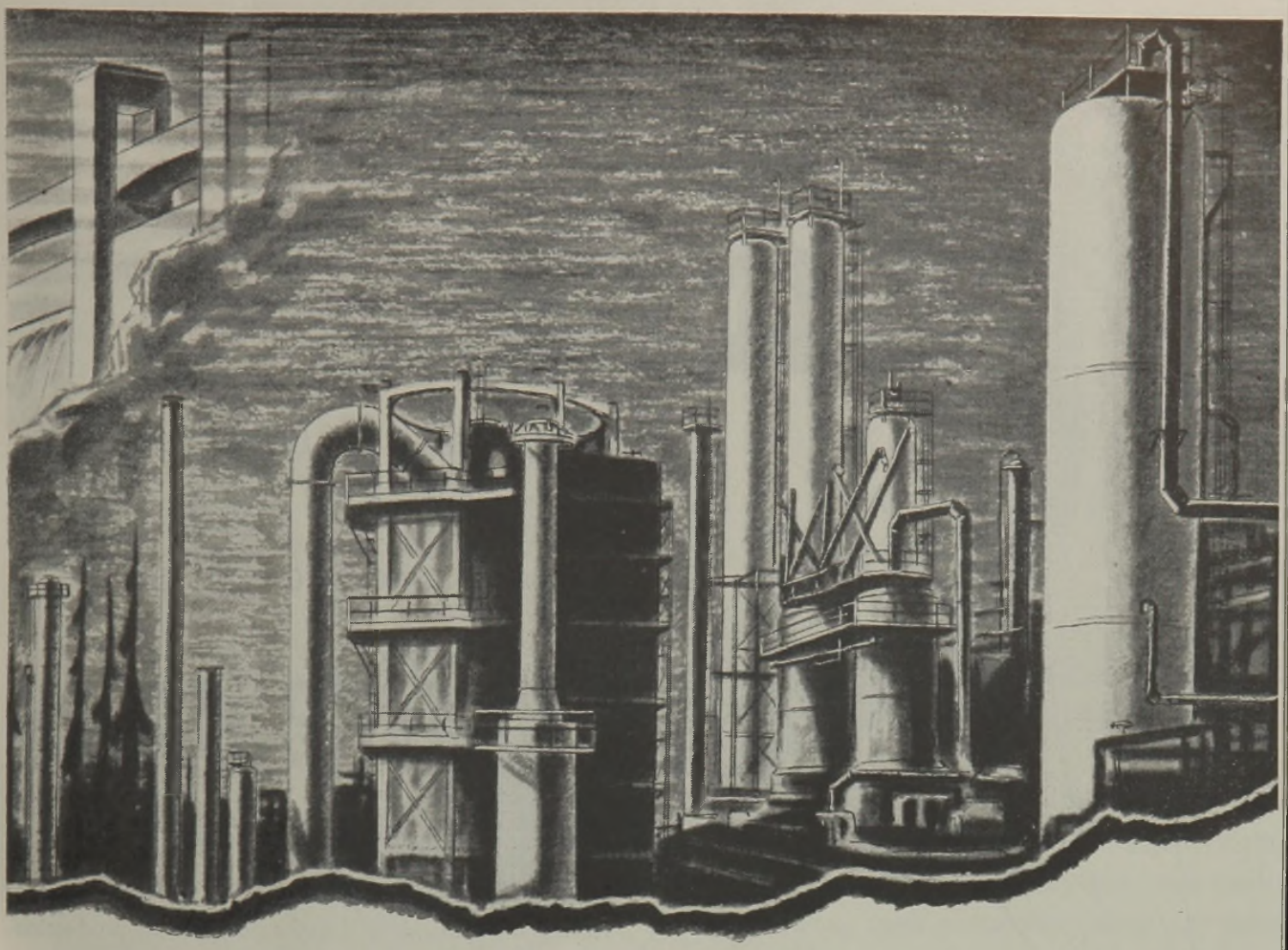
The registered trade-marks "National" and "Karbate" distinguish products of National Carbon Company, Inc.

BIG JOBS MEAN BIG THINKING



The stupendousness of this war has upset old senses of proportion and dwarfed former scales of operation in most every kind of enterprise.

The 5000-barrel petroleum refining unit — a sizable job only a few years ago — finds itself a Lilliputian among today's 60,000-barrel to 90,000-barrel Gullivers. Synthetic rubber production has risen from an experimental plaything to a giant industry. Plants and units in the chemical processing industries are decisively bigger.

Setting up these large-scale manufacturing facilities has naturally required "bigger" thinking. Plans, process engineering, design, and the application of new methods involve entirely new considerations.

No longer, in looking toward expansion, can the average operator's engineering department be expected to possess all the desirable background to undertake alone the job of important new plant construction or modernization. For no matter how large or small the plant, its pattern must embody the means for meeting the competition of the modern war-built giant.

The Badger organization has headed so many large wartime engineering and construction jobs in the chemical, petro-chemical and petroleum refining industries that Badger thinking can almost certainly be of great help to you — (a) in an advisory capacity, (b) as co-managers with your own engineering and executive departments, or (c) under sole responsibility for putting through the entire project from preliminary plan to practical operating stage.

Badger engineering services include:

Analysis and Evaluation of Processing Requirements.
Selection and Design of Processing Methods.
Estimating Costs of Equipment, Materials, and Entire Projects.
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AVAILABLE — 1944 BROCHURE ON THE SCOPE OF BADGER SERVICES

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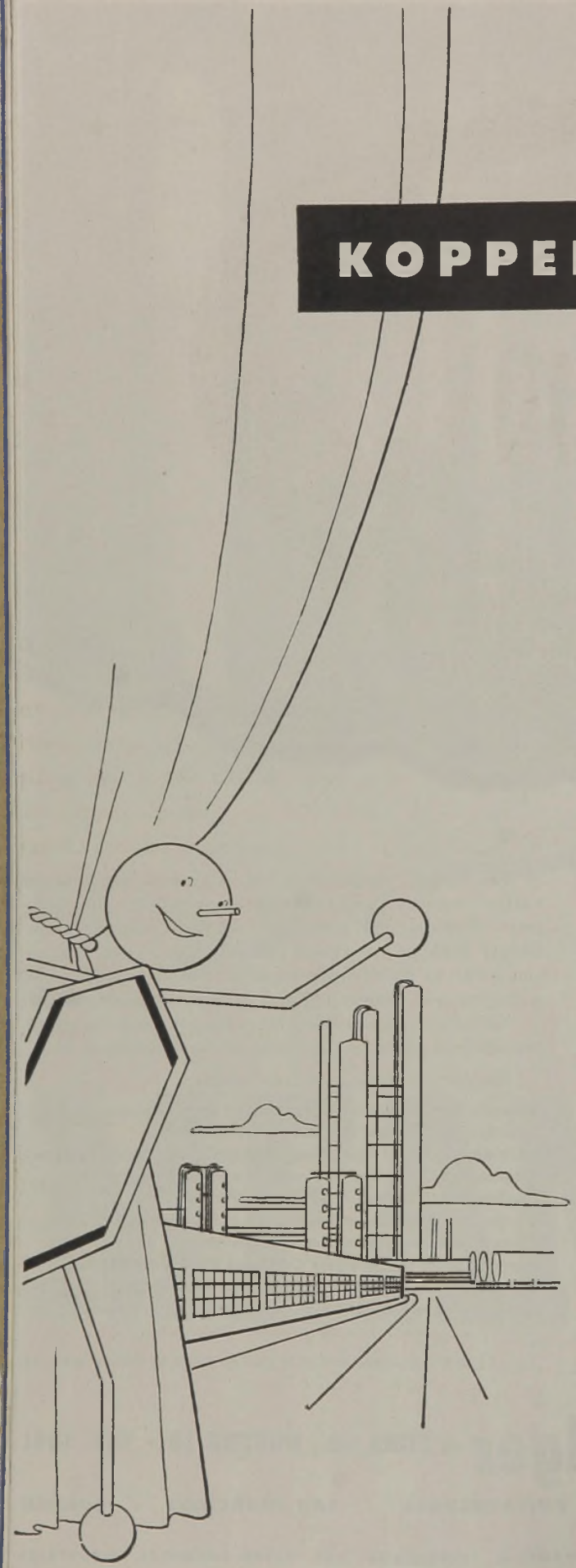
PROCESS ENGINEERS AND CONSTRUCTORS FOR THE CHEMICAL, PETROLEUM AND PETRO-CHEMICAL INDUSTRIES



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

In Special Cars for Speed and Safety

PENN SALT

CAUSTIC SODA

These 8000 gallon units are designe especially for carrying Penn Salt Liquid Caust Soda. They have protective lining, are equi ped with special draining plates, caustic resi tant valves and interior connections. Dang of contamination is eliminated because th steam-heating coils do not contact the causti

These insulated cars assure fluid Caustic Soc in any weather. They can be emptied speedi and safely . . . no waste of time, no waste effort, no waste of caustic.

Penn Salt Liquid Caustic Soda is available 50% and 72—73% solution in tank cars. solid form Caustic Soda comes in 750 l drums—in flake form in 125 and 400 lb. drum For assistance in handling problems consu our technical staff without obligation. F complete information write us.

SOME OF THE PRODUCTS MANUFACTURED BY PENN SALT:

ACIDS, Sulphuric, Muriatic, Mixed Acids, Hydrofluoric, Hydrofluosilicic, Nitric • AMMONIA • ALUM, Sulfate of Alumina • HYDRATE OF ALUMINA • BLEACHING POWDER • AMMONIA, Anhydrous and Aqua • CARBON BISULPHIDE • CARBON TETRACHLORIDE • CAUSTIC SODA • CORROSION-RESISTING CEMENTS • LIQUID CHLORINE • FERRIC CHLORIDE • FLUORIDES AND FLUOSILICATES • HYDROGEN PEROXIDE • *KRYOLITH Flux and Opacifier • *KRYOCIDE Insecticide • *ORTHOSIL AND *PENNSALT METAL CLEANERS • SAL AMMONIAC • SODIUM ALUMINATE.

*Trade-marks Reg. U. S. Pat. Off.

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MANUFACTURING COMPANY
Chemicals

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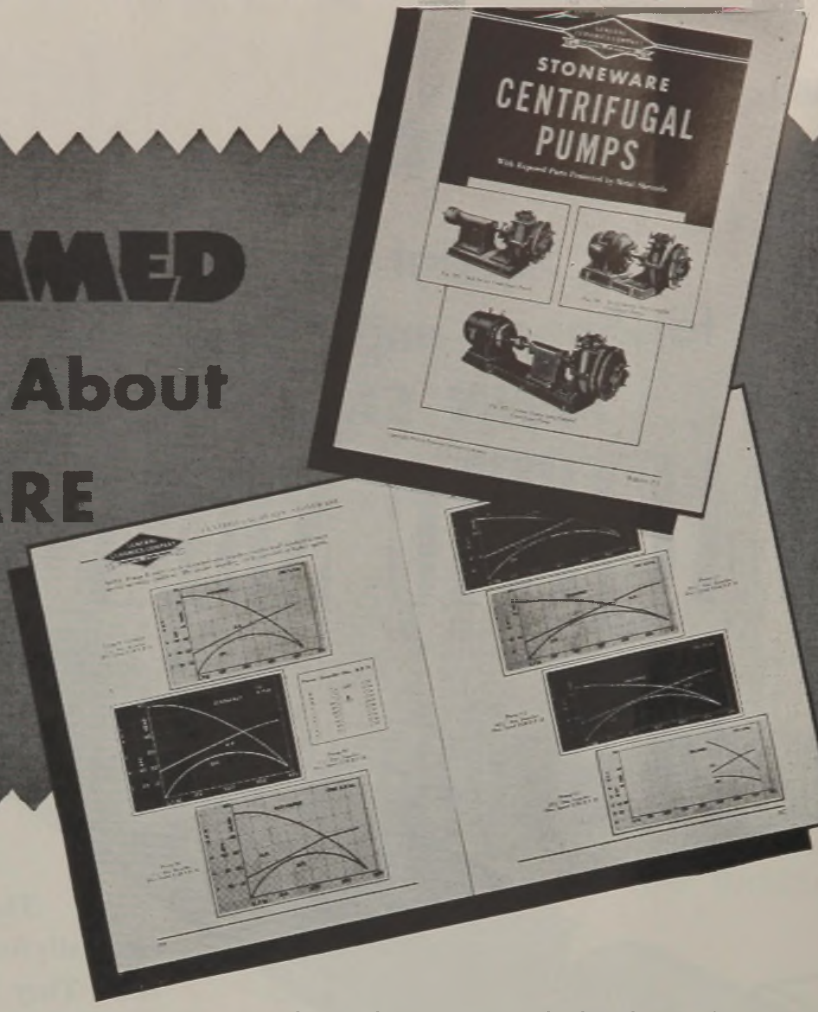
It's CRAMMED With Facts About STONEWARE PUMPS



Are you faced with the task of specifying a pump for a difficult corrosion application? Here are some FACTS to help you.

SPECIFICATIONS: Description of types manufactured and method of construction; table of capacities and sizes; testing and installation procedure.

DRAWINGS: Dimensioned drawings of assembled pumps, both belt driven and direct drive; detail drawings showing operating parts and water cooled stuffing box.

CAPACITY AND POWER CONSUMPTION: Graphs showing the characteristics of stoneware pumps at capacities varying from 5 to 750 GPM at heads up to 70 feet.

If your duties involve the handling of corrosive liquids, this new bulletin will be a valuable adjunct to your files. General Ceramics Armored Stoneware Centrifugal Pumps offer the corrosion protection which is characteristic only of stoneware and also the correct mechanical design to insure efficiency, freedom from breakdowns, and resistance to mechanical abuse. Since the "wet end" is stoneware, the liquids handled touch no metal and the pumps are admirably adapted for handling bleach solutions, strong acids, pharmaceuticals, and food products.

Send us the details of your pumping problem and ask for bulletin No. 211 on your letterhead.

General Ceramics Co.

GENERAL CERAMICS COMPANY
CHEMICAL STONEWARE

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Buffalo: 610 Jackson Bldg. • *Los Angeles:* 415 So. Central Ave. • *New York:* 30 Broad Street • *Portland:* 3019 N. E. 26th Ave. *San Francisco:* 598 Monadnock Bldg. • *Seattle:* 1411 Fourth Ave. • *Spokane:* 3219 Wellington Pl. • *Tacoma:* 702 Tacoma Bldg. *Montreal:* Canada Cement Bldg. • *Toronto:* Richardson Agencies, Ltd., 454 King St. West *Vancouver, B. C.:* Willard Equipment, Ltd., 860 Beach Ave.

GENERAL CERAMICS and STEATITE CORPORATION
High Frequency Insulation for the Electronic Industries

CARILLON CERAMICS CORPORATION
Domestic and Institutional Sanitary Ware

The manufacturing facilities of these affiliates of GENERAL CERAMICS CO. are available for handling special ceramic problems in all branches of industry. GENERAL CERAMICS CO. is thus able to offer a service covering all industrial applications of ceramic products.

Hidden Enemy Without a Chance

Within the vital parts of an aircraft engine lurks a delayed-action saboteur—CORROSION. Without constant safeguard, prior to installation and use, this hidden enemy of motors and machine parts can be deadly and destructive. Thanks to the protection of chemical inhibitors, corrosion rarely has a chance to strike.

Sharples Organic Chemicals perform an important job in the formulation and production of corrosion inhibitors for essential war purposes. In other fields and on other fronts, Sharples Chemicals serve in rubber, munitions and plastics —in petroleum, mining, pharmaceuticals and photography. Trained through the critical demands of war, Sharples Research will be better equipped than ever to serve the peacetime needs of both industry and science.

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AMYL ALCOHOLS · AMYL ACETATE
AMYL PHENOLS AND DERIVATIVES
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ALKYLAMINOETHANOLS
CHLOROPENTANES
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AMYL MERCAPTAN

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SHARPLES CHEMICALS INC.

Philadelphia *Chicago* *New York*

BUY WAR BONDS SHARPLES TRADE MARK CHEMICALS ...REGULARLY!

SHARPLES SYNTHETIC ORGANIC CHEMICALS

PENTASOL (AMYL ALCOHOLS)
PENT-ACETATE (AMYL ACETATE)
PENTALARM (AMYL MERCAPTAN)
BURAMINE (CRUDE BUTYL UREA)
PENTAPHEN (p-tert-AMYL PHENOL)
o-AMYL PHENOL
DIAMYL PHENOL
DIAMYLPHENOXY ETHANOL

MONOAMYLAMINE
MONOBUTYLAMINE
MONOETHYLAMINE
DIAMYLAMINE
DIBUTYLAMINE
DIETHYLAMINE
TRIAMYLAMINE
TRIBUTYLAMINE
TRIETHYLAMINE

DIETHYLAMINOETHANOL
ETHYL MONOETHANOLAMINE
ETHYL DIETHANOLAMINE
MIXED ETHYL ETHANOLAMINES

DIBUTYLAMINOETHANOL
BUTYL MONOETHANOLAMINE
BUTYL DIETHANOLAMINE
MIXED BUTYL ETHANOLAMINES

MIXED AMYL CHLORIDES
AMYL NAPHTHALENES
DICHLOROPENTANES
MIXED AMYLENES

SHARPLES CHEMICALS INC.

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for Your Post-War Plans

There are countless reasons why members of post-war planning committees or leaders of the Chemical Industry are saying "We must consider purification by *adsorption.*"

Early in the battle of wartime production American process industries realized that active carbon offered short cuts to many obstinate purification problems.

They found uses for active carbon that were unheard of before all-out production. The development of new products such as penicillin, atabrin, sulfa drugs and others also required large amounts of active carbon in their processing. To meet these demands the manufacturing facilities of Nuchar Active Carbon have been increased and during normal times large quantities of active carbon should be available to make your product free from impurities. Plan now to include Nuchar Active Carbon in your manufacturing process. We will be glad to discuss with you its availability in the grade and quantity you will require.

Nuchar Active Carbons ★ Abietic Acid ★ Snow Top Precipitated Calcium Carbonate ★ Liquid Caustic Soda ★ Chlorine ★ Lignin ★ Liqro Crude Tall Oil ★ Indusoil Distilled Tall Oil ★ Tall Oil Pitch ★ Sulphate Wood Turpentine

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TRACERS of light that started in the big Heekin factories in Cincinnati carry direct to the target. In between these tiny beams of light are bullets that find their target. The Heekin Can Company, famous for its beautifully lithographed metal packages for peace time merchandise, now produces a remarkable assortment of war time needs for the men in the service . . . for export . . . for lend lease. But we are not so busy that we do not look forward to renewing pleasant relations with the old peace time customers of the Heekin Can Company and welcoming new ones after we win the war. The Heekin Can Company, Cincinnati, Ohio.

HEEKIN *Lithographed Cans* WITH HARMONIZED COLORS

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FREE BOOK HELPS KEEP EXTINGUISHERS READY FOR ACTION

You'll be prepared to nip fires quickly at your plant only if your *extinguishers* are ready. And that calls for periodic examination.

To make it easy for you to set up a maintenance system, Walter Kidde & Company has issued a booklet—"INSPECTION AND MAINTENANCE OF FIRST AID FIRE EXTINGUISHERS." It covers every type of equipment, tells where to locate them, how to mark them for quick identification, what to check, how and when to recharge. It suggests forms for keeping records. Write for your free copy today!

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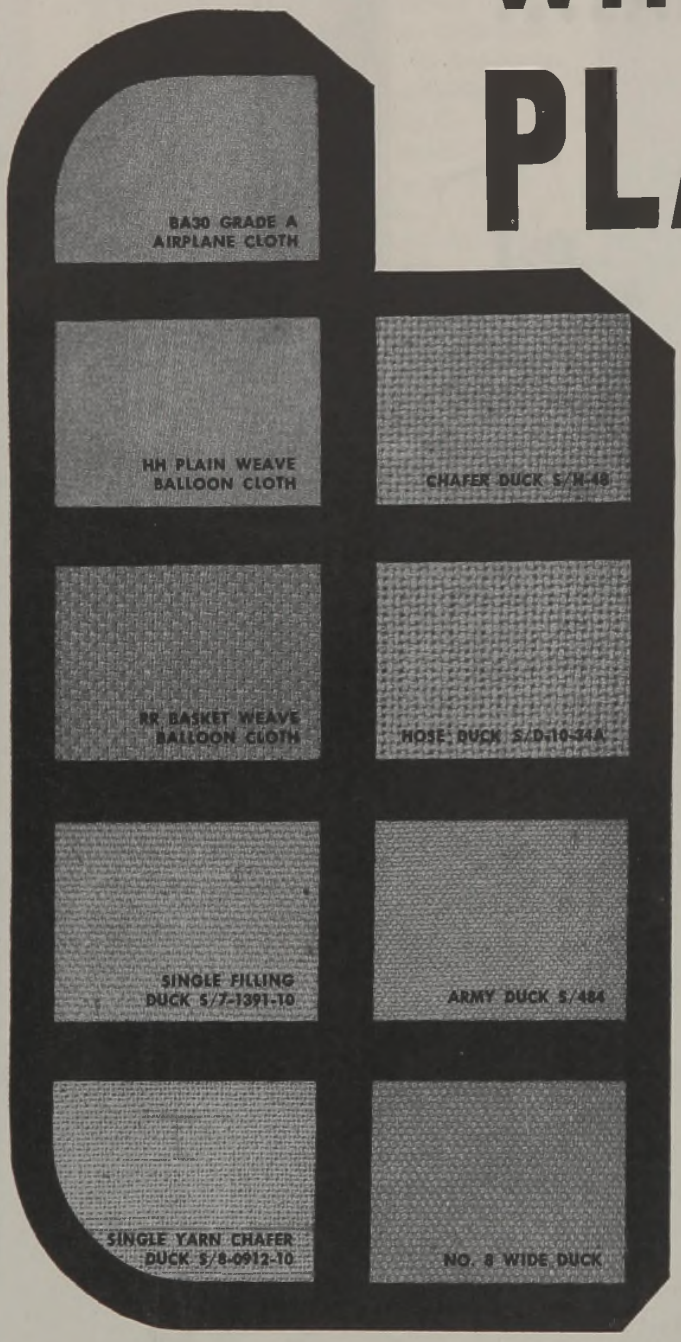
WORKING WITH PLASTICS?



Many of our 25,000 different fabrics are of special interest to those who manufacture plastics or are working on a product for which a fabric base is required.

Our technical knowledge of fabrics, and our facilities for textile research may be of great value to you and may help you speed your production schedule. Shown are only a few of our wide range of fabrics of interest to plastic manufacturers. And, since plastics are coming into constantly greater importance, we are keeping abreast of their progress with a steadily enlarged line of fabrics for the plastics industry.

We represent eighteen mills and maintain the finest textile research laboratories. Our technical staff is constantly working on the development of new fabrics for special purposes. We shall be glad to study your individual needs in order to provide the proper fabric for any specific product.

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From One of Chemistry's First Families

These are the Amines we supply in commercial quantities:

Ethylenediamine
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Triethylenetetramine
Tetraethylenepentamine
Propylenediamine

Monoethanolamine
Diethanolamine
Triethanolamine
Methyldiethanolamine
Diethylethanolamine
Aminoethylethanolamine
Phenylethanolamine
Phenyldiethanolamine
Ethylphenylethanolamine
Triisopropanolamine
Tetraethanolammonium Hydroxide

Butylamine
Diethylhexylamine

Acetoacetanilide
Chloracetoacetanilide
Dichloracetoacetanilide
Acetoacet-o-toluidide

Morpholine
Thialdine
Phenylmethylpyrazolone

THE Amine family of chemicals is one of the largest produced by Carbide and Carbon Chemicals Corporation. Twenty-five Amines are supplied in commercial quantities, and more than twenty others in research quantities. The family is so useful that many of its members are now restricted to essential work.

Present industrial applications of the Amines arise primarily from their ability to neutralize acids. They serve as corrosion inhibitors in special lubricating oils, metal-cleaning compounds, carbon-removers, and slushing compounds for engines. Certain Amines purify the gases in plants making toluene, high-octane gasoline, aluminum, magnesium, and synthetic rubber.

Amine soaps are employed as emulsifying agents in polishes, camouflage paints, and textile specialties. Amines are also used in the production of dyestuffs, pigments, cement addition agents, rubber chemicals, and certain pharmaceuticals.

The research and development work done by Carbide and Carbon Chemicals Corporation with Amines has been repeated with the other families of aliphatic chemicals. Building with atoms and molecules, our chemists and engineers have synthesized many new chemicals, and have produced many others commercially for the first time.

Today we are producing more than 160 synthetic organic chemicals in commercial quantities. After the war these chemicals will be available for greater use by industry than ever before . . . and many new compounds with them.

BUY UNITED STATES WAR BONDS AND STAMPS

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Unit of Union Carbide and Carbon Corporation

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Today, many of the most successful industrial and research laboratories employ RCA Electron Microscopes in solving vitally important problems—problems relating to the processing and use of metals, chemicals, ceramics, plastics, synthetic rubbers, textiles and petroleum products—to name just a few.

Equally noteworthy is the fact that several industries at present are using this equipment for purposes of production or quality control. This is an application of the Electron Microscope which should be considered by every industry in which size or shape of small particles or fine details of surface structure are important in processing or manufacturing.

To further enlarge its utility and convenience to science and industry two new models of the RCA Electron Microscope are now offered. These new instruments . . . one a compact desk model, the other a de luxe Universal model incorporating an electron diffraction camera . . . are described in a bulletin "The RCA Electron Microscope." The coupon below will bring you this bulletin by return mail. Fill it out *now*.

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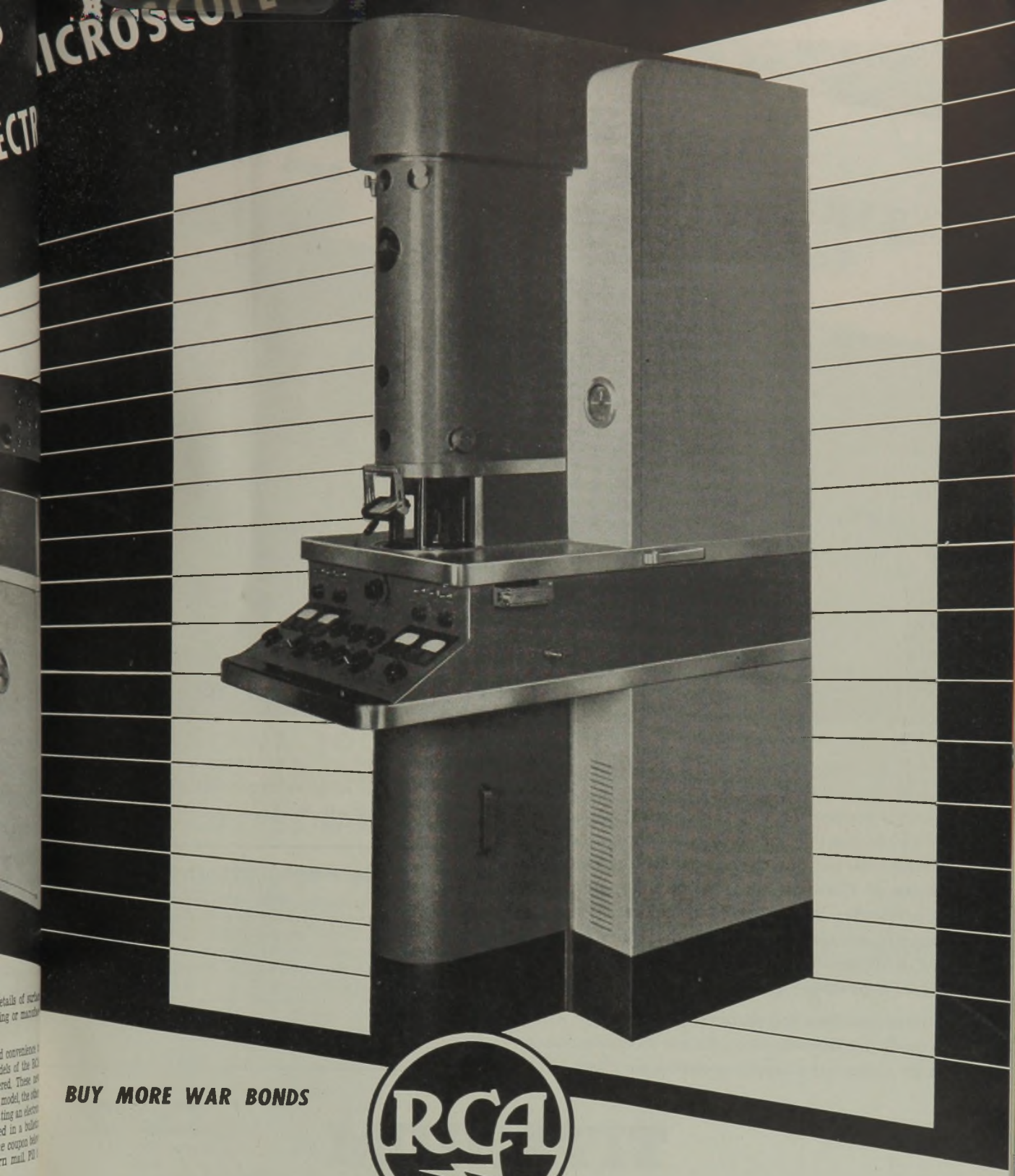

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For temperatures up to 3500° F and 4500° F

TAM Zircon crucibles are finding wide application for various high temperature applications up to 3500° in non-ferrous melting such as aluminum, platinum, etc. These Zircon crucibles not only resist various acid and alloy reactions, but due to the straight line expansion coefficient of Zircon, exhibit exceptionally good heat shock properties. Refractory bonds consisting of other compounds are not necessary in the manufacture of TAM Zircon crucibles thereby assuring the user of a pure Zircon product.

TAM small crucibles and shapes of semi-vitreous Zirconium oxide are manufactured for use in quartz fusions and high temperature applications up to 4500° F.

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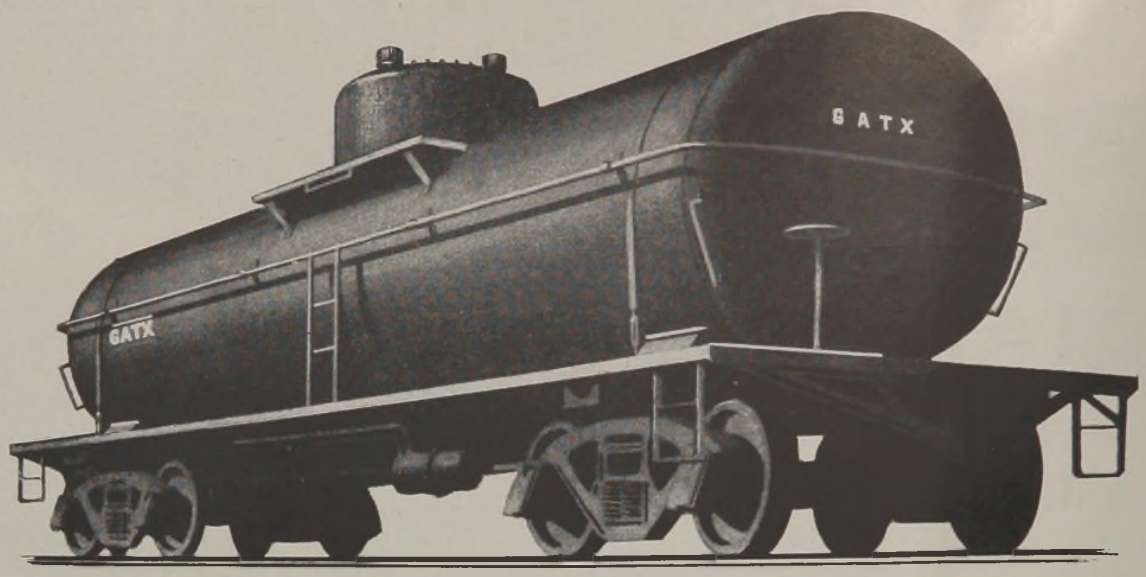

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General American engineers are ready now to consult with you—to plan new tank cars with every feature needed to transport your new products safely. Call or write our main office—135 South LaSalle St., Chicago 90, Ill.

GATX
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General American tank cars keep rolling thes days. They speed gasolines for fighters; lubr cants for industries; explosives, synthetics, ed ble oil, and many other war materials.

Their proven dependability and safety are im portant to you, planning for the years ahead Your postwar products—liquid or gas—may b "hard-to-handle", requiring new types of lining or coatings—special cars unknown today. W will design the highly specialized cars you nee —and build into them the proven reliability o all General American tank cars.

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there never was a substitute for the real thing~

Regardless of war restrictions and shortages, there never was a substitute for HARDESTY products. When the government allocated Red Oil (oleic acid) some consumers were forced to use replacement material. Now that all Red Oil can be sold freely, HARDESTY customers are again being supplied with both distilled and saponified Red Oils in a wide range of specifications. If you manufacture a product in which Red Oil is used, send for samples and specifications of the various grades we are now producing. HARDESTY also manufactures many other interesting products with unusual characteristics. Write for complete information.

Stearic Acid
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Hundreds of thousands of yards of surgical adhesive tape are being used by our armed forces to top dress a hundred and one minor and major wounds, cuts, scratches.

Into the manufacture of this vast yardage of adhesive tape go great quantities of Lanolin USP. That's why Lanolin USP and other grades of Lanolin, Degras and Wool Grease have been placed on allocation . . . to make sure war needs are met first.

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.

Lanolin and Wool Greases Help Fight for Victory

BUY WAR BONDS

and support the fight

MALMSTROM NIMCO BRAND LANOLIN

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LANOLIN • Anhydrous U.S.P. • Hydrous U.S.P. • Absorption Base • Technical

DEGRAS • Neutral and Common • Wool Greases

147 LOMBARDY STREET • BROOKLYN, NEW YORK

These members of the Hooker chemicals family may be the ones you're looking for

THE Hooker family of chemicals is continually growing. Listed here are a few—some new—some old—all of which have already proved their value in one or more uses. A study of their properties may reveal to you a possible use in solving your problems. All are available for prompt delivery now.

HOOKER CATALYSTS

Aluminum Chloride, Anhydrous, $AlCl_3$

Molecular Wt. 133.3
Solubility: Gms/100 gms
Nitrobenzene . . . . . 26.6 at 20°C
Orthochlornitrobenzene . . . . . 22.6 at 20°C
Heat of solution . . 550 small calories/gram minimum
DESCRIPTION: Gray crystalline solid.
ANALYSIS: Aluminum Chloride . . . . . 99% Min.
Iron . . . . . 0.1% Max.

USES: As a catalyst for Friedel-Crafts reactions; polymerization, isomerization, halogenation in petroleum and rubber industry. Also used in dye making, photographic chemicals and pharmaceuticals.

Antimony Trichloride, Anhydrous, $SbCl_3$

Molecular Wt. 228.1
Melting Point °C 73.4
Solubility: Gms/100 gms
Benzene . . . . . 30.5 at 20°C
Monochlorbenzene . . . . . 56 at 20°C
DESCRIPTION: Yellowish solid.
ANALYSIS: Antimony Trichloride . . . . . 99% Min.
Iron and Arsenic . . . . . 1% Max.
Lead 0%

USES: As catalysts in manufacture of dyes, pharmaceuticals; intermediate in manufacture of antimony salts; a mordant in textile printing; moisture and fireproofing textiles.

HOOKER INTERMEDIATES

Benzoyl Chloride, (Benzenecarbonyl Chloride), C_6H_5COCl

Molecular Wt. 140.5
Min. Freezing Point °C . . . . . −0.9
DESCRIPTION: Water clear liquid. Soluble in ether, reacts with alcohol and water.

USES: Highly active source of benzoyl group; manufacture of benzoyl peroxide, benzophenone, benzyl benzoates, other esters and ketones.
Other Hooker Benzoyl intermediates include *Benzoic Acid* and *Benzoate of Soda*.

HOOKER SOLVENTS

Monochlortoluene (Methyl Chlorbenzene), $C_6H_4ClCH_3$

Molecular Wt. 126.5
Boiling Range °C . . . . . 158 to 163
Solubility: Water . . . . . Insoluble
Ether . . . . . Infinitely soluble
DESCRIPTION: Colorless liquid, consisting of approximately 60% orthochlortoluene and 40% parachlortoluene.

USES: Solvent for rubber and synthetic resins; manufacture of rubber chemicals; intermediate for other organic chemicals.

Orthodichlorbenzene (1:2 Dichlorbenzene), $C_6H_4Cl_2$ (Tech)

Molecular Wt. 147
Boiling Range °C . . . . . 170 to 180
Freezing Point °C . . . . . −10
Solubility: Water . . . . . Insoluble
Alcohol . . . . . Infinitely soluble
Ether . . . . . Infinitely soluble

USES
1. Solvent for: natural and synthetic gums, resins, tars, rubbers, greases, oils, fats, asphalts, sulfur.
2. Insecticide for: termites, powder post beetles, flies, bedbugs, roaches, wood borers, midges, barnacles, etc.
3. Ingredient of: metal polishes, paint and varnish removers, tar removers.
4. Manufacturer of: pyrocatechin, dye intermediates, other synthetic organic chemicals.
5. Degreasing: metals, leather, hides, wool.

Further information on Hooker Chemicals will be furnished gladly. If you are looking for a chemical to solve a particular problem, perhaps our technical staff can help you find it among Hooker's many other products.

HOOKER CHEMICALS

HOOKER ELECTROCHEMICAL COMPANY

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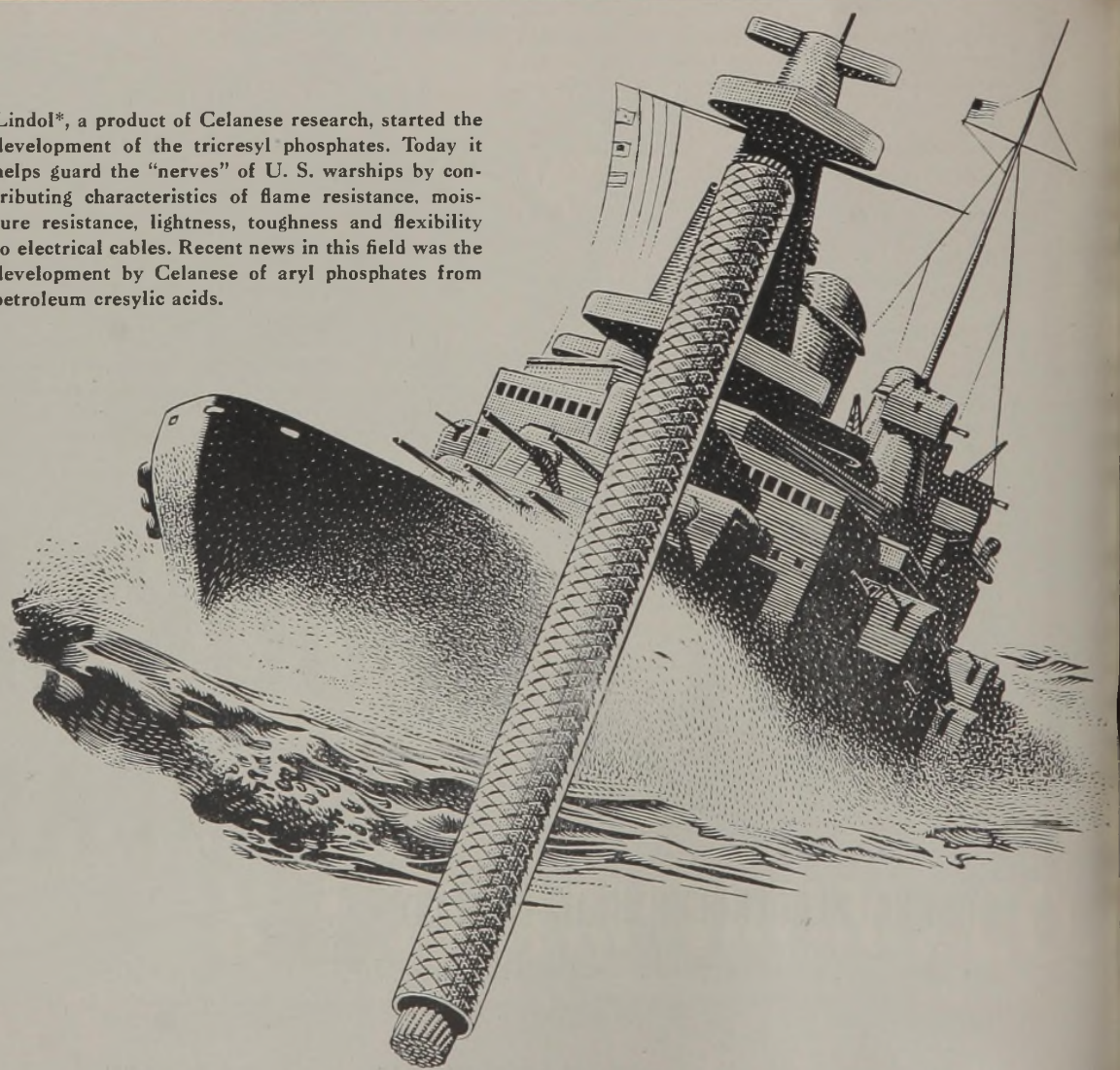
ARMY E NAVY

CAUSTIC SODA | CHLORINE | MURIATIC ACID
PARADICHLORBENZENE | SODIUM SULFHYDRATE | SODIUM SULFIDE

Celanese* Chemicals

Lindol*, a product of Celanese research, started the development of the tricresyl phosphates. Today it helps guard the "nerves" of U. S. warships by contributing characteristics of flame resistance, moisture resistance, lightness, toughness and flexibility to electrical cables. Recent news in this field was the development by Celanese of aryl phosphates from petroleum cresylic acids.



CELANESE CORPORATION OF AMERICA

Possibly you haven't thought of Celanese as a major producer of chemicals

NOR WOULD IT be surprising, for the name, Celanese, as had almost universal association with plastics nd synthetic textiles. Yet these are only two of the asic divisions of Celanese Corporation of America. A third and important division is chemicals.

Chemicals—particularly the specialized and more omplex products of modern chemistry—have long een a major part of our operations. This is only atural, for the entire field of synthetics, from tex- les to plastics, is after all a business of chemistry.

But fully as important as Celanese productive acilities, now being expanded for new products, is he Company's attitude towards *hemical research* and *product de- elopment*. It is a point of view, acked by performance, that has roved of immense value to our ustomers.

It is the willingness and the bility to approach problems from he customer's side of the desk . . . to consider no formula as final or finished . . . no improvement as impossible . . . no product as finally set.

Often the result is obtained merely by variations in a given formula to emphasize a desired characteristic. Sometimes it involves a wholly new concept. In all cases, it means fitting just the right chemical properties to the user's needs instead of adjusting the needs to the chemical. Its goal is precision—not adequacy.

This research attitude is more than a general policy. It is real and instinctive with virtually everyone in the Celanese organization. And by every right, it should be—for it is one of the basic qualifications demanded by the great and flexible science of synthetics.

PLASTICIZERS

ORGANIC PHOSPHATES

LUBRICANT ADDITIVES

INTERMEDIATES

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Celanese Chemical Corporation, a division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

*Reg. U. S. Pat. Off.

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When almost *isn't enough*

"Wheels down . . . hook down," the observer reports. Now the landing signal officer's gaze narrows as he watches the incoming plane. Arms aloft, he signals the pilot lower, seconds later motions an over-correction. At the last possible moment he waves the plane in and dives for the protection of his net. Bringing a fighter plane to a safe carrier landing is an exacting task—to be almost right isn't enough.

Nor is it enough for Columbia chemicals to be "almost right." As basic ingredients, as essential agents in the conversion of raw materials, or in intermediate and finishing processes, their part is vital in a host of products necessary in war and peace. Smooth, uninterrupted production and the maintenance of product standards are dependent on chemicals which conform to specifications.

This is why Columbia safeguards the interests of its customers by using every care to assure chemicals which meet their exact requirements.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING, PITTSBURGH 19, PENNSYLVANIA

Chicago • • • Boston • • • St. Louis • • • Pittsburgh • • • New York • • • Cincinnati
Cleveland • • • Minneapolis • • • Philadelphia • • • Charlotte

COLUMBIA SPOTLIGHT

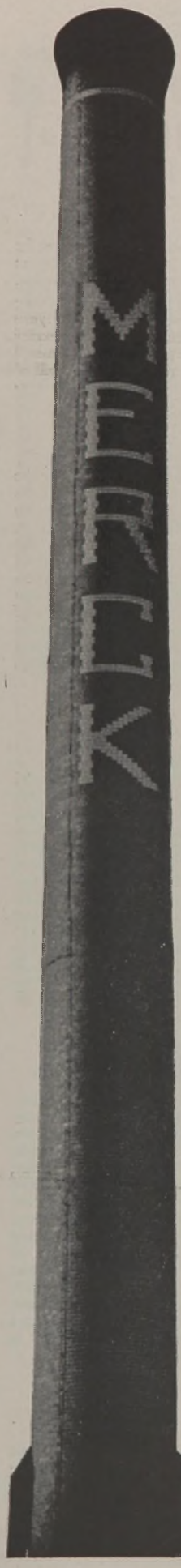
"ALLYMER" is the new trade name for the entire line of Allyl Resin Monomers formerly referred to as Columbia Resins. The same identifying numbers—C.R. 39, C.R. 149—will continue to be used to designate types of Allymer. The first bulletins of a series describing various types and phases of Allymer have already been released. Others will soon follow.

COLUMBIA'S patented process for the purification of diaphragm cell electrolytic Caustic Soda has been an important contribution to various industrial operations, notably in the manufacture of rayon. The use of this high quality 73% NaOH concentration is expanding—four commercial installations for its production having been made in different parts of the country. After the war, it is quite likely that this expansion will continue as other users take advantage of this high quality Liquid Caustic Soda.

THE TRACTOR is virtually a symbol of the agricultural mechanization which is so important to the nation. And Columbia Calcium Chloride—that chemical of such varied usefulness—is helping to increase the efficiency of thousands of tractors. Those big tractor tires, when weighted with a Calcium Chloride solution, provide increased traction and smoother riding qualities. The "CCC" solution is as much as 25% heavier than plain water . . . is doubly valuable because it won't freeze, eliminating the necessity of draining tires in winter.

SALT, of inestimable value to mankind, has been significantly involved in the history of the world. The salt of Palmyra was an important element in the trade between the Syrian ports and the Persian Gulf. Other great salt deposits have been vital in the commerce which enabled many nations to rise to eminence. And today, at least 10 billion pounds are being used annually in the manufacture of chemicals that are helping to win the war . . . to stamp out the menace which threatens our civilization. Columbia salt deposits being converted into essential chemicals are an important factor in meeting these wartime requirements.

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.



yes, MERCK is MAKING

"DDT"

(dichloro-diphenyl-trichloroethane)

the Remarkably Effective Insecticide

BUT OUR PRESENT LARGE-SCALE PRODUCTION IS EXCLUSIVELY FOR THE ARMED FORCES

Early this year, at the request of the Government, Merck & Co., Inc. began expanding its facilities for increasing tonnage production of the powerful insecticide known as "DDT" which now is being used by the Armed Forces to protect them from Typhus fever, an infectious disease caused by the bite of the typhus-infected body louse.

Used by the Army Medical Department on a mass scale in the North African and Italian campaigns, "DDT" proved more effective against body lice than any insecticide previously employed. Dusted into the clothing in the form of a powder, a single application provides anti-louse protection for a month.

Chemically known as dichloro-diphenyl-trichloroethane, "DDT" also is highly effective against flies and other insects which are a menace to humans, animals, and plants, and thus has numerous possibilities for postwar use in various fields.

Although Merck has, for many years, been producing one of the basic chemicals now employed in making "DDT," our total production of this powerful insecticide will, for the present, be devoted exclusively to the Army and Navy.

Until further notice, and because our entire supplies are controlled by the War Production Board, we are unable to accept direct orders for "DDT" from our regular or potential customers. However, when we are in a position to do so, we will advise you accordingly and gladly cooperate with you in developing practical uses for this very promising product.

MERCK & CO., Inc. RAHWAY, N. J.

Manufacturing Chemists

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SHELL CHEMICAL helps keep him dry

Methyl ethyl ketone is the solvent for vinylite resins which waterproof Army raincoats. Shell's ammonia fights on both war and food fronts. Every product on our list is doing an important war job.

OFFICIAL U.S. NAVY PHOTOGRAPH

ISN'T IT LOGICAL that our products which are doing so many jobs for war industry today may be useful in the products you are planning right now for peace? We will welcome inquiries regarding any of them, even though at present they are all on allocation.

When war came, SHELL CHEMICAL was ready with many products vital to the national welfare. We will also be ready to supply your requirements when peace is here again.

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Butadiene
Acetone
Diacetone
Isopropyl Alcohol
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"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

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The chipped teacup of the PATRIOTIC Mrs. Jones

No matter who the guest—Mrs. Jones brings out her chipped teacup with no embarrassment. On the contrary, with a thrill of pride.

Not very pretty, that chip. But it bears witness to the fact that Mrs. Jones has her nation's welfare at heart.

Mrs. Jones has given up all unnecessary spending for the duration. By doing *without* —she is helping to fight inflation.

Maybe she doesn't know all the complicated theories about inflation. But she does know that her government has asked her *not to spend.*

So Mrs. Jones is making all the old things do . . . not only that teacup. She's wearing her clothes for another year—and another. She's not competing with her neighbors for merchandise of any sort.

And the dollars she's not spending now are safely put away (and earning interest) for the peacetime years ahead. *Then* those dollars will buy things that can't be had for any price today.

If we all are like Mrs. Jones, there will be no inflation with skyrocket prices. If we all are like her, dangerous Black Markets cannot exist.

A chipped teacup stands for all that . . . for a *sound, secure* U. S. A.

7 RULES FOR PATRIOTIC AMERICANS TO REMEMBER EVERY DAY

1. Buy only what you *absolutely need.* Make the article you have last longer by proper care. Avoid waste.

2. Pay no more than ceiling prices. Buy rationed goods only by exchanging stamps. (Rationing and ceiling prices are for *your protection.*)

3. Pay willingly any taxes that your country needs. (They are the cheapest way of paying for the war.)

4. Pay off your old debts—avoid making new ones.

5. Don't ask more money for the goods you sell or for the work you do. Higher prices come out of everybody's pocket—including *yours.*

6. Establish and maintain a savings account; maintain adequate life insurance.

7. Buy all the War Bonds you can—and hold 'em!

HELP US KEEP PRICES DOWN

Use it up . . . Wear it out . . . Make it do . . . Or do without

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

Peacetime Markets

Editorial

by ROBERT L. TAYLOR, editor

WHAT WILL BE THE MARKET PICTURE for chemicals after the war? To what extent will old markets come back? Will prewar preferences still hold? Which new war babies will be able to withstand the competition when old-line materials become plentiful again? What are going to be the needs for entirely new materials to do new jobs? What chemical-consuming fields appear to be headed for the greatest postwar activity?

These and countless similar questions already occupy a high place in the management thinking of most chemical concerns. They represent problems that individual members of the industry soon will be facing in earnest, and they will be just as real and just as important as the somewhat different problems of the last four years.

FORTUNATELY, THE CHANGEOVER to peacetime operations will not be as difficult for a basic industry like chemicals as for one which must switch back to a product that was discontinued during the war. By the same token, however, chemical producers will face problems that some of the less basic industries will not have to concern themselves with until later—problems such as inventories and stockpiles, production facilities that are greatly over expanded by peacetime standards, and a tighter competitive situation generally.

In other words chemical industry—principally that major part represented by products sold to other industries and not directly to the public—will encounter sales problems immediately upon the coming of large-scale termination of war contracts. Unlike consumer goods, industrial chemicals will not have an unlimited and insatiable market awaiting them. Their market will be limited by the capacities of customer plants to consume chemicals, and it would be foolish indeed to assume that even the best level of chemicals consumption in the years immediately following the war will approach the wartime peak. Of course some new products will far exceed it, but important as they may turn out to be they can hardly be counted upon to carry the major burden for very many producers.

The end of the war, therefore, will bring an immediate shift of emphasis on the part of chemical industry from problems of production to problems of selling. The principal attention of management will once again be focused on sales and distribution methods, and evaluation of markets and products. The job to be done will be more than a mere picking up from where things left off in 1941. It will require a whole new appraisal of markets and outlooks, a complete re-evaluation of objectives and opportunities in the light of a world that will, it is true, be licking its wounds after a long war, but at the same time will be filled with new ambitions and new wants.

IN AN EFFORT TO PROVIDE its readers with some basic information on the postwar market prospects for industrial chemicals in various specific fields, CHEMICAL INDUSTRIES this month presents the first of a continuing series of articles on "Peacetime Markets for Chemicals."

This first article presents the broad overall outlook for chemical markets as seen by Francis J. Curtis, vice-president of Monsanto Chemical Company. It discusses such things as the relationship of demand for chemicals to general levels of purchasing power and national income, the effect of unfilled public needs and accumulated wants on postwar consumption of chemicals, and finally some of the important contingent factors in the scene.

Succeeding articles will discuss the outlook for consumption of chemicals in the most important user industries, such as textiles, rubber, soap, petroleum refining, glass, food, drugs and cosmetics, and others of similar stature. Changes brought on by the war will mean drastic revisions in the chemical requirements of some of these industries as compared with their prewar needs.

Although some of the ablest and best informed men in the industries concerned are preparing the articles for this series, it will naturally be impossible for them to anticipate—let alone answer—all of the questions that may be in the minds of readers. But that need not detract from the value of the studies as providers of basic information on postwar chemical markets. Indeed, the editors believe that the series will be one of the most helpful contributions to postwar planning in the chemical industry that could be made at this time, and it is with sincere gratitude that they express their appreciation to the men who will make it possible and whose names you will see on the individual articles as they appear from month to month.

Research for Preparedness

WHAT MAY BE A HISTORY-MAKING MOVE "to keep America not abreast but ahead of the rest of the world" in the application of the latest discoveries of science to national defense, was gotten under way last month when the Secretaries of War and Navy jointly appointed a Committee on Postwar Research charged with the job of establishing a permanent peacetime counterpart of the wartime Office of Scientific Research and Development. At this writing, plans for the new agency have not been worked out in detail, but reports indicate that it will be governed by a top board of leading scientific men of the nation, including representatives of the Army and Navy. It would initiate and direct research along lines having to do with military preparedness. The work itself would be done in government, university or private laboratories and would be government-financed.

There has, of course, been provision for scientific research on military projects in the past, but the work has been solely under the direction of the Army and Navy. Civilian experts have been called in only as required in the judgment of the military agencies.

Under the new arrangement, with civilians accepting part of the responsibility, there presumably will be much closer liaison between Army and Navy laboratories and those of private industry and the colleges. It is in this direction that the principal value of the board of civilian experts should lie. There should be no fear on the part of private laboratories in giving the cooperation required provided assurance is received, as it surely will be, that confidential information will be fully protected as such. The project is one that deserves the support of industry and the nation.

Engineering in Selling

THE PREDICTION HAS BEEN MADE by Fenton B. Turck and William E. Hill, management engineering consultants, that there will be 8,000 potential jobs for engineers in distribution after the war.

The application of engineering training and principles to problems of distribution, especially where industrial products are involved, has been advocated before on these pages. We are heartily in accord with the idea. But we believe also that it is one of those things that must be approached with discretion.

Both chemical company managements who are thinking about postwar sales department organization and technical men interested in trying their hand at distribution work should remember that it takes more than a good technical brain to sell chemicals or chemical plant equipment or most other things for that matter. A degree in engineering or chemistry still cannot supplant entirely the flare for selling that has been the distinguishing mark of every outstandingly successful salesman in industrial history. However, that man who can offer a good technical background in addition to a natural aptitude for the science of "making friends and influencing people [illegible] one sales manager called the best definition of salesmanship he had ever heard—will find no greater satisfaction or reward anywhere than in the great opportunities that lie ahead in the field of distribution.

Value Received

THERE IS NOW AT LEAST ONE CASE on the record where the taxpayer seems to have received full value for his money.

Representative Engel of Michigan, who presented before the House last month his report on the wartime explosives industry, had this to say about the 58 government-owned, company-operated explosives, shell-loading and chemical plants, 22 of which he visited personally to gather information and statistics:

Since 1940 we have constructed in this country 58 modern powder plants costing nearly $2½ billion.

A new method for making TNT was introduced which increased production from 33,000 lbs. per line per day to as high as 100,000 lbs. per line per day. The cost of making TNT during World War I ran from 26¢ to 55¢ per lb.; in this war it started at 29¢, is now 7¢.

In April 1941, 7.61 gals. of alcohol were required for 100 lbs. of smokeless powder; today the same amount of powder is produced with 1.9 gals. of alcohol. Smokeless powder cost 41¢ to 62¢ a lb. during World War I; it is now being made for 17¢ to 26¢ a lb.

Costs have been reduced in Government-owned privately-operated chemical plants as follows:

	1942	1943
Anhydrous ammonia, per ton	$39.60	$28.80
Dimethylaniline, per lb.	.196	.109
Dinitrotoluene, per lb.	.097	.062
Diphenylamine, per lb.	.246	.175
Toluene, per gal.	.304	.191

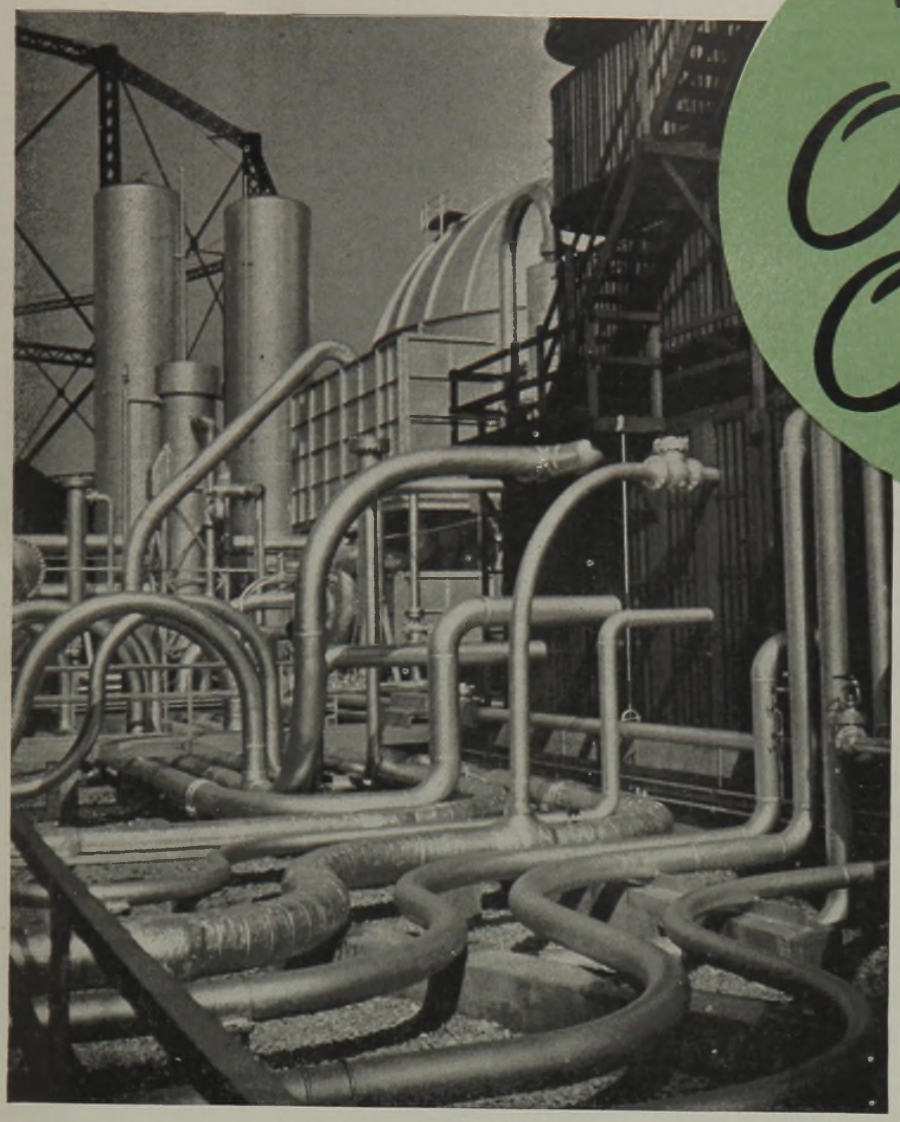
Representative Engel cited as reasons for these and other reduced costs: (1) excellent quality of contractors selected; (2) free exchange of information between plants; (3) continuous analysis of costs by Field Director of Ammunition Plants; (4) high quality of personnel; (5) effective cooperation of industry with the War Department.

This is a record that all concerned in our wartime explosives program can well be proud of. We would like to go a little further than Representative Engel, however, in assigning the credit for these impressive economies in manpower and materials. They are not exactly, as the chronology indicates, savings made over a four-year period. They are savings that started a good many years before—when a young chemical company was struggling to get on its feet—when a young man started a career in chemistry because he saw opportunity in the chemical field—when a research group bent to the task of redesigning a process in order to increase a profit or lower a price. It is just possible that the American way of doing things may have had something to do with the showing made in the explosives industry report.

Peacetime Markets for CHEMICALS

THE Over-all Outlook

by FRANCIS J. CURTIS
Vice President
Monsanto Chemical Company

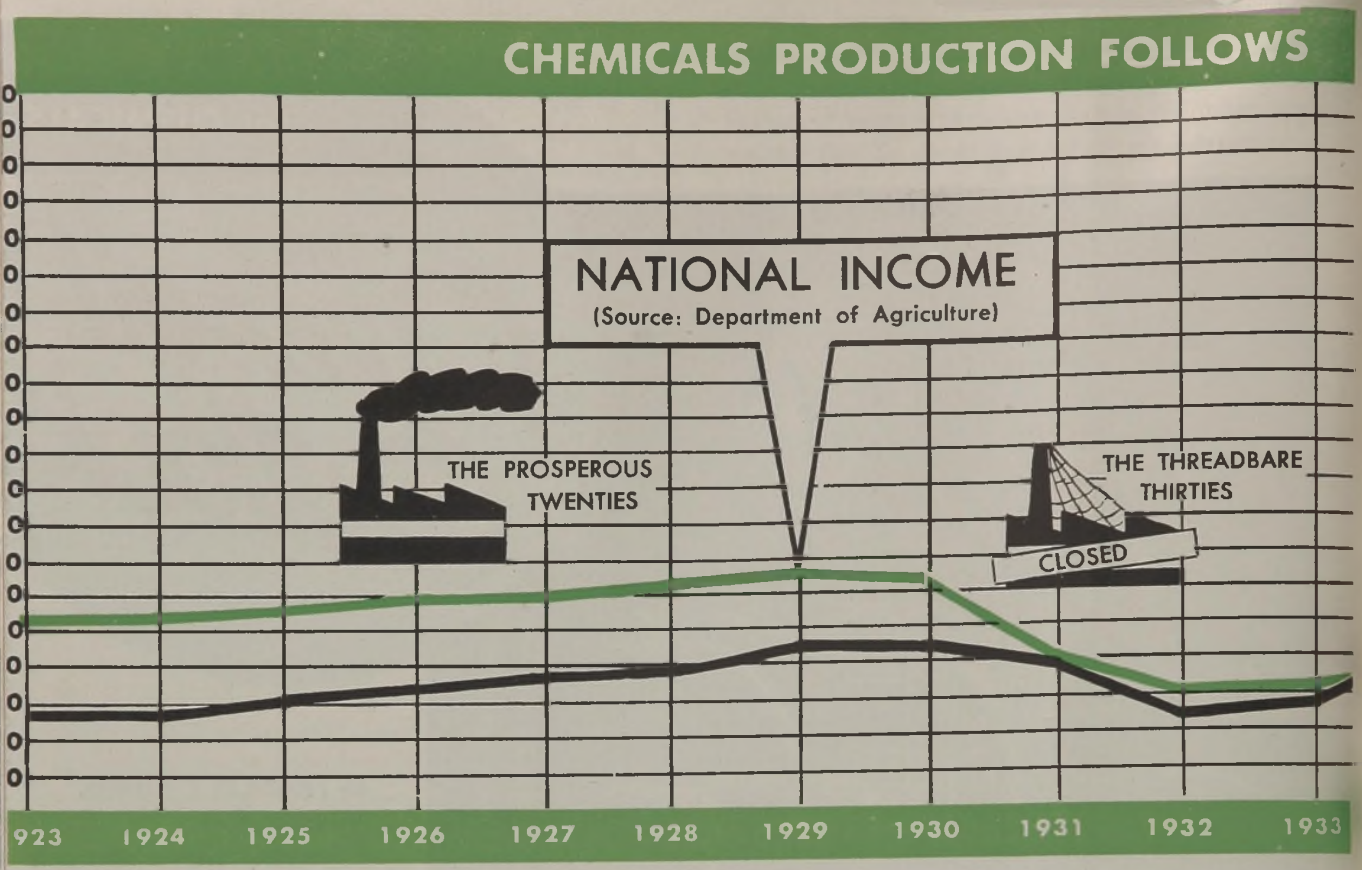


New industries and the evolution of old ones mean major changes in the prewar pattern of civilian markets for chemicals.

The postwar performance of individual chemicals and chemical-consuming industries will be conditioned to a large degree by overall economic, social, and technological trends that are becoming more and more discernible as the war nears its climax. Thus it is appropriate that this first article in Chemical Industries' new series on "Peacetime Markets for Chemicals" should concern itself with the overall picture. Next month Douglas G. Woolf, executive vice-president of the Textile Research Institute, will discuss "Postwar Textile Industry as a Consumer of Chemicals."

FEW WOULD deny the outstanding job accomplished by the production forces of the United States during the last four war years. To a constantly increasing extent, and in late years to an amount of over 50%, this increased production has been absorbed by one insatiable customer—War, who has, for the time being, the ability to pay. As we revert slowly to peace conditions, more and more we will be concerned with increasing numbers of customers and variability in the ability to pay. The great emphasis on production will not be entirely removed because our development has been necessarily lopsided, but will be joined and possibly surpassed by an equally great or greater emphasis on the problems of distribution.

In attacking this problem, we can work from two points of view: first, the usual one of studying for what uses we can sell a given chemical; and, second, what chemicals we can sell to a given industry. In the first case we may know what we can make but not what



we can do with it, and, if we cannot find anything to do with it, we have to go out of that particular business. In the second case, we find out what we can dispose of, and our problem becomes one of producing, in which field we are particularly skilled.

CHEMICAL INDUSTRIES presents here the first of a series of articles on "Peacetime Markets for Chemicals," in which will be given a fairly detailed study of postwar market potentials for chemicals in each of the major chemical consuming industries. These individual studies will include such things as data on prewar chemical consumption, major war tonnages in the industry that have affected its consumption of chemicals, the general postwar outlook for the industry, and technological changes—either already taking place or in prospect—that may have an effect on chemicals consumption. Such a series of studies must give consideration to the over-all conditions: What do we see? What must we have?

Significance of the Over-All Picture

No man or industry lives by himself or itself alone. He or it is profoundly affected by the surrounding conditions. In this country there is not much that we cannot have, but what we will have is a very different thing. We have heard much of recent years of the idea that we have entered upon a period of "mature" economy. If we believe this conception to be true for the United States of America, there is no use in continuing with this article.

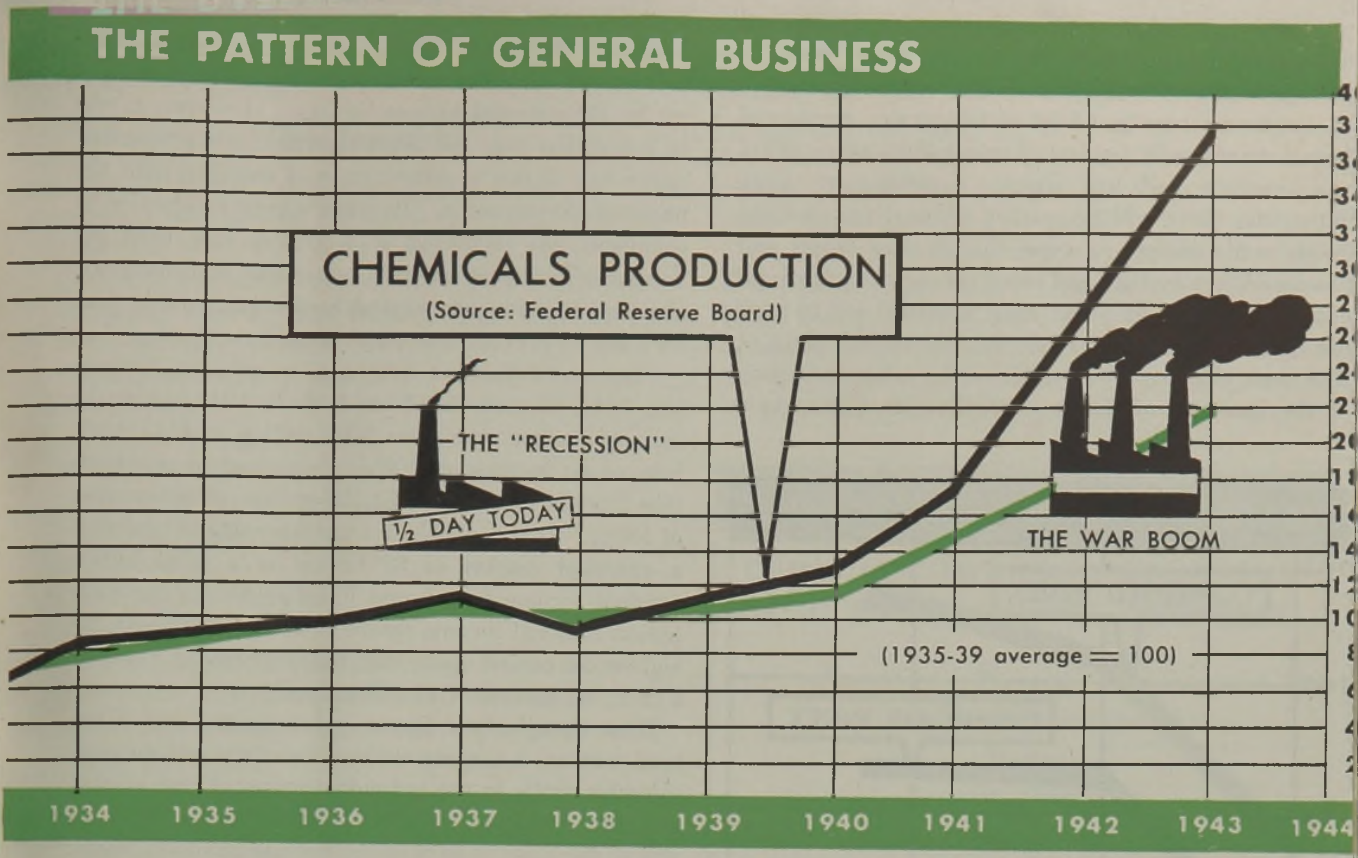
If, on the other hand, we take the point of view that the United States of America is not all washed up, then maybe our faith plus our works will move a mountain or two, and our expanding economy will continue. Our frontiers are within us. No one can truthfully say that all human wants have ever been completely satisfied, though naturally individuals vary in their degree of discontent.

A corollary of the diffusion of the "washed up" economy thought is the predatory struggle of various groups to get a bigger share of the supposedly static quantities of satisfactions available. If we are to have not the washed-up economy but the expanding one, we can only do so under conditions whereby the individual can produce more and more and in turn receive more and more in proportion to his contribution, whatever that may be. If any one segment is not sufficiently rewarded the whole edifice creaks.

Business Climate

The above is obviously an ideal, possibly like a geometric limit to be constantly approached and never completely attained. The present work force may be estimated as follows, in millions of workers:

Total	63.0
Unemployed	1.0
Agriculture	10.5
Forestry, Fishing and Mining	1.3
Manufacturing	18.0
Construction, Transportation, and Utilities	5.0
Trade, Distribution and Finance	7.1
Professional Service and Government	9.1
Army and Navy	11.0



Our chief concern is with the industrial segment because that is the group in which most of us are placed and, although all the sections of the working force are dependent to some extent one on another, the prosperity of industry possibly has the most widespread effect of any one on the prosperity of the others.

A little earlier it was stated that we were coming to the period where we would have very many customers instead of one and there would be more doubt about the ability to pay. It is not very difficult to reason that the ability of an individual to pay is highly contingent on having a job and hence has arisen the ideal of full employment. It might be noted that even at the present we do not have full employment, nor will we ever completely have it. Men are changing jobs, on holidays, sick. Furthermore, if we are to have freedom, we should have freedom not to work if we so choose.

Full employment seems an impossibility to many, and we will *not* have it if we have not the will to have it. A wish is not the same as a will. We need in our government above all things impartiality between the various sections of our economy, with no baiting of one sector in favor of others. It should be remembered always that the favorite of one era is likely to be the bait of another. The government should shape and enforce the rules with complete impartiality. It should act as a partial balance wheel. The word "partial" is important. We have always had public works with us, but they cannot take the whole load. A consistent framework of tax policies should be framed to encourage and not discourage the flow of investment capital. Finally, it is as important to clamp down on booms as to dig out of depressions.

We need managements that will recognize that labor is not a commodity but a market, that change is inevitable, that no one has ever recovered the past. We need labor that will recognize its own responsibility to the community, and to the other segments of the economy, and that will realize that what is not put in cannot be taken out. We need shareholders who will recognize that a fair return in proportion to risk is just, but that gambling serves no useful economic purpose. And lastly, all of us need an over-all greater sense of social responsibility in all our industrial activities.

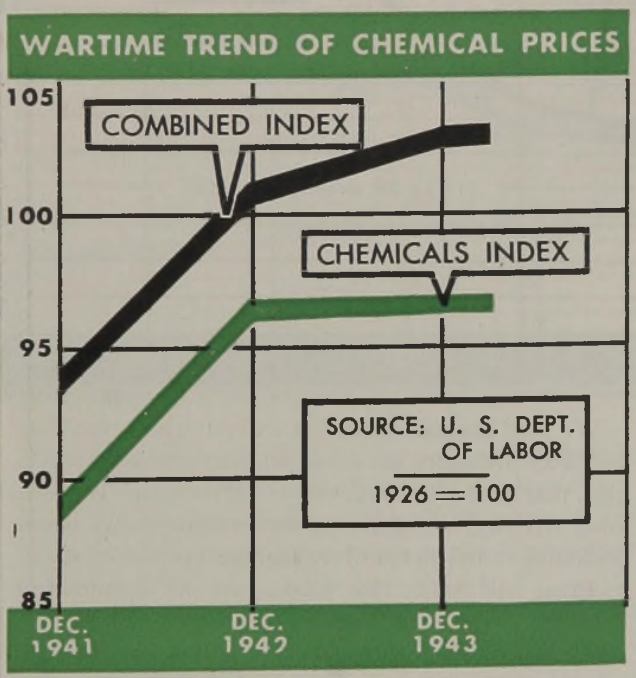
We can have it here. We have the men, the money, and the machines. Our present national income is $150 billion dollars, over half of which goes to war. If the present effort for full employment succeeds, what can we in the chemical industry look forward to?

Our Customers—People of the United States

Though most chemicals are sold as intermediates and not directly to the ultimate consumer, what the ultimate consumer demands determines the intermediates to be sold. In the United States at the present time, there is a definite trend toward an older population. The average age has risen three years in the last ten. In addition to this we anticipate a greater preponderance of women and of women without husbands.

One's first conclusion would be a lessening in food consumption and a trend towards foods of the fruit-vegetable class. A still greater proportion of the shopping will be done by women, and obviously women's apparel, cosmetics, and so forth, will grow. A larger

proportion of adults will require more individual homes, and more labor-saving devices, especially since the upgrading of war workers will reduce the supply of domestic servants. Older and a greater number of female drivers will demand of automobiles more safety and comfort, and less speed. According to some authorities there will be smaller demand for sporting goods and a change in type, that is, less tennis and more golf, less football and more fishing. Fundamental changes of this sort affect each industry and in turn the chemical industry. It should not be lost sight of that these changes are complicated by other variations of the standard of living. Actually for a time food



consumption may increase due to the fact that more people have the ability to buy.

Fortune, in its number of December, 1943, gave the results of a survey of the things people would buy first when they are able to do so. Placing these things in order, we get the following:

1. Automobile
2. House
3. Furniture
4. Mechanical Refrigerator
5. Home Repairs
6. Washing Machine
7. Stove
8. Clothes
9. Misc. Electrical Appliances
10. Farm Machinery
11. Rugs
12. Radio
13. Misc. Furnishings

In this list there are only three items which do not deal with house and furnishings. We can be reasonably certain, then, that all such products are in for a boom.

Chemical Markets

Obviously, the over-all size of the market for chemicals will depend on the extent to which our national income is kept up. If we plot curves of national income against value of production of chemicals, we find that there is rather a close general parallel, due probably to the peculiar position [illegible] in almost everything. This wide spread tends to make the market for chemicals follow the general pattern set by the national income figures. However, it will be noted that over the years the chemicals production curve has shown a greater rate of increase than the national income curve. In other words, production of chemicals has increased at a greater rate than the volume of economic activity as a whole, and until our chemical frontiers are pushed back much further than they are at present this trend should continue.

Clark and Talbot in CHEMICAL INDUSTRIES, November, 1943, showed that from 1939 to 1943, when the national income rose from $70.8 billion to $147.9 billion, or an increase of 108%, the output of chemicals rose from $790 billion to $2,210 million, or an increase of 180%. It is probably not unreasonable to postulate a chemical market of $2 billion at a $150 billion national income figure, and if we return to the $100 billion national income figure of 1941, which was the highest on record up to that time, we might guess at a chemical market of $1,350 million.

Even though these figures represent the size of the total market, it is quite evident that there will be considerable shifts in the individual items. Those chemicals, the production of which has been vastly increased due to their use in explosives, such as ammonia, nitric acid, alcohol, sulfuric acid, formaldehyde, toluol, methanol, and so forth, will be in large surplus and will have to find new outlets. On the other hand, those going into the automobile industry, the building of houses, and house furnishings, will be in high demand.

Since we are talking in terms of dollars of chemical markets, we must give some attention to the probable price levels. The United States Department of Labor shows the following indices of wholesale prices, based on 1926=100:

Year	*Combined Index*	*Chemicals Index*
Dec. 1941	93.6	88.6
Dec. 1942	101.0	96.1
Dec. 1943	103.2	96.3
Mar. 1944	103.8	96.3

The percentage rise in both the combined index and the chemicals index is the same, namely 10.8%, but the latter started from a lower level and has maintained its position as under the average.

As to what will happen with the price level there are too many factors for prophecy. The efficiency and timing of controls with respect to deferred demand, and of foreign requirements are weighty factors which are still unknown. At the present time the prices for chemicals seem to be leveling off and we know that there have been reductions on some items even in the war period. Due to almost continuous technological change, the general tendency for chemical prices is downward over the long pull, as is shown above compared to 1926, even with the tremendous war demand. The corollary has been the tremendous growth of the chemical industry. Technological change must be the

statistician's bugbear, and in dealing with an industry so profoundly affected by it, we must approach the curves with caution.

New Industries

As a result of such technological change, we can expect a flow of new industries or of large potential growth of some of the older ones. In an article of this type, individual analyses are not possible. But we may list briefly some of those industries which are new or which have large potential growth.

Combinations, for example
- Plywood
- Resin Treated Textiles
- Plastics and Light Metals

Synthetic Fibers, particularly new types
Frozen Foods
Electronics
Unorthodox Housing
Light Metals
General Construction (roads, urban rehabilitation)
Electrical Appliances, particularly household

These industries and many others may upset statisticians' curves always based on the past.

Exports and Imports

Most of our thinking has been about the domestic markets, though we must remember that in the figures for chemical production, large quantities have been sent abroad as part of the war effort. There is no question of markets for American goods abroad, but the ability to pay is very spotty. One of the bright spots is Latin America which has accumulated large dollar balances in general during the war period. If we want long term export business, we must be prepared to do one of two things: (1) extend credit under conditions that frankly mean giving away the goods; or (2) increase our imports to balance exports. No matter how willing we are, the first step can obviously be only a stop-gap, because no nation can afford to give forever. The second might lead to unemployment for Americans.

There has been for some time throughout the whole world a pressure for nationalistic self-sufficiency, and as countries now industrially undeveloped become so nationalistically industrialized, and in order to do so raise trade barriers such as quotas, the general volume of exports and imports of those things made in common must decrease. However, there is a reverse tendency. As the standard of living increases with industrialization, so does the market for luxuries.

We might plot these potential curves of exports as being initially very large during the rehabilitation and reconstruction periods, then gradually decreasing over the years as nationalistic industrialization proceeds, with a slow change to a rising curve as the standard of living in other countries goes up.

Reefs Ahead

Reference has been made to deferred demand. Various estimates indicate that the backlog of deferred demand might equal as much as three years or in some thinking even five years of full production. It is obvious that if we attempt to satisfy this demand all at once, we can hardly avoid inflation, a tremendous boom, and an inevitable depression. Therefore a large factor in our postwar prosperity is the use or misuse of the deferred demand for goods.

As a nation we are swingers and travel the middle of the road largely only by mathematical calculation. If the swing is to too much government interference in business, the tendency, surprising as that may be, will be towards the elimination of competition, because all government actions in any country tend towards that end, without respect to lip service to other principles. Too little government, on the other hand, will permit reversion to the law of the jungle, and whether we like it or not, that phase of human existence is over.

CHEMICAL-CONSUMING INDUSTRIES WITH GOOD GROWTH PROSPECTS

Plywood
Resin-treated textiles
Plastics
Light metals
Synthetic fibers
Frozen foods
Electronics
Unorthodox Housing
General construction
Electrical appliances

One of the strongest tendencies in the modern world, probably resultant of the same factors that led medieval man to seek shelter in monasteries, is the quest for security. Tied in with this is the lack in incentive, since one feels that one would not be allowed to enjoy the fruits of his labors, were they successful. Hence the tendency to desire a low safe level. This quest is by no means existent in the United States alone, but seems to be common to many of the countries of the world. One cannot have security for nothing: the price is loss of freedom.

There have always been reefs; ours merely look bad because we are near them. Each generation has had equally difficult problems to solve and we are still here. The American soldiers, sailors, air men have shown that they possess initiative to a high degree when there is something they believe in. What we need is faith in our future, but also to remember that faith without works is nothing.

NORWEGIAN CHEMICAL INDUSTRY Looks to the Future

EDITORIAL STAFF

ONCE RELEASED FROM GERMAN OCCUPATION, Norway will seek new trade relations, shipping facilities, and the technical skill with which to develop the full potential of her chemical and, particularly, her electrochemical industries.

PRIOR to the war, Norway's chemical production was rising steadily. A combination of the availability of certain raw materials and an abundance of natural power had lent itself to development in the chemical and electrochemical industries to an extensive degree. As both a supplier and a consumer of chemical products, Norway was an important factor in the markets of the world, but especially of Europe, for approximately 80% of her trade, both imports and exports, was with European countries. In some products, calcium carbide, sodium nitrate, explosives, and fertilizers, Norway had become a chief source of supply for the Continent.

When the Germans overran Norway in 1940, the production facilities were absorbed into the Nazi war machine. Both Allied and German bombings have ravaged some of Norway's industries, and with the possibility of more damage being done when the Germans are finally forced out of the country, it cannot be safely surmised in what manner and condition Norway, and her people and industries, will emerge from the shroud of German occupation. However government and technical organizations are at work with plans for rebuilding her industries to their prewar status and promoting her investment possibilities to develop her resources further.

Trade Pattern to Change

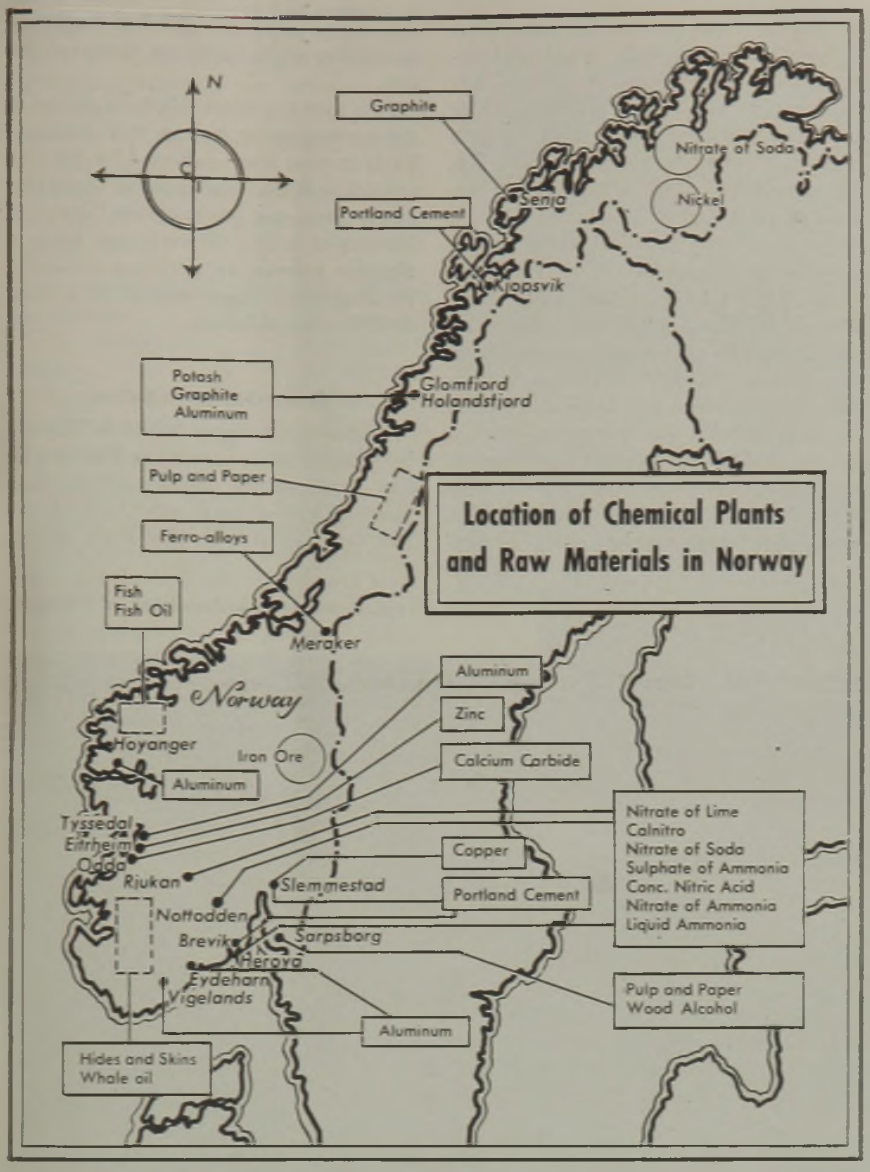
With this disruption of Norwegian industry and the general leveling of all European producing power, the trade pattern of Norway in the future will have to change to find the goods and the markets which will help her climb back to the high standard of living she had reached before her tragic fall. The simultaneous highly accelerated production capacity of the United States can make this country the natural trade center for Norway. In the chemical industry, a survey of the products which Norway can and has produced most economically will reveal many types of chemical products which the United States can supply to complement her market, to both countries' mutual advantage, for all that is needed in the total economy of a nation.

When the war is over, the practical thing for Norway to do is to strive first to get back again to her pre-invasion status. So many problems will arise in connection with rebuilding, that if an attempt were made to incorporate all the newest improvements, the problems would be so tremendous that nothing would be accomplished. On the other hand, whatever improvements can be adopted, without too much interference with the rebuilding program, should be included or the country will march backward, not only the years of the war's duration, but possibly the equivalent of twenty years, because the wartime progress in many fields is known to be equal to a generation of normal time progress. It is necessary, therefore, to establish somehow a mutually beneficial cooperation between the technical men and organizations of Norway and the United States. Certain Norwegian groups, recognize this necessity and are working toward closer cooperation with U. S. industry. They know that German domination has bred such rebellion among the Norwegians that they will not want to become wholly dependent on Germany again for such essential chemical products as medicines, drugs, and dyes.

Norway's Needs

Norway has now been occupied for four long years, and much physical damage has been done to the country, the industries, trade, and to the entire economic setup. Norway, under German occupation, is being blockaded by the United Nations, and the food situation is bad. The whole condition grows worse with time, and all reserves, including the reserve power in the human body, are being

Norway's thriving fishing industry supplied most of the world's cod liver oil.



drained, but the will of the people lives on. If Norway can be recovered in time, and before the cancer has drained too much of her vitality and physical and mental resistance, she will be able to recover through hard work, and with a businesslike assistance from the outside.

There will be a period immediately following liberation of the country when material help will be needed quickly, or preferably instantly, until the distribution system can be made to function again. Many things needed in daily life Norway produces, but in order to do so she must have raw materials, supplies, livestock, fertilizers and communications. Norway's economic setup is such that she will always have to import vegetable oils, and other products, from warmer climates.

In discussing Norway's industries, Norwegians fully realize themselves as only a function in the world picture. Other countries are as bad off, and even worse off. They see their problems, therefore, in relation to the other problems. While it is their nearest concern to rebuild Norway as quickly and as well as possible, they realize that they cannot rebuild their country without doing their share actively towards rebuilding other countries. For instance, they know the standard of living in Norway will, to a large extent, depend upon foreign trade, and any attempt to be deliberately self-supporting in everything can only have one effect, to reduce the standard of living. Norway has always been a firm believer in liberal trade, and there has never been a time in the history of the world when there was greater need for constructive work to further liberal trade and improve standards of living in all countries.

Economic Set-up

The total population of Norway is slightly below 3 million. The area is 324,000 kilometers, only 2.5% of it being cultivated. Some of the balance of the land is used for pasture, much is covered by timber.

Agriculture is the main industry, and still occupies about 30% of the population. Practically everything needed is raised except roughly ½ million tons of cereals which are imported annually, along with products from the warmer climates, such as sugar, tobacco, cotton, vegetable oils, etc.

Industry and mining come next in importance, occupying about 27% of the population. Parts of the products are domestically consumed, but several industries are also important as export industries. Most important are the electrochemical industries, cellulose, wood pulp, and mining. The total exports from this group in 1937 was $144,500,000.

Shipping and transportation occupy 10% of the population. The fleet before the war started was about 4.8 million tons gross register. Norway's position in regard to shipping, however, was different from that of other countries, because only a very small part of her shipping was required for her own use, while the rest of it was being used as a service department for the world's agriculture and industries.

Most of the Norwegian fleet was on the open sea when Norway capitulated to the Germans, and the crews have turned their services to full support of the Allies to help win the battle of transport. The fleet has sustained many losses in the course of the war and will need to secure ships to begin its peacetime trade again.

Fish, Fish Oil Trade

Fishing and whaling are third in importance as Norwegian export industries. Two seasonal fisheries, cod and herring fisheries, are both industrialized. Probably about 80% of the codfish is exported as dried or salted fish. The surplus herring production is used by herring oil factories, which also produce herring meal as a by-product. The cod livers are collected carefully at the most important codfish places, the oil is rendered and refined and shipped all around the world.

The other fishery of great importance for world trade is the whale fishery. Most of the whale oil is used as raw material for margarine and as shortening fat in Europe. The United States used to be a good market for whale oil for soap making purposes, but because of prohibitive import duty and excise tax, this export was almost stopped, and since then most of this oil has been used exclusively by the edible trade in Europe, taking the place of other edible oils and fats such as American cottonseed oil, and incidentally forcing Norway to buy extraordinarily much from Germany in exchange for whale oil.

These three groups, that is, shipping, industry and mining, and fishing and whaling, provided 90% of all of Norway's income from abroad in 1937. From this it can be seen how imperative it is for Norway to try to recover its ocean going fleet, whaling fleet, fishing equipment, and to put its industry and mining back

into production of peacetime goods if she is to regain her pre-war status.

Chemical Industries

Norway's manufacturing industries, which next to agriculture are the principal source of her income, were of a nature requiring a heavy consumption of chemicals. Pulp and paper industries, soap, tanning, and textile industries were the main consumers of chemicals. The demand for nitrocellulose lacquers for the state railways and automobile-body makers was registering a steady increase before the war. Likewise, ammonia and sulfur dioxide consumption were increasing owing to further developments in refrigeration. The tanning industry had increased its consumption of tanning extracts and chemicals by 11% from 1937 to 1938. Many chemicals, however, were used in the production of goods which Norway exported.

In 1937, Norway's imports of chemicals and allied products amounted to $13,566,000 and exports to $23,260,000. The chief suppliers of coal tar were Germany, Switzerland, and Italy. Sweden was the main source of supply of sulfuric acid during 1938, imports from that country amounting to 50% of the total; the remainder coming from Belgium, the Netherlands, and France. In 1937, the Netherlands was the principal source of superphosphate, imports amounting to 88% of the total. Imports of caustic soda were largely of Belgian, German, and Japanese origin; the United States supplied only 14 tons of the total. Sweden was the principal source of alum.

By far the most important consumer of Norway's calcium carbide was Great Britain, purchasing 96% of her total exports in 1937. Exports of calcium carbide during the first 9 months of 1939 were reported at 49,990 metric tons, 50% over the volume shown for a corresponding period for 1938. Great Britain accounted for 47,903 tons of the 1939 figure. France was the principal consumer of Norwegian sodium nitrate in 1937, shipments amounting to 31,707 tons. Australian purchases registered a large increase in sodium nitrate, jumping from only 68 tons in 1936 to 2,488 tons in 1937. The United States and Denmark offered the best markets for Norwegian calcium nitrate, 104,526 tons having been sent to the United States and 88,485 tons to Denmark in 1937. Finland, Great Britain, and Sweden were also important consumers of this product just before the war.

Zinc oxide was the principal chemical pigment Norway needed, having imported 1,818 tons in 1938. Red lead was also imported in considerable quantities with receipts totaling 630 metric tons in 1938. Ammonium nitrate mixtures, bearing the trade designation "Cal-nitro" were supplied by Norway to the United States in heavy quantities. There was no recorded production of identical products by American industry up to 1939. Imports of this product to this country the first 8 months of 1939 were valued at $1,148,158.

Notodden was a manufacturing center for rayon and ammonia; at Rukjan were produced nitro products including fertilizers; but by far the most important chemical plants were located at Heroya where metallurgical products, soda and nitrate were produced and a magnesium industry was on the point of beginning production when bombings destroyed the city.

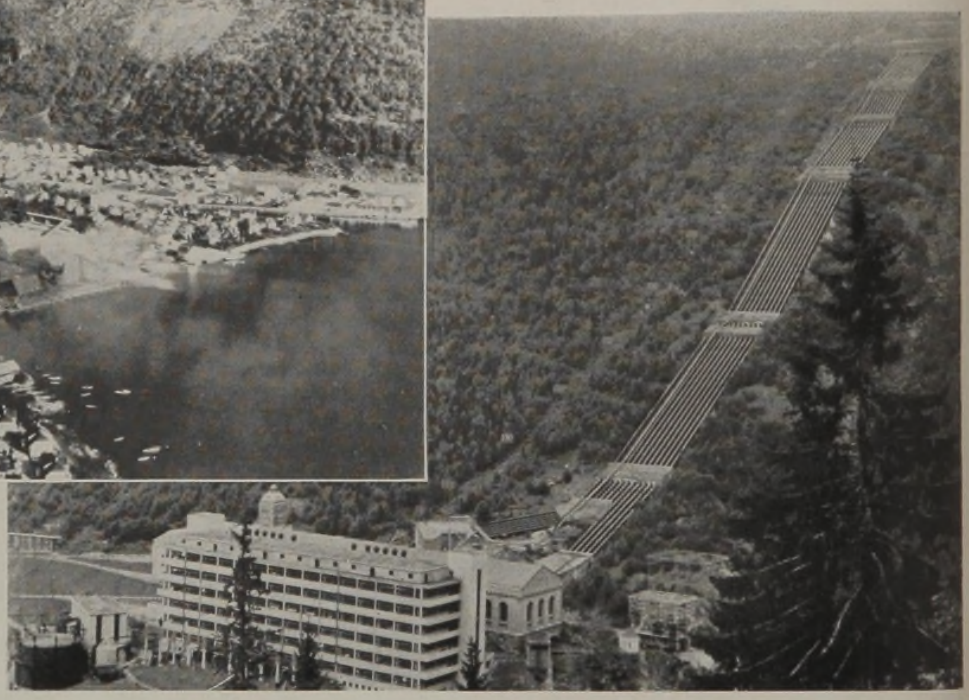
It is apparent from this brief survey of the market while it was still comparatively normal and unaffected by the tide toward war that chemicals of American origin were not an important factor in Norwegian trade. Norway can be in a singular position as a market possibility for the United States where only a small one had existed before.

Electrochemical Industries

The available water power in Norway is estimated to be something like 15 million horse power, and up till the time Norway was invaded, only 15% of this had been developed. The eight million kilowatts which still exist and can be developed at a very reasonable cost represent one of the most important assets of the country. Some power plants have been built up by the municipalities, some of them by the government, and some by a combination of both, but many of the power developments are privately owned, and as a rule they supply a farm or group of farms, and perhaps one or several small industries.

In a group by themselves come the larger power units that have been built by industrial companies in order to provide heat in great quantity for chemical fixation of gases, for smelting, for electrolyses, and for other purposes. For instance, the nitrogen fixation industry was very important for Norway. About 90,000 tons of nitrate per year were produced and out of this were exported about

American flyers bombed the German-held nitrate plant at Rukjan in November, 1943



A British owned aluminum plant is located at Hoyanger.

70,000 tons. Other users of large quantities of hydro-electric power are the aluminum industry, and different alloy industries such as ferro-silicium, ferro-manganese and nickel, metallic sodium, zinc and others.

Dollar values of electro-chemical products exported in 1936 are given in the following table:

Nitrates (fertilizers)	12.8 million $
Aluminum	6.3 million $
Ferro Alloys	8.3 million $
Zinc	3.4 million $
Nickel	5.4 million $
Calcium Carbide	1.3 million $
Cyanamide	0.8 million $

Three parts built on the same spot usually make up an electrochemical plant in Norway: the hydro-electric power plant, the factory, and the pier with storehouses. This constitutes a convenient unit of operation for the producer requiring a minimum of handling of goods from raw materials to manufacture and export.

Since in the realm of economic geography distances are not measured in miles but rather in freight rates, Norway can be considered nearer to the United States than, for instance, Canada, as the following table of comparison of freight rates for chemicals in large lots between Norwegian and Canadian products on the U. S. A. market shows:

Prepared Fertilizer Mixture
Import from Canada

Value of import to U. S. A. in 1938	$1,202,000.00
Quantity imported	32,000 tons
Value per 100 lbs. of product	$ 1.84
Freight rate per 100 lbs.	$ .40

Ammonium Nitrate Mixture
Import from Norway

Value of import to U. S. A. in 1938	$1,894,000.00
Quantity imported	75,600 tons
Value per 100 lbs. of product	$ 1.25
Freight rate per 100 lbs:	
Atlantic port	$.23 to .28
Pacific port	.27 to .35

Thus, in spite of geographical distance, Norway has been able to export a fair amount of ferro-alloys and aluminum to the United States because of cheap sea transportation.

Postwar Markets

Before the war, about 60 percent of Norway's electrochemical industry was producing materials for constructional purposes (aluminum, ferro-alloys, zinc, etc.). The demand for constructional materials will be large again during the period of reconstruction in Europe. The rolling stock in almost every country will have to be replaced or recompleted taking quite a stock of aluminum. In addition to this outlet, Norway could profitably develop the use of lightweight containers for the transportation of fresh fish to the Continent. The construction and maintenance of such a container-pack would be of significance to the aluminum industry.

Calcium carbide shipped principally to Great Britain is produced in Sauda.

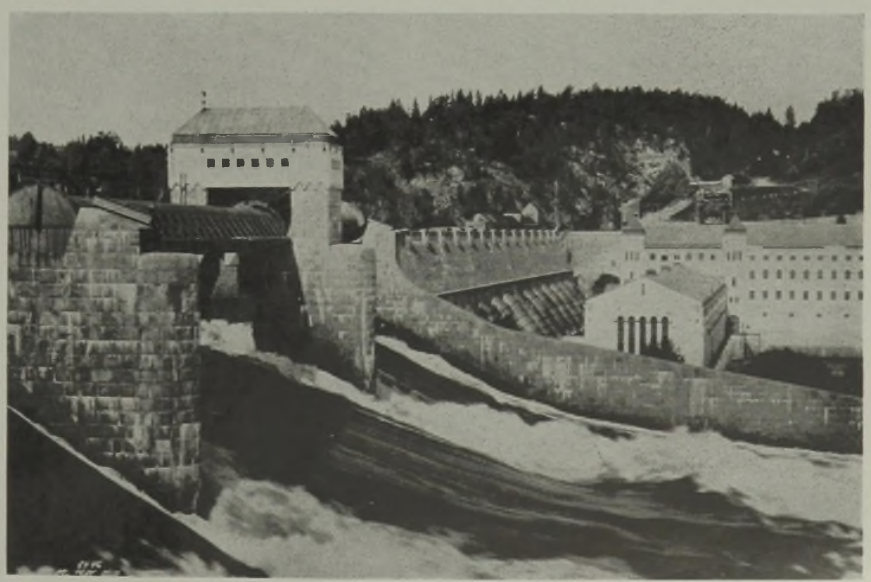
There will exist a large demand for phosphates in Europe after the war. The total imports of the various countries in Europe of natural phosphates for the year 1938 totaled about 5,245,000 metric tons. About 12 percent of the demand on the Continent was supplied by the Russian deposits at the Cola peninsula. It is a geographical fact that the Norwegian water power is very favorably situated in respect to these deposits.

Norwegian producers of fertilizers had been utilizing these phosphates for the production of fertilizers of the type known as Nitrophosca. Further developments along these lines may be forecast if the war and trade relations after the war develop favorably.

Given an initial opportunity to start up her production of chemical and electrochemical products, with normal conditions and free competition on the world market, Norway can hold her own in this sphere of business in the postwar future, with greater potentialities of a thriving trade with the nations of the world and a larger trade with America than was ever realized in the past.

This article is based in part on an address given by Hans Bull of the Norwegian Embassy, Washington, D. C., before the American Institute of Chemical Engineers, April 27, 1944.

Pulp and paper, and various types of wood products are produced at Sarpsborg.



NEW CHEMICALS

A New Dry Process for Making CHLORINE DIOXIDE

by E. R. WOODWARD, G. A. PETROE and G. P. VINCENT
Mathieson Alkali Works, Inc., New York

CHLORINE DIOXIDE HAS NOT ENJOYED the industrial recognition it deserves on the basis of its merits as an oxidizing and bleaching agent. The principal reason is that it is so chemically unstable that it must be generated at the point of use, and past methods of generation have been limited in their practicability. The new dry chlorite process overcomes many of these limitations and gives promise of making this valuable industrial chemical available for a much broader range of uses.

CHLORINE DIOXIDE [illegible] powerful oxidizing and bleaching agent, but because of its chemical instability it cannot be produced in bulk and stored. It must be generated in very low concentration at the point of use.

Several methods of doing this have been developed since the compound was first identified by Davy in 1815.[1] All of them, however, have limitations of one sort or another which have prevented their wide application in industry. Among the earliest processes were several involving treatment of potassium chloride with sulfuric acid according to the reaction

$$3KClO_3 + 2H_2SO_4 \rightarrow KClO_4 + 2KHSO_4 + H_2O + 2ClO_2$$

These were unsuccessful chiefly because they produce chlorine dioxide mixed with chlorine, the production efficiency is low, and the acid gives rise to serious corrosion troubles. Also, no solution had been found for the problem of controlling the output of chlorine dioxide in very small quantities at a strictly regulated rate.

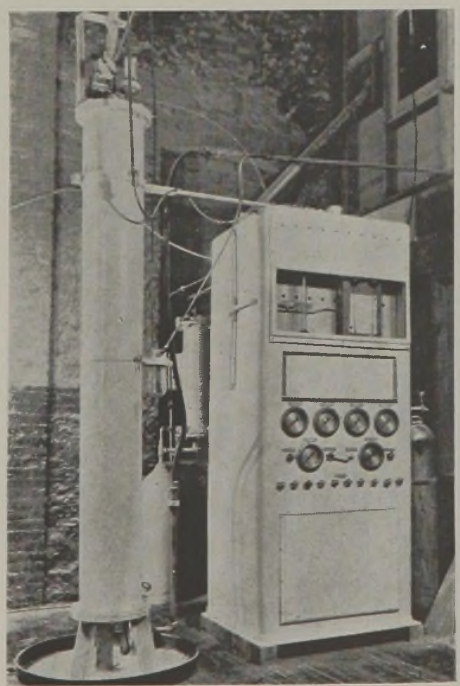
When sodium chlorite was introduced as a commercial product, a series of processes for generating chlorine dioxide was developed using this compound as the raw material.

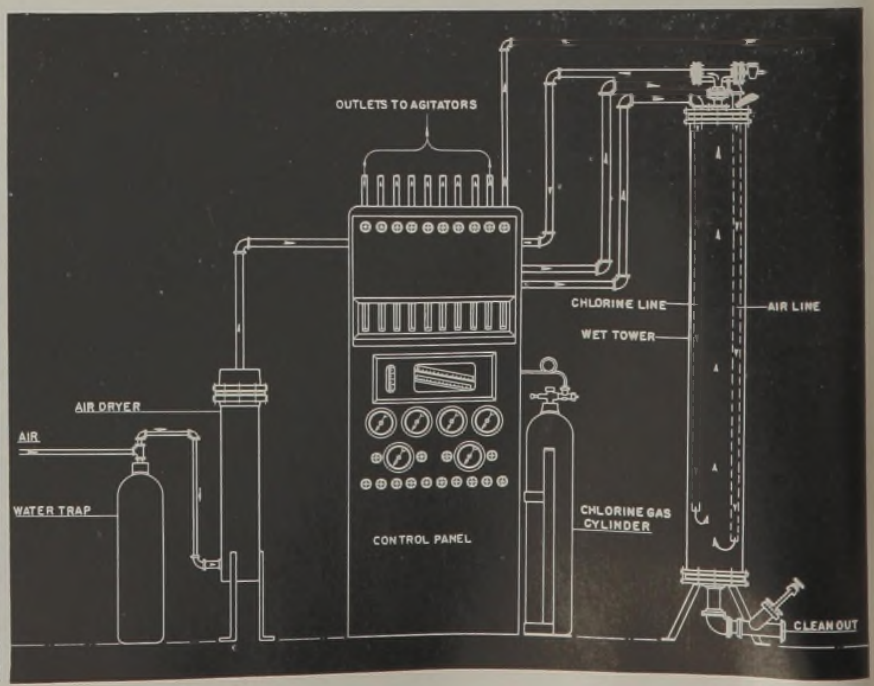
In 1939, Logan[3] patented an electrolytic method based on the reaction:

$$2NaCl + 2NaClO_2 + 2H_2O \longrightarrow 2ClO_2 + 2NaCl + 2NaOH + H_2$$

This process produces chlorine dioxide under satisfactory conditions for use in bleaching flour in mill-scale experiments,[2] but requires complicated equipment and the services of an electrochemist. It was therefore abandoned when simpler and purely chemical processes were introduced.

Figs. 1 and 2—Photo and schematic drawing of a single-tower, chlorine-chlorite solution generating unit. The flooded reaction tower (patent applied for) is filled to about 75% capacity with a 20% solution of sodium chlorite and has in it two 5/8" silver tubes which run from the outside to points close to the bottom. Chlorine passes into the solution through one of these, while air is blown in through the other and strips out the chlorine dioxide, which is free from chlorine. By using two towers the process can be made continuous.





The first of these chemical processes, patented in 1936 by Cunningham and Losch,[5] was based on the fact that when chlorine is introduced into a solution of sodium chlorite, the following recation takes place at room temperature:

$$2NaClO_2 + Cl_2 \longrightarrow 2NaCl + 2ClO_2$$

Equipment used for carrying out this process, developed by Logan and Petroe[4] and later modified by Woodward, is shown in Figures 1 and 2.

This process, utilizing suitable control, measuring, and safety devices, is practicable. However, in 1943, Hutchinson and Mecham patented a method of generating chlorine dioxide by treating *dry* sodium chlorite with chlorine.[6] The advantages of a dry process from a corrosion standpoint are obvious.

The Dry Chlorite Process

The equipment for generating chlorine dioxide by the chlorine-dry chlorite process consists of two principal parts—a two-tower generator, with means for supplying chlorine and air, and a cabinet, which houses the control and measuring apparatus. (See Figures 3 and 4.)

Generating the Chlorine Dioxide—The generator consists essentially of two vertical steel towers, 4 inches in diameter and 3½ feet high, lined with stoneware or glue.

Each tower is filled almost to the top with about 8 pounds of flaked commercial sodium chlorite, of approximately the composition shown in the table below. A mixture of chlorine, which is supplied at the rate of 0.05 to 1.5 cubic feet per hour, and a large excess of air, at a pressure between 2 and 5 pounds per square inch, is fed into the bottom of one of the towers. Chlorine dioxide, formed within the tower, is carried out at the top by the air current. The ClO_2 then enters the base of the second tower, and passes out at the top into the mixed gas manifold. The operation takes place at room temperature.

PROPERTIES AND USES OF CHLORINE DIOXIDE

At ordinary temperatures and pressures, chlorine dioxide is a yellow to red, unpleasant smelling, irritating gas, with a vapor density of approximately 2.4. Work with guinea pigs has shown that 45 minutes of exposure to an atmosphere containing 150 p.p.m. of ClO_2 is fatal. Exposure of 40 minutes in 45 p.p.m. of ClO_2, and for 6 hours in 14 to 17 p.p.m. did not result fatally. The gas is about as hazardous as nitrogen dioxide. The odor of ClO_2 is evident at 14 to 17 p.p.m., and at 45 p.p.m. it is irritating.

By comparison with other chemicals in daily use, such as chlorine, hypochlorite, and chlorate, chlorine dioxide is not unusually hazardous; and, if the proper precautions are taken, there should be no hesitation in using it.

At room temperature it is soluble in water to the extent of 2.9 grams ClO_2 per liter at 30 mm. partial pressure. Its aqueous solutions are decomposed by light, forming perchloric and chloric acids, oxygen and water.

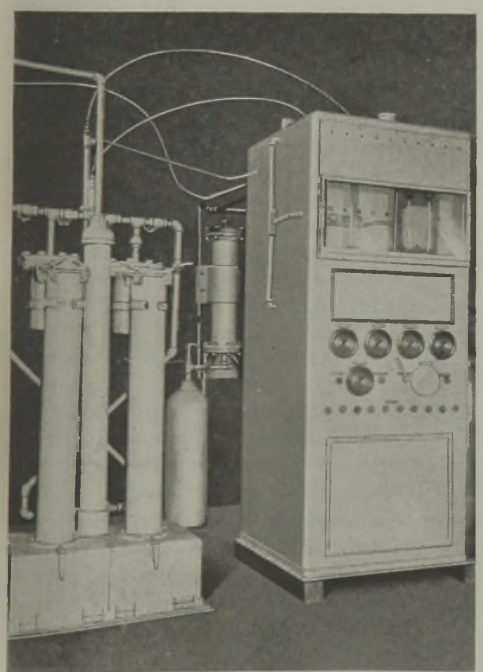
The oxidizing power of ClO_2, stated in terms of "available chlorine," is two and a half times that of chlorine itself. This is illustrated on a molecular basis as follows:

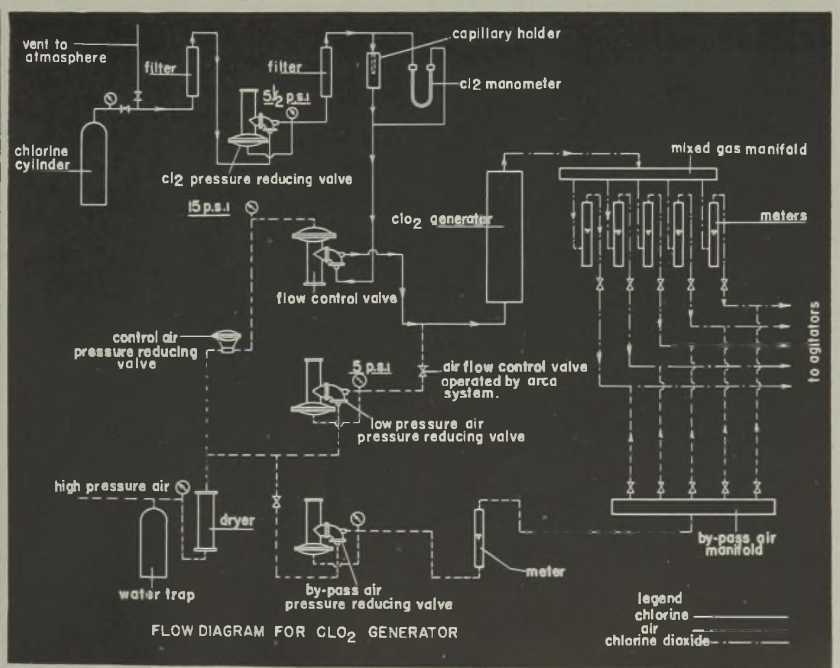
$$ClO_2 + 2\tfrac{1}{2}H_2 \rightarrow HCl + 2H_2O$$
$$Cl_2 + H_2 \rightarrow 2HCl$$

Through the new dry chlorite process chlorine dioxide gas is easily produced under controlled conditions as a new and powerful industrial chemical for oxidizing and bleaching operations.

It has already proved to have specific values in bleaching and maturing flour, improving taste in public water supplies, checking blue mold in citrus fruits, and experiments have indicated increased yields of penicillin in an atmosphere sterilized with ClO_2.

Figs. 3 and 4—Photo and flowsheet of a dry chlorite type chlorine dioxide generating unit. The generator in the photo consists of two reaction towers, each with a salt trap mounted at the top. The third cylinder is the vent from base to atmosphere. The control cabinet contains one chlorine dioxide flowmeter, but provision is made for ten. Valves for controlling the individual distribution lines are to be mounted at the top of the cabinet. The flowsheet shows a single generating tower and five chlorine dioxide distribution lines.





The principal reaction within the tower is

$$2NaClO_2 + Cl_2 \rightarrow 2NaCl + 2ClO_2$$

but, as shown by the following table, small amounts of sodium chlorate are also formed.

Typical Analyses of Tower Charge

	Fresh Charge	Spent Material
	%	%
$NaClO_2$	83.00	0.05
$NaClO_3$	5.00	7.68
NaCl	6.00	88.33
Na_2CO_3	0.75	—
H_2O	5.25	3.94

The curve shown in Figure 5 indicates the action that takes place within the first generating tower when chlorine is fed at a uniform rate into a fresh charge under normal operating conditions. It will be noted that:

1. A lag occurs before the system attains equilibrium. (This lag can be reduced by increasing the chlorine flow at the start for a short time.)
2. Chlorine dioxide is then generated at a uniform rate, for a period of about 100 hours under the conditions shown.
3. As the charge nears exhaustion, chlorine begins to appear with the chlorine dioxide.

When free chlorine is discharged together with the chlorine dioxide from the first tower, it reacts during its passage through the charge in the second tower, so that the output of the second tower is free from chlorine.

At this point, however, the first tower is disconnected and recharged, while the second tower alone is used temporarily for generation. Then the freshly-charged tower is reconnected, this time as the second tower, and operation continues without interruption.

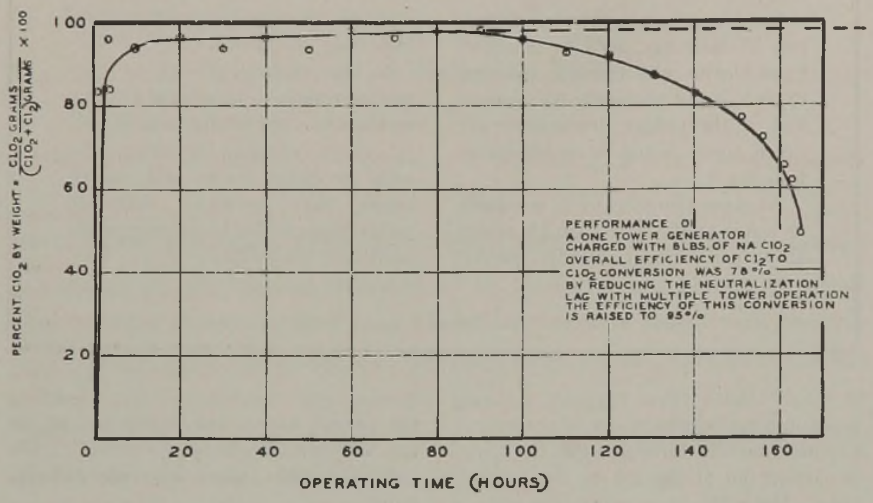


Fig. 5—Curve showing production of chlorine dioxide when chlorine is fed at 0.171 cu. ft. per hour highly diluted with air into a tower charged with 8 pounds of sodium chloride.

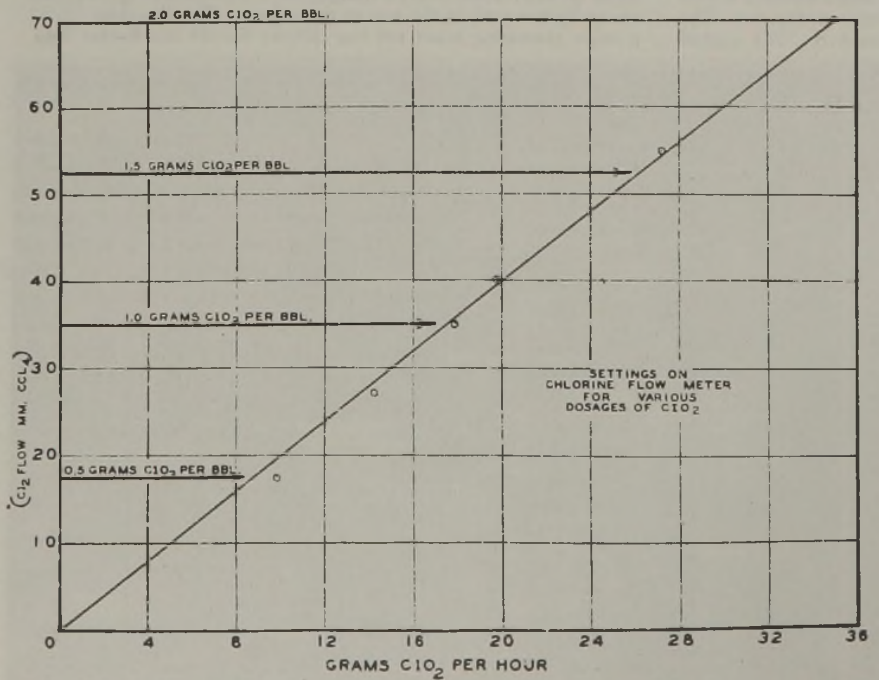


Fig. 6—Calibration curve showing grams of chlorine dioxide produced per hour for various readings of the manometer measuring flow of chlorine. Note that curve is a straight line.

As shown by Figure 6, the amount of chlorine dioxide generated varies directly with the amount of chlorine supplied to the generator. Hence, the output of chlorine dioxide can be accurately regulated by varying the input of chlorine.

The Chlorine Supply—The chlorine from the supply cylinder passes through a pressure-reducing valve,[7] which reduces the pressure to 5½ pounds per square inch, and then through a glass capillary, which cuts down the delivery to approximately the amount desired. Adjustment of the flow of chlorine to the capillary is by a hand operated needle valve.

The rate of flow of the chlorine is measured by a manometer, which records the pressure drop through the capillary. Carbon tetrachloride is used as the manometer liquid. The chlorine flow is set by adjusting the needle valve until the meiscus rests at the required point in the manometer.

To prevent chlorine from being fed into the generator, unless amply diluted with air, a valve operated by the pressure of the air supply opens the chlorine line when the air is turned on and closes it when the air is shut off.

The chlorine line contains three filters consisting of a piece of pyrex pipe packed with glass wool and silica gel, and there is a valve, close to the supply cylinder, for clearing the line of chlorine when the generator is shut down and for permitting the escape of the gas, should the cylinder valve leak.

All chlorine-carrying parts of the system are made of non-corroding materials, such as silver, Hastelloy-C, glass, and plastics. Silver is used for the high-pressure tubing, and Saran for the low-pressure tubing. The use of iron is avoided as much as possible to reduce the formation of a gummy substance, composed largely of ferric chloride, that tends to clog up piping, valves, and other parts of the equipment.

The Air Supply—Air for operating the generator, supplied by a compressed air system or an individual compressor, passes through a water trap, a calcium chloride drier, and a pressure-reducing valve. This valve maintains a pressure of 5 pounds per square inch. Final adjustment of the air flow before it enters the generator is secured by means of a needle valve, operated by an Arca regulator.

A second line goes to the air-operated control valve in the chlorine supply line; and a third line goes to a manifold, from which by-pass air can be drawn for diluting the chlorine dioxide in the distribution lines, should this be necessary.

Safety Features of the Generator—If the ratio of chlorine to air exceeds 5% when fed into a charged tower, an explosion hazard is created due to the rapid generation of chlorine dioxide at a partial pressure above 70 mm. Hg. In addition,

the heat of reaction converts much of the sodium chlorite into sodium chlorate, according to the equation

$$3NaClO_2 \rightarrow 2NaClO_3 + NaCl$$

As sodium chlorate is an oxidizing agent, it will set fire to any organic material it touches, when heated above 248° C., which is its fusion point. Sodium chlorite is also a powerful oxidizing agent and can set fire to organic materials under similar conditions.

To guard against this hazard, the towers are mounted over apertures in a box-like sheet-steel base, and each tower is closed at the bottom with a thin silver safety disc, as shown in Figure 8. Should an explosion occur, the disc in the tower affected will be ruptured, and most of the salt discharged into the base, where it will cool harmlessly. At the same time, any chlorine and chlorine dioxide discharged into the base will be vented to the outside air through a 3-inch pipe mounted on the base behind the towers. If any salt is ejected from the top of the tower, it will be caught in the external expansion chamber, shown in Figure 8, and kept out of the piping.

The possibility of an explosion is remote, however, because the air-operated control valve in the chlorine line prevents chlorine from being fed into a tower unless it is diluted with a large volume of air.

Chlorine Dioxide Distribution Lines—The chlorine dioxide formed in the generator, highly diluted with air, is led through Saran tubing to a manifold located in the top of the control panel. From the manifold run as many individual distribution lines as may be required.

Included in each distribution line is a hand-operated control valve, a rotameter, and a valve for admitting by-pass air into the line.

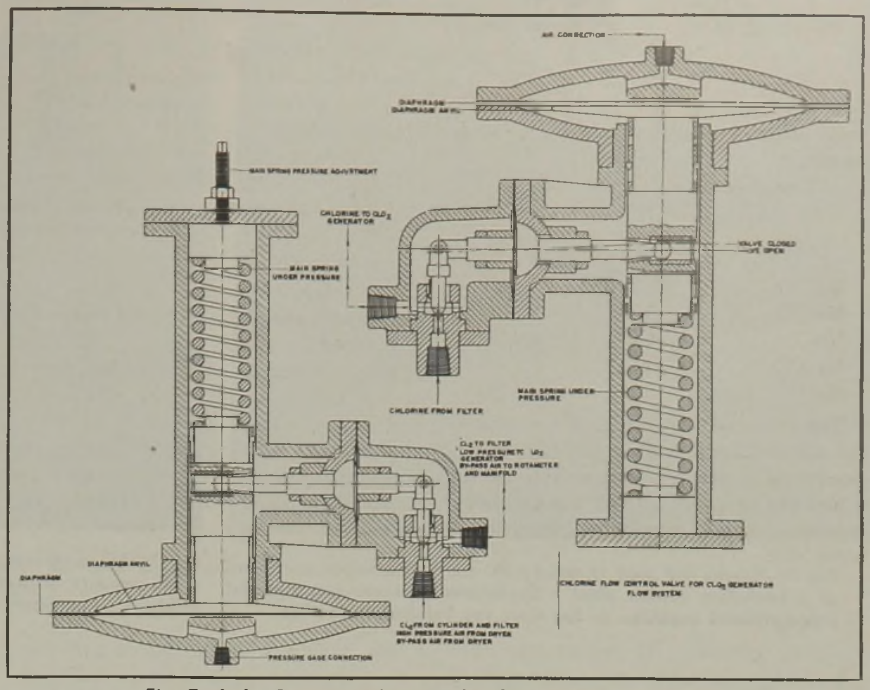
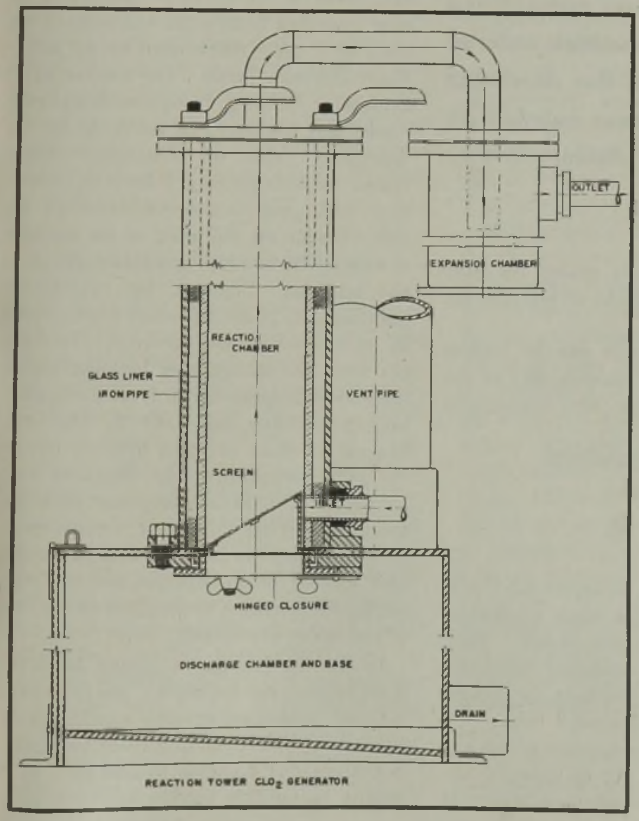


Fig. 7—Left: Pressure-reducing valve for chlorine and air supplies. Right: Air-pressure actuated chlorine-flow control valve.

Fig. 8—Discharge chamber in base of generator and salt trap at top of tower. The lower end of each reaction tower is closed by a safety disc of fine silver, 0.0025 in. thick, held between flanges. If pressure should build up, disc ruptures at 30 to 35 pounds per square inch, permitting contents of tower to be discharged into base. Disc assembly is hinged to facilitate complete removal of charge.



Control of Output—The total pressure of the ClO_2-air mixture in the manifold must be held constant under all conditions of gas flow demand. This control is effected by means of an Arca regulator, which is actuated by any change of gas pressure in the manifold. The regulator operates a valve which admits air to the generator towers.

The partial pressure of chlorine dioxide in the gas-air mixture must be carefully regulated for two reasons:

1. For most industrial applications, best results are obtained by supplying the chlorine dioxide within a definite range of partial pressures.
2. When the partial pressure of chlorine dioxide in the gas-air mixture exceeds 70 mm. Hg., the mixture may explode on exposure to sunlight, heat, or an electric spark.

Research and commercial experience indicate that a partial pressure of 30 mm. Hg. for the chlorine dioxide is safe under ordinary operating conditions, and this is the highest partial pressure recommended for industrial work. In practice, however, much lower partial pressures are commonly used. For example, in bleaching flour, a partial pressure of 2mm. Hg. is suitable.

The partial pressure of the chlorine dioxide can be varied by keeping the air flow constant and adjusting the needle valve that controls the input of chlorine, and hence the output of chlorine dioxide. Or, if this method supplies the desired amount of chlorine dioxide at too high a partial pressure, the chlorine flow can be kept constant at the desired point and the air flow increased.

The operator is guided in this matter by a calibration curve (Fig. 6) and a table showing the partial chlorine dioxide pressures that are produced at various settings of the meters in the chlorine and chlorine dioxide flow lines. A gas sample, taken occasionally from a sampling line at the point of application can be quickly analyzed to check the actual gas concentration against these standard data. This check reveals any changes in conditions due to possible obstructions in the flow lines.

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[3] U. S. Patent No. 2,163,793.
[4] U. S. Patent No. 2,131,447.
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[6] U. S. Patent No. 2,309,457.
[7] U. S. Patent No. 2,138,937.

Based on the paper "A New Process for Producing Chlorine Dioxide for Industrial Use" presented at the 36th annual meeting of the American Institute of Chemical Engineers, Cleveland, May 15, 1944.

Fig. 1—Trucks are used to move bulk material between operations at a smokeless powder plant. Continuous conveyor would permit propagation of explosion or fire from one building to another.

Fig. 2—Monorail system used to move a large number of relatively small amounts of water-wet, slightly flammable material between buildings. Containers spaced to prevent propagation in case of fire.

Explosives Manufacturing Techniques Offer SAFETY IDEAS for Chemical Plants

CHEMICAL SPECIALTIES

by W. F. SUHR; Hercules Powder Co., Wilmington, Del.

BECAUSE OF THE NATURE of their operation, explosives manufacturers have devoted much study to the problem of safe handling of materials under all types of conditions. Many of the precautionary techniques thus developed have applications in other chemical processes where hazardous materials are handled. Some of these are discussed here, with special reference to their possibilities outside of the strictly explosives field.

IT HAS been suggested that some of the special precautions used by explosives plants could be advantageously applied to plants where other chemicals are processed.

The need for special precautions at the explosives plant arises from the nature of the material being processed. For our purpose an explosive can be defined as a chemical compound or mechanical mixture that will suddenly generate gases at a pressure capable of producing destructive effects on contiguous objects or of destroying life or limb when any portion of the material is ignited by fire, friction, concussion, percussion, or a detonator. This definition shows why the safe practices used in the explosives plant are based on the prevention of fires and the careful handling of ingredients to avoid explosions by impact. Design for accident prevention is supplemented by design for protection so that the effects of any trouble will be minimized.

All chemical processes can be broken down into steps. The manufacture of dynamite is no exception, the sequence of steps being:

1. Preparation of ingredients
2. Mixing
3. Cartridging
4. Boxing
5. Storage

The manufacturing processes for TNT, smokeless powder, and other explosives may similarly be broken down. Each step brings with it individual problems. The answers to these problems are usually based on definite fundamental rules.

To prevent the propagation of an explosion or spread of fire to adjacent operations, each step in the manufacture of explosives is set up in a building of its own separated from other buildings of the plant by a space determined by the Intra-Plant Distance Table. The spacing of an explosives building from dwellings, railroads, and highways is governed by the American Table of Distances. These tables, formulated on the basis of experience with past explosions, establish the safe distance on the basis of the quantity of explosives being processed or stored in the building. Suppose, for example, a building is to house a process where 10,000 lb. of explosives are involved. To comply with the tables, this building would have to be at least 400 ft. from the nearest factory building and 1740 ft. from the nearest dwelling or other building not on the plant property. The distances may be halved if a satisfactory barricade intervenes. With this plant arrangement, serious damage is confined to a particular unit in case of an accident and the continuity of operation of the plant as a whole is not upset extensively.

In this connection, it should be noted that continuous conveyors are not used between buildings as they would act as connecting links and propagate an explosion from one building to another. It is usually customary, therefore, to use some

Fig. 3—Building divided into several bays by concrete fire walls. One piece of equipment is placed in each bay and scrapped process material stored in the shed at the right.

Fig. 5—Operation by remote control is one of the best safety precautions. Here an operator is protected by a steel shield while he applies pressure to a powder press.

form of trucking to transport materials from one operation to another. Figure 1 shows a method used to move bulk material between operations at a smokeless powder plant. It also illustrates the separation of operating buildings, and the use of barricades and escape chutes. Figure 2 shows a monorail system used to move a large number of relatively small increments of water-wet, slightly flammable material between buildings. The containers are adequately spaced to prevent communication in case of fire.

While the chemical manufacturer may not be concerned with an explosive risk, he may find it desirable and advantageous to segregate unit operations for other reasons. If, for example, a particular operation involves the handling of toxic material, proper spacing will limit the exposure to the few people required for that operation, and special protective equipment can then be applied to care for those individuals. The separation of operations might also be applied to effectively limit possible damage due to fire.

Construction Design and Materials

Very careful consideration is given to the type of construction used for a process building. Where an explosion is possible, the building is usually of frame construction and wood is used wherever possible in the construction of the process machinery. The use of metal or masonry is minimized so that the chance of throwing heavy missiles will be as small as possible. In processes where the risk is from fire, it is usually desirable to use fireproof construction for the buildings and provide adequate sprinkler systems. Figure 3 shows a building divided into several bays by concrete dividing walls. Only one machine is installed in each bay. A fire originating in any bay is readily controlled in such a building so that it does not spread to the other bays. Scrapped process material is stored in the shed at the right until it is picked up by a disposal crew.

Explosives equipment design requires the careful selection of materials to prevent fires or explosions; therefore, in addition to the consideration given to corrosion and usual mechanical qualities, it is also necessary to select materials of construction with reference to the danger of ignition by impact or friction.

A large part of our knowledge on this subject has been derived from experience with process machines. This information can usually be applied successfully when designing a machine to handle regular products. When new construction materials are proposed, they are studied under controlled conditions to determine whether they can be safely used in conjunction with the explosive material to be processed. Several machines have been devised with which the sensitivity of explosives can be safely determined. Typical of these is a test machine arranged to subject a sample of an explosive to impact. The principal parts of the machine are the falling weight and the anvil. These parts are removable and are made from the type of material (wood, steel, copper, etc.) required for the study. A small quantity of explosive of known sensitivity is placed on the anvil. The weight is raised to a measured height. When it is released, it strikes the explosive, which may or may not explode. The test is continued, using different heights of fall for the weight. A height will be found above which the explosive will always shoot. This value can be compared with the results of other tests to determine the relative safety of materials. In a similar manner by using previously tested material for the hammer and anvil, the sensitivity of explosives under controlled conditions can be determined. This machine is shown in Figure 4.

This illustrates one method used to determine the type of material suitable for the construction of explosives manufacturing equipment. Other tests are made to determine the characteristics of the process material with reference to specific operating conditions. While the manufacturer of other chemicals may not be concerned with an explosive, he must know the characteristics of his process material so he can build safety into his equipment.

Proper Equipment Important

The safe performance of explosives machinery depends on its ability to go through each cycle of operation unerringly so that in any part of the cycle a given set of conditions will exist and each cycle will duplicate all others. This requires that the mechanical design of the unit be sturdy. It does not necessarily imply massive construction, but that all parts be built with an adequate safety factor and that all fastenings be made secure so they will not come loose during operation. This latter precaution will also prevent contamination. A loose nut or bolt or other part that finds its way into the material being processed is a potential source of trouble and may become the cause of a fire or explosion. In addition to such preventive measures it is also necessary to provide protective measures. While visual inspection will reveal many items of contamination, this method cannot be relied on. Wherever practical, therefore, screens are used to remove dangerous foreign material. Hand tools like the proverbial monkey wrench in the machinery could cause a lot of grief. Consequently, the number of small tools required to make machine adjustments is kept at a minimum. While the machine is in operation, they must be in the tool rack which is arranged to show at a glance if any tools are missing.

All chemical process equipment must be arranged for ease of cleaning and inspection. This is especially true of explosives

manufacturing equipment as the operator must be able to observe all phases of the operation in order to detect any irregularities. To avoid accidents when machines are disassembled for inspection or repair, the number of joints, where explosives can collect, is kept at a minimum. For the same reason, threaded-type fastenings are avoided wherever possible.

Remote Control Operation

Where practicable, explosives processing equipment is arranged for operation by remote control. Concrete walls or sturdy steel shields are provided to give the operator a control station where he is well protected while he regulates the process. He can then give full attention to his work knowing that his life is not endangered. Figure 5 shows an operator protected with a steel shield while he applies pressure to a powder press.

Many operations are carried on in closed vessels which must be equipped with pressure release devices in order to prevent explosions. For example, the die bushings of smokeless powder presses are undercut so the pressure will be relieved if dangerous pressures should develop in the press chamber. A rather interesting method was adopted for a vessel operating at comparatively low pressure. A water seal was provided between the cover and the side walls. The cover was made just heavy enough to overbalance the internal operating pressure. A relatively small increase in pressure will blow the water seal. In the event of fire or unusual pressure increase, the entire cover will blow off to provide a vent.

Emergency Controls

All chemical operations must be arranged to avoid accidents to equipment and personnel under emergency conditions. Things to be considered, for example, are the failure of process piping, pumping equipment, electric power supply, steam supply, and compressed gas supply. Such failures must be anticipated in the design and construction by providing emergency controls and equipment. It is also necessary that all operators be carefully trained to know what to do when such emergencies arise.

A good example of emergency control in the explosives industry can be found in a glycerine nitrator. Agitation, normally obtained by a steam engine driven agitator, can also be gotten by discharging compressed air from a large reserve tank through a sparger in the bottom of the nitrator. The heat of the reaction, normally removed by pumping cold brine through a set of coils, can also be removed by circulating cold water from the service mains. Hence in an emergency when steam, air, and electric services are interrupted, the nitration can be completed safely though at a rate slower than normal.

Aside from the care taken in the c
struction of the process equipment, a number of other factors are involved in the general design and operation of hazardous processes. Where flammable solvents are handled as liquids, there is the imminent possibility of a spill and the formation of explosive gas mixtures in the workroom. Static discharges must be avoided when such a condition exists. For this reason, it is important that all equipment be carefully bonded and grounded and that conductive belts be used if the equipment is driven with a belt drive. The building up of static charges on personnel can be prevented by suitable footwear and the proper use of conductive-type flooring.

Some process materials are temperature-sensitive. This sensitivity must be considered in designing any process equipment requiring heating and in the heating of the process room for personal comfort. It is customary at smokeless powder plants, for example, to limit the steam pressure applied to process and heating

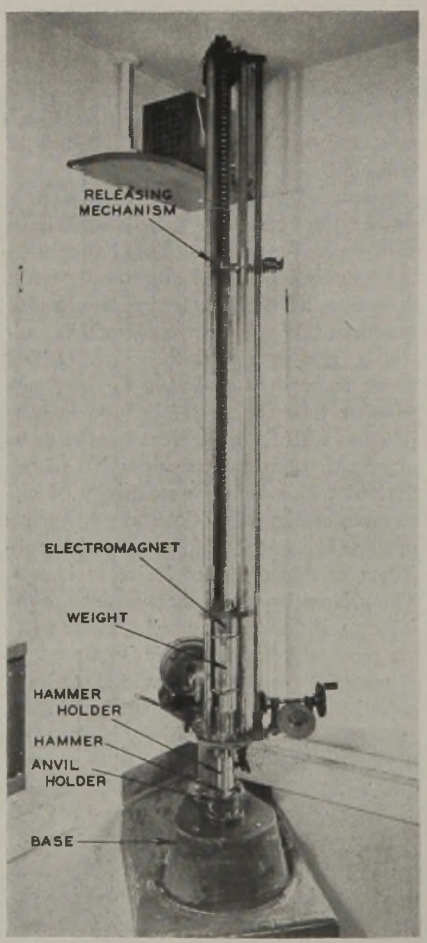


Fig. 4—Bureau of Mines impact machine for determining sensitivity of explosive materials.

equipment to 5 lbs. so that the maximum temperature will not exceed 227°F. At operations where more critical material is handled, it may even be necessary to heat by means of forced air with the heating equipment located in a separate building.

op-
erations which protect equipment and personnel might be applied at chemical plants. One such practice is the custom in the explosives industry of establishing house limits. The maximum number of operators and transients and the maximum quantity of process material permitted are established for each process unit. This minimizes confusion and loss of life and material should a serious accident occur. Operations cease whenever either limit is exceeded. Visitors too are required to abide by all the rules of the plant. Figure 6 shows how these limits are posted in an operating building. Operating rules are also conspicuously posted.

Another practice is the extensive use that has been made of sprinkler systems where a fire risk exists. Special units have been developed that have been known to come into operation and to extinguish a fire in approximately 1 sec. after the initial flare-up. Still another example is the requirement that operators exposed to flash fires wear flameproofed uniforms. These uniforms are laundered and flameproofed at a laundry operated by the plant. The flameproofing provides protection from flash fires only. The flameproofing compound inhibits actual burning of the material but does not prevent charring if exposed to a severe fire. The added protection afforded by flameproofing has been justified in many instances where operators exposed to flash fires have suffered burns only on unprotected parts of the body such as the hands.

Some explosives operations involve the handling of material that is irritating to the operator or harmful to his health. Such conditions require the close cooperation of the medical director, the safety engineer, the operating department, and the employees. The application of suitable protective measures when such conditions exist is well understood by progressive chemical producers.

The maintenance of explosives equipment calls for special handling and care to remove all traces of explosives or flammable material from the equipment before it is turned over to the mechanical department. While it is possible to establish standard practices for certain types of repairs, it is impractical in an article of this type to go into details. It is mentioned here because it is an important link in the safe operation of explosives plants.

Personnel Training

Since a false move could bring dire results, the explosives operator is thoroughly trained before he is assigned to a job. The training is based on standard operating practices which have been established for each particular job. The new employe also must be given guidance in safety matters of a more general nature. This is usually accomplished through the medium of a safety handbook. The training program must be well balanced so the

worker will have a full understanding of how to do his job and a knowledge of safety precautions that must be followed to prevent accidents. While the worker must learn to appreciate the hazards involved in explosives operations, he must also be made to realize that these materials can be handled safely. Demonstrations showing the effect of a fire or explosion of the process material followed by evidence of the effectiveness of the protective measures provided are usually included in the training schedule.

The well-rounded training program develops and maintains good morale. The job assignment does not mark the end of the training given the new worker but the start of a program designed to enlarge on the fundamentals he acquired during his indoctrination. This part of the program requires the earnest cooperation of all groups in an organization beginning with the plant manager, and his staff, and then on down the line through supervisors and foremen to the operators. Material for this program can be developed from a study of the accident and industrial injury reports that show up the weak spots in an organization. Other sources of information and material are organizations such as the National Safety Council, American Standards Association, and many trade associations.

The explosives industry as a whole has established an excellent safety record. This has been developed through the application of two fundamental ideas:

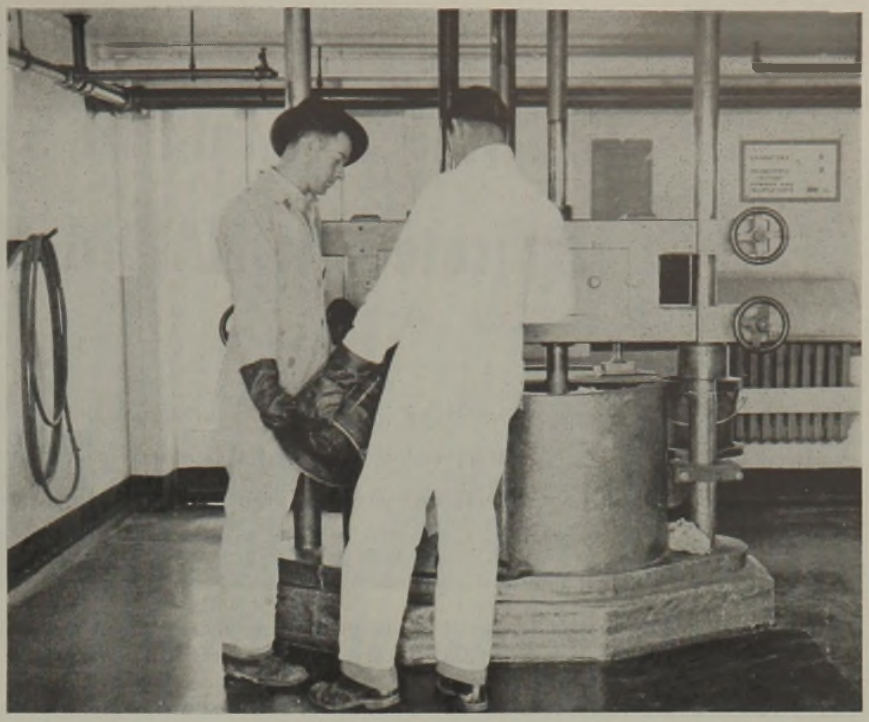


Fig. 6—Maximum number of operators, transients, and process material permitted in the building is posted in a prominent place in each operating unit. Here the notice is on the rear wall.

1. Recognition of hazards and the arrangement of equipment and method of operation to prevent accidents.

2. Recognition of the situation that would result from an accident and the application of suitable protective means to minimize injury and property damage.

When the plant manager who has not already looked at his plant with these factors in mind does so, he will find real opportunities to make his plant a safer and more desirable place in which to work.

A British View of Private vs Government Research

The following excerpt from a recent address by Samuel Courtauld over the BBC short wave system is of interest because it represents one school of thought among British industrialists on the question of state-operated research. Great Britain has moved considerably further toward acceptance of government participation in research than has the United States. Mr. Courtauld is chairman of British Cellophane, British Nylon Spinners, and Courtauld, Ltd.—EDITORS.

AS I AM an Englishman, what I have to say naturally refers chiefly to Great Britain, but I think that the same general arguments apply to all countries, especially those which are now standing on the brink of great industrial expansion.

Clearly there is room for both public and private research working side by side, for each of the two is fitted to perform some functions better than the other. But whatever methods we choose, we must take far more generous views of the value of science than we have done in the past, and cheerfully face vast increased expenditure one way or another.

It is obvious that research wholly paid for by the state must be directed to the benefit of the whole community, and its results must be public property. This does not mean the immediate publication of everything, though that is the ultimate aim.

It is also obvious that the results of any research which is wholly paid for privately are the property of the individuals concerned, who have the choice of publishing them in whole or in part, or not at all. Present day industrial thought seems to be moving in the direction of more pooling of knowledge.

Without going so far as to broadcast everything, industrialists may decide to pool much private information with their own competitors on a reciprocal basis, thinking that cooperation will strengthen their industry as a whole, to the benefits of all in it. I believe that the maximum degree of publication and cooperation consistent with reasonable safeguards against abuse will accelerate the healthy growth of every industry based upon applied science. Probably the old-fashioned love of secrecy brought more harm than good to the average manufacturer.

Big concerns can well afford to spend much more on research than most of them have yet done, and government should encourage them in this by relieving the whole financial cost from taxation. Small businesses can contribute far more liberally to research associations, and they can make real use of these by employing men of scientific outlook on their own staffs. These associations should be liberally and freely supported by Government contributions on a much bigger scale than hitherto. It is estimated that existing industrial research associations in Great Britain have a total annual income of £800,000 to £1,000,000, which include £200,000 from the Government. This is niggardly on both sides. It is the duty of a Government to support the smaller men; the big can better look after themselves. Government support will not bolster up inefficiency and undermine the strong. It will add to the industrial strength of the nation; a well-tilled and well-manured field produces the biggest and strongest plants.

Growing Strength of Synthetics Indicated At NAIDM Meeting

NEW SYNTHETICS, aerosol bomb-type insecticides, raw material situation, development of "DDT", and other industry topics held interest of record crowd at mid-year meeting of National Association of Insecticide and Disinfectant Manufacturers in Chicago.

A TREND toward the application of scientific research which has been developing for the past several years was clearly evident at the recent 30th annual mid-year meeting of the National Association of Insecticide and Disinfectant Manufacturers in Chicago. This trend had its start several years before the war in the laboratories of a number of chemical companies where research was under way to determine the chemical, germicidal, toxic and biochemical properties of synthetic chemicals for use as insecticides and disinfectants.

As in many other instances the war brought tremendous demands for products to control disease-spreading and destructive insects and at the same time cut off or curtailed the supply of natural raw materials. Thus it was that the newer synthetics from the chemical laboratories which had been struggling for markets against the older, accepted types suddenly gained acceptance to an extent that would have taken several years of peacetime development and plugging.

With this stimulus of new competitive products and a promise of greatly expanded markets after the war it has become apparent from the past few NAIDM meetings that the insecticide and disinfectant field is becoming an important and aggressive chemical specialty industry with a belief in the benefits of chemical and applied science research.

Topics on Program

In this latest meeting at Chicago the program consisted of papers and discussions on the following subjects: civilian requirements for insecticides, post war planning, occupational dermatitis, aerosols vs. spray-type disinfectants, post war sprayers or dispensers for insecticides, sanitation in the dairy industry, floor coatings and treatments, the nature of and outlook for "DDT", the future market for insecticides and disinfectants, and several others.

In the opening address of the meeting Henry A. Nelson, president of the Chemical Supply Co. of Cleveland and president of NAIDM reviewed the progress of the industry, outlining some of its wartime achievements and pointing to its post war problems.

With respect to the raw materials situation he said:

"The raw material situation leaves much to be desired. Pyrethrum, paradichlorobenzene, tar acid oils, cresylic acids and numerous other products are still on allocation. Pine oil in particular remains tight. The recent decision of W.P.B. not to allocate any pine oil to disinfectant manufacturers during the month of May caused considerable hardship, especially so since the demand for pine oil disinfectant is larger than for many years past. However some improvement is in sight as soon as stocks have been replenished at the producing points."

Aerosol Symposium

One of the features of the meeting which aroused the interest of nearly all attendants was the symposium on "Aerosols vs. Spray-Type Insecticides". The discussion was led by C. E. Smith of Socony-Vacuum Oil Co. and consisted of talks for aerosols by Dr. Lyle B. Goodhue, U. S. Department of Agriculture and W. W. Rhodes of Kinetic Chemicals, Inc. N. J. Gothard of Sinclair Refining Co. and R. O. Cowin of Standard Oil Co. (Ohio) spoke for spray-type products.

The paper given by Goodhue and coauthored by J. H. Fales, also of the Department of Agriculture, consisted of a comparative study of the efficiency of aerosols and oil sprays. In summing up the authors stated:

"The comparative effectiveness against houseflies of sprays produced with a standard Peet-Grady atomizer and aerosols produced by liquid "Freon" has been determined. The aerosol is superior when sprayed directly on the insects, being slightly better even with exposure periods

Henry A. Nelson, president, delivering his annual address to the convention at the mike; Dr. H. W. Hamilton, Koppers Co., White Tar Div., secretary; N. J. Gothard, Sinclair Refining Co., 1st vice-president, and Mrs. E. D. Sullivan, executive secretary, at the opening of the convention June 12.

as short as 1 minute. When the insects are not exposed until some time after the insecticide has been distributed, the aerosol is more effective after 20 minutes than the spray is after 5 minutes. The 10-minute knockdown effect was about 7 percent greater with the spray, but the knockdown with the aerosol was still 74 percent after a delay of 20 minutes before exposing the flies."

W. W. Rhodes reviewed the development of the non-toxic, non-flammable "Freon" group of refrigerants and their adaption to the aerosol bomb-type of insecticides. In discussing the post war possibility of aerosol insecticides Mr. Rhodes said:

"The objective of a number of manufacturers of returnable 1-pound containers is to be able to sell one for $.50 and make a profit. Such a container will have a valve through which it may be refilled and will be suitable for use during a period of 25 years. This container sold to the aerosol loader at $.50 should reach the public at $.75. On the initial purchase of one pound of aerosol the customer will buy a container and the pound of aerosol for a sum, say, of $2.00. He then becomes the owner of a dispensing device. This dispensing device may be returned to the dealer when making a new purchase and an identical one will be turned over to the customer and he will pay only the price of one pound of aerosol which may be $1.25. He will not be allowed to return the container for a refund as that would place too much of a financial burden on the aerosol loader during the slack months of the year.

"Some I know are speculating on how much capital will be necessary to get into this business. An efficient loading plant will cost from $50,000 to $75,000 to erect and equip. Stock of raw materials and containers must be financed before the season opens and there may be as much as $300,000 tied up in stocks before the selling season. The plant for which I have given the cost above would have a capacity of about 300,000 pounds per month and it will hardly be economical to erect plants of less capacity than this amount."

R. O. Cowin in his talk on behalf of the spray-type of insecticides said that it is possible that the industry will be greatly affected by the new aerosol bomb which the armed forces have been using in fighting insects but went on to say that the cost of aerosols may be too high for general acceptance and that the matter of the toxicity of "Freon" must bear careful examination. He also said that progress would be made in developing more potent sprays and better equipment for dispensing them.

In summing up his talk on "Another View of Aerosol Efficiency" N. J. Gothard of Sinclair Refining Co. said:

"In summary, we find that the current aerosol bomb, as at present used, and which is claimed to be effective against flies and roaches is not as effective as the conventional sprayer. In a full scale room test, using 48 percent more pyrethrins and with the benefit of a synergist, the bomb gave a knockdown 15 percent lower and a kill 11 percent lower. In order to equal the knockdown and kill obtained by the conventional sprayer, it seems evident that an excessive amount of pyrethrum must be used in the bomb to equal the kill obtained by the usual sprayer. We find further that the knockdown with the aerosol bomb is excessively slow, as well as ineffective, and would not be satisfactory to the average user.

"Further developments of the aerosol bomb may remove these objections, particularly if the newer and possibly more effective toxics are successfully developed. Some of these developments may be under way, of which we are unaware, but it would appear to us that the present aerosol bomb, using pyrethrum, is not as effective as the conventional Grade AA insecticide applied with a sprayer."

James E. Green, Standard Oil Co. of Indiana, left, and J. O. Cowin, Standard Oil Co. of Ohio, who discussed sprays in the symposium on "Aerosols vs. Spray-Type Insecticides."

"DDT" Story

The story of "DDT", of universal interest to members of the insecticide industry, was told by Victor Froelicher of Geigy & Co. In tracing the development of this material Mr. Froelicher said:

"In September 1941, J. R. Geigy of Basle, Switzerland, our parent company, informed us of a new insecticide which, in the form of a 1 percent dust had been found extremely effective against the Colorado potato beetle."

Melvin Fuld, right, Fuld Bros., Baltimore, Md., chairman of the Post War Planning Committee, and W. A. Hadfield, Pennsylvania Salt Co.

"In August 1942, we received from Switzerland 100 lbs. each of "Gesarol" spray, containing 5 percent active ingredient, and "Gesarol" dust, containing 3 percent active ingredient. At about the same time, we received news that Major A. R. W. De Jonge, American military attache at Berne, Switzerland, had shown great interest in our new lousicidal composition called "Neocid," which contained the same active ingredient as the "Gesarol" products. It was indicated that "Neocid" had great significance in controlling the typhus-carrying body louse.

"On October 16, 1942, we contacted Dr. R. C. Roark at Washington, and handed him a Swiss report giving the results of tests which had been made with "Gesarol" on a great variety of insects, some of which, like the Colorado potato beetle, are familiar to us in the United States.

"A hundred kilos of the active ingredient were imported from Switzerland so that research might be continued and the manufacture of the product studied in the United States. In particular, we were interested in the lousicidal qualities which proved to be of such singular importance. This work was mainly carried on at the Orlando Station of the United States Department of Agriculture by 29 scientists under the direct supervision of Dr. F. C. Bishopp, Dr. W. E. Dove and E. F. Knipling. The results obtained were so spectacular that the Surgeon General's Office and the Office of Scientific Research and Development became very interested. In a short while the supply of imported material was exhausted and it became desirable to manufacture the product in this country.

"With little current information regarding the manufacture, Cincinnati Chemical Works, Norwood, Ohio, which is partly owned by Geigy, Switzerland, was called upon to solve the manufacturing problems.

"GNB-A-DDT" is made from chloral hydrate, monochlorobenzene and sulfuric acid. Cincinnati Chemical Works did an amazing job considering that pilot plant production only started in May 1943. By July, a very creditable showing was being made in the practical units, but unfortunately, chloral hydrate stocks and production were overtaxed and this proved a bottleneck in the manufacture. It was necessary to take steps to increase production which the WPB undertook and on which they did a very exceptional job.

"Other manufacturers besides Cincinnati Chemical Works have been asked to manufacture DDT. Production is steadily increasing, but in spite of this I fear there is little hope that it will become available for civilian or agricultural use during 1944 on a commercial scale."

As chairman of the post war planning committee for the association Melvin Fuld of Fuld Brothers reported on the work carried out by the committee and presented the following recommendations as a guide for the future.

1. That interest of the individual member will be better served if he does his own post war planning and bases his conclusions and courses of action upon his individual problems, giving due consideration, however, to both general economic factors and trends and such factors that will affect his immediate sales area.

2. That the association, through the secretary's office, should keep members posted on the general economic factors and trends.

3. That a small but active advisory committee be formed. The duties of such committee to be (1) the gathering of worthwhile data on post war planning, and submitting such data to the secretary's office of the association, together with recommendations as to distribution to the membership, and (2) to answer individually questions of wide interest, which may be sent in by the members, the individual answers of the members of the committee being published in full, without names of the members, in the bulletin, in order that different views may be had for consideration.

4. That a questionnaire be sent out to the entire membership with the recommendation that it be carefully and completely filled in—and that this questionnaire be retained by the members for study and action.

Quaternary Ammonium Compounds

A. S. DuBois, Onyx Oil & Chemical Co. said in addressing the gathering on quaternary ammonium compounds as germicides, that the first of these products was put on the market in 1938 and that they are still a novelty in the antiseptic field compared with products such as the phonols whose use dates back to about 1850. In conclusion he said it appears that even though the high molecular weight quaternary ammonium compounds have certain limitations their unique combination of valuable properties does represent advantage for numerous important uses.

Cationic Germicides

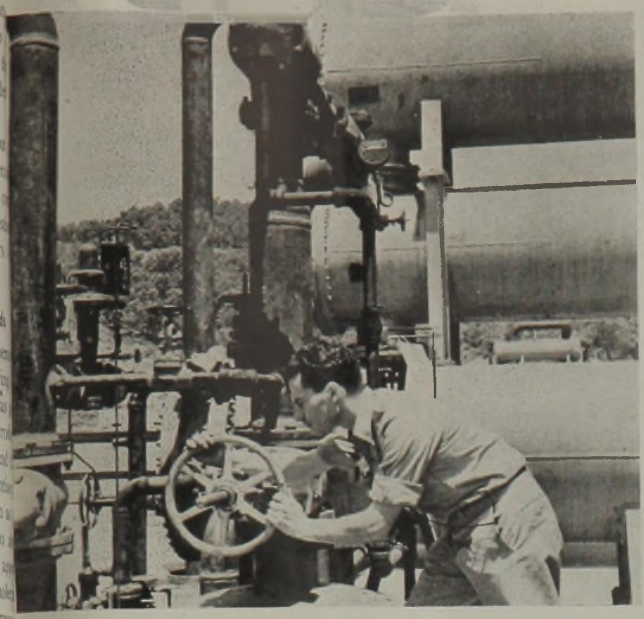
Charles G. Marshall, Associate Director, Industrial Division, Winthrop Chemical Co., in speaking of cationic germicidal agents said:

"Prior to World War I disinfectants for general cleaning use were limited to few preparations such as chlorinated lime, certain coal tar disinfectants and several oxidizing and reducing agents with germicidal characteristics.

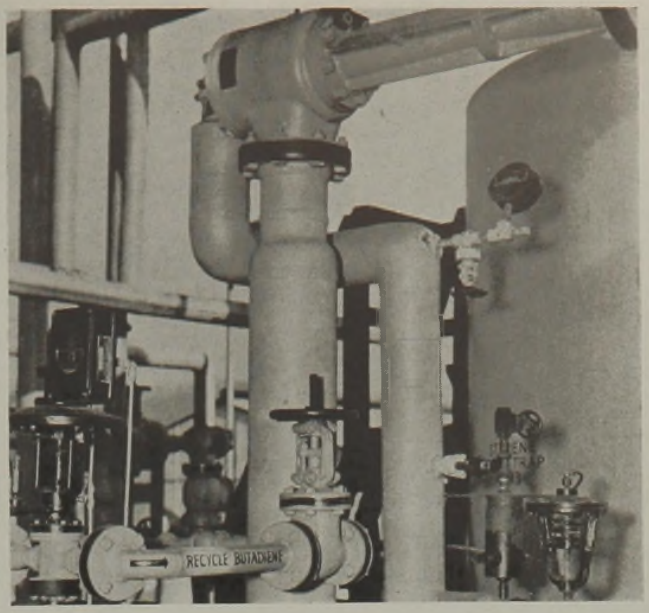
"The ideal disinfectant has not been discovered yet. However the cationic germicidal detergents which have been studied and developed commerically during the past five years more nearly approach the idea than any other sanitizing agents which have been in general use."

Dr. Louis Schwartz and his assistant, Lieut.-Col. S. M. Peck, of the U. S. Public Health Service, Bethesda, Md.

Newton C. Farr, Farr & Co., chairman, Committee for Economic Development, and C. R. Cleveland, Standard Oil Co. of Indiana.



Unreacted butadiene and styrene are recovered from synthetic latex by flash evaporation and steam distillation at government plants.



Part of butadiene condensing system is shown at left. Above is booster ejector in butadiene-styrene recycle system.

Recovery of Unreacted Gases Cuts Synthetic Rubber Cost

by L. S. STINSON
Heat Transfer Department, Elliott Company

MANY IMPROVEMENTS IN TECHNOLOGY have had a hand in making possible Rubber Director Bradley Dewey's statement that synthetic rubber will compete with natural rubber after the war without benefit of subsidy. One such improvement has been the virtually complete recovery of unreacted butadiene and styrene.

IN TEN YEARS of prewar experiment with synthetic rubber a considerable "know-how" was built up in this country; two synthetics, neoprene and thiokol, had been invented in the United States, and several American companies were manufacturing rubber of the Buna type. These prewar synthetics had wide industrial uses, especially where special qualities of oil resistance or other attributes not common to natural rubber were needed. But they were not competitive with natural rubber in cost.

With today's mass production, however, one workman in a synthetic rubber plant is the equal, in terms of output, of 100 native laborers on a plantation. Tires made from today's synthetic rubber are the approximate equals of natural rubber tires in service and wear. And the cost of synthetic rubber in the postwar future will be "competitive with normal prices for plantation crude," say the experts.

There are many reasons for this reduction in cost; continuous operation after the batches leave the reactors, as against limited "pilot plant" output, greater experience, and improved methods are some of them. Credit must go in part, however, to the highly efficient recovery system by which unpolymerized butadiene and styrene are recaptured and re-run until they combine into latex. Formerly there was considerable waste of this unreacted material; today all of it is used.

The importance of the recovery procedure lies in the practical limitations attached to the polymerization process. In the amount of time allotted to this process, only about 80 percent of the butadiene and styrene combine into latex. The remaining 20 percent would combine if given sufficient time and treatment, but it is not practical to delay the operation until this occurs. It is more efficient to use a recovery system to gather and re-run the valuable unreacted material.

Polymerized latex plus unreacted butadiene and styrene pass through a blow-down or surge tank which provides enough material for a changeover from batch to continuous operation and then, as a first step in the recovery operation, flow through two flash tanks. Pressure in the blow-down tank is reduced from the 75 pounds used in the autoclave to approximately 40 pounds. In the two flash tanks it is further reduced to about 5 pounds and 10 inches of mercury absolute by automatic controls.

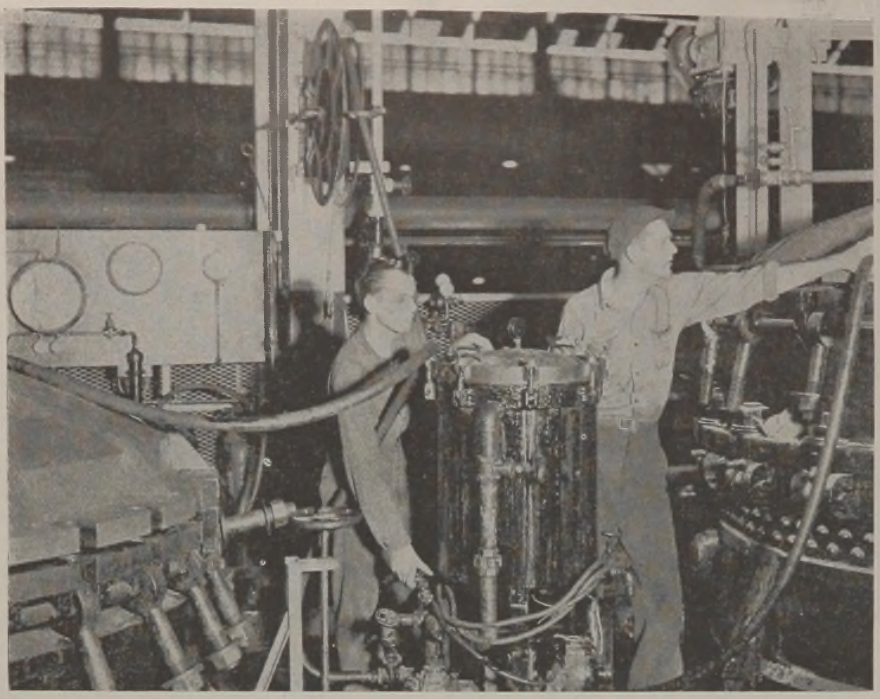
Since butadiene boils at approximately 24°F. at atmospheric pressure, it is freed by this reduced pressure and is returned to storage. Almost complete recovery of butadiene is accomplished at this point.

The latex minus unreacted butadiene is then pumped to the top of a stripping column for styrene recovery, a much more difficult problem. Fractionating columns, four stories high, are of the perforated plate type. The latex descends from plate to plate counter current to the upward movement of steam which has been desuperheated. The pressure of the rising vapor maintains the liquid level across the plates, and the vapor bubbling through the latex distills off the styrene under a vacuum of 25 inches of mercury.

The unreacted styrene and steam pass from the column into a vapor trap which would trap out any possible carry-over, a condenser, and an ejector. Condensed liquid styrene is thus separated from non-condensable vapor such as residuary butadiene and gases, which are returned to the flash tanks where the gases are vented.

A steam jet ejector and two condensers are ordinarily used to maintain the required vacuum and condensed styrene and water which flow to a decanter or settling tank, where difference in specific gravity separates them. Styrene is drained from the top and re-used, while the water drains from the bottom.

Virtually all of the unreacted butadiene and styrene is being recovered in this manner in the government synthetic rubber plants.



the East Pittsburgh Works of Westinghouse. Pressures of 15 to 28 p.s.i. are used in this portable pressure filter.

Maintenance of Quality of INSULATING VARNISHES Conserves Critical Materials

CHEMICAL SPECIALTIES

by D. L. GIBSON and C. H. BRAITHWAITE
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

CONSERVATION OF MATERIALS requires cooperation between producer and user. Here is an example of how a user of insulating varnishes worked out an easy, on-the-spot method of reclaiming contaminated varnish by cold pressure filtering. The idea is one that other makers of protective coatings may find useful for their own purposes or for passing on to customers.

A PROBLEM that concerns both makers and users of insulating varnishes is the tendency of the varnish in the dipping tank to pick up various foreign materials in the course of its use. Contaminants seriously impair the insulation value of the varnish film and lower the performance of the electrical equipment treated.

In the usual electrical manufacturing plant the varnish tank is open during use, is located in the center of manufacturing activities, and the pieces to be coated are themselves not always perfectly clean. Under such conditions a certain amount of contamination is unavoidable. Periodically, therefore, the situation requires rehabilitation or disposal of large quantities of varnish. Obviously it is in the interest of both economy and conservation of critical materials that disposal be avoided and the life of the varnish be extended as long as possible.

To accomplish this, a method of cleaning the varnish without interfering with production has been developed. Portable pressure filters have proved adequate for the operation. In addition, a system for control and test of these varnishes has been developed which indicates when filtering is needed. The savings resulting from longer use of the varnish and increased service of the apparatus in the field cannot be estimated.

Nature of Contamination

Contamination may be classified into three types by use of wet and dry dielectric tests and heat endurance tests. Conducting particles may lower both wet and dry dielectric strength, and very probably impair the heat endurance of the varnish. A second type is identified by a high dry dielectric strength, a low wet dielectric strength, and a low heat endurance. Contamination producing varnish gels or precipitated resins might not lower the dielectric strength but might lower the heat endurance or life of the varnish film.

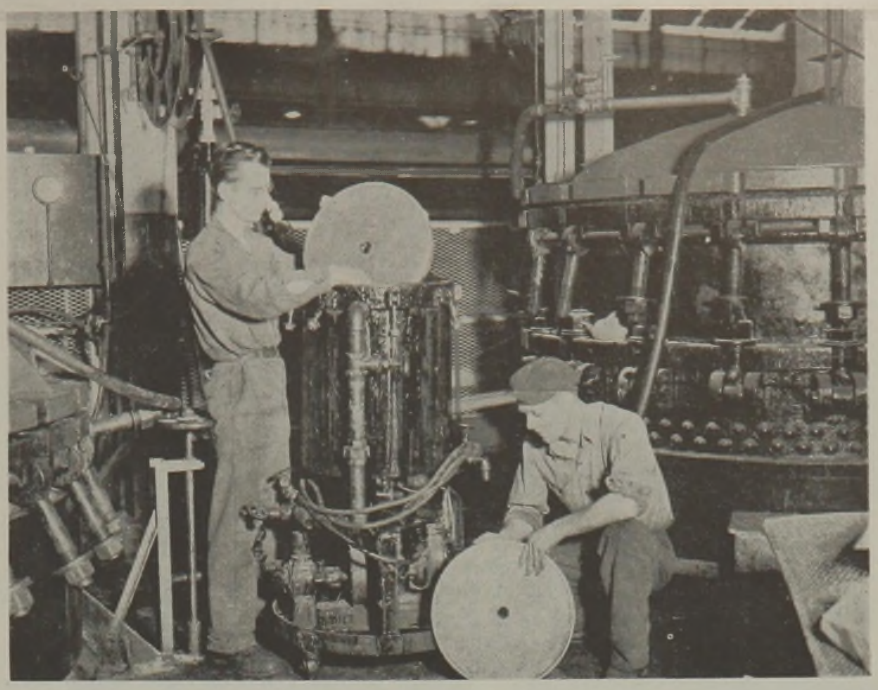
Disruption of the varnish film by particles of foreign matter seriously impairs the properties of the insulation. On electrical equipment there is no need to mention the effect of electrically conducting or ionizing particles on the dielectric breakdown value, particularly when they become imbedded in the insulation. In some cases, although the particles are not conducting, they cut into the insulation during processing, lowering the breakdown level of the material.

Thus, it is important to keep varnish for treating electrical equipment as clean and as free from foreign material as possible. As a base or goal, the electrical properties and mechanical properties should be kept in the same order of magnitude as those of the new varnish.

Reclamation Process

Careful control of the varnish requires an adequate filtration method. The materials used in varnish manufacture are critical, and maintenance of the varnish in usable condition is essential. The particle sizes of contaminants range from large pieces of wood to colloidal carbon. Pieces of metal as small as .003" in diameter have been found. A study of the available methods suggested that the most efficient method of reclamation of the varnish and conservation of critical materials was by pressure filtration.

A *portable type pressure filter*, consisting of a number of plates arranged vertically and enclosed in a shell, was found to be satisfactory. Pressure of 15 to 28 P.S.I. are used, with rates of flow varying



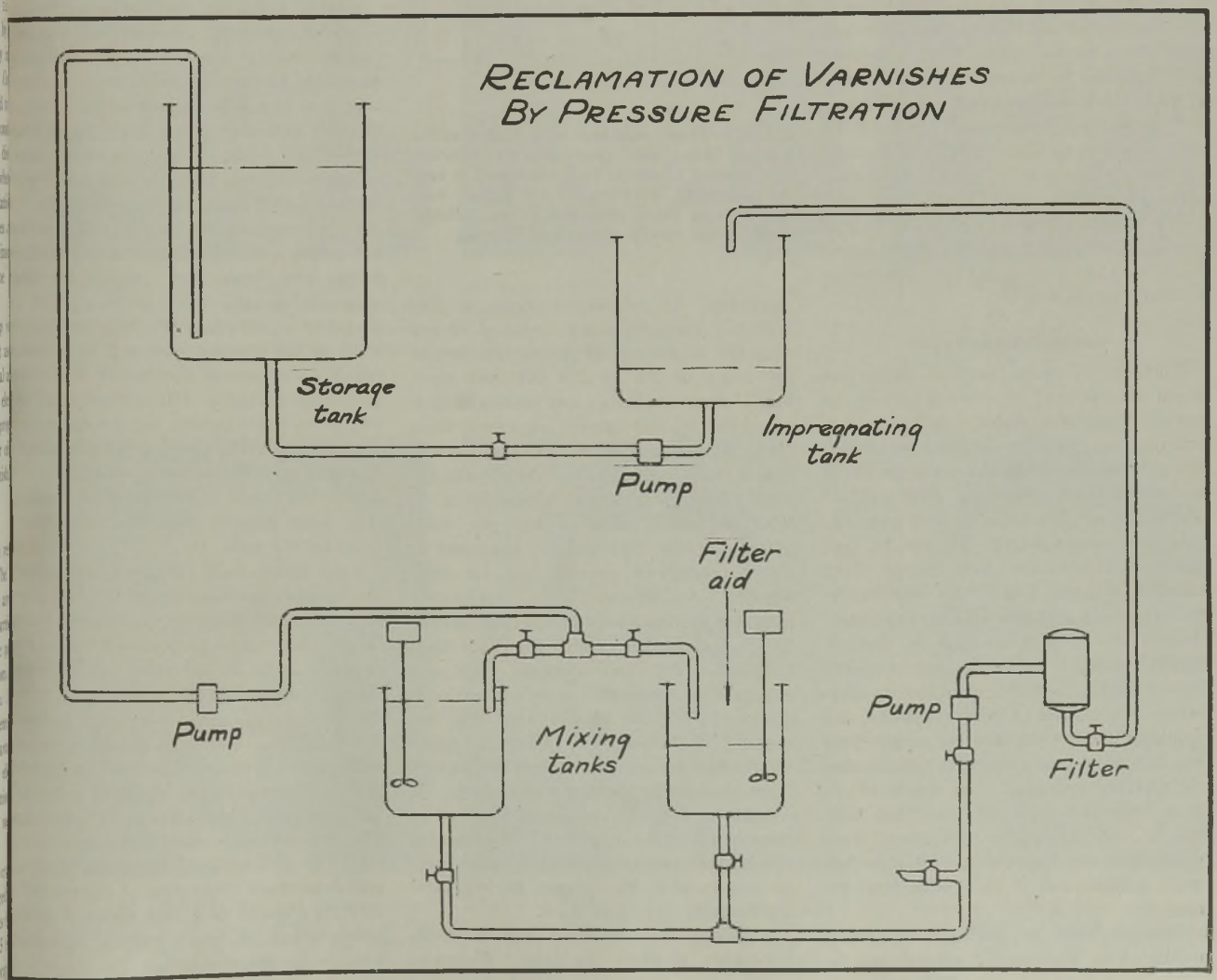
Right— plates of the portable pressure filter. Extreme care must be taken to keep every one of the 1/16-inch holes open.

from one to five gallons per minute depending upon the pressure, amount of cake and viscosity of filtrate.

Filtration was carried out using a diatomaceous earth as a filter aid. This was found to be particularly necessary since some of the contaminating material filtered out was a gel, and quickly filled up the pores of the filter medium. The addition of filter aid allowed a porous cake to build up which was not as easily clogged as the filter medium alone. In order to avoid addition of the filter aid to the large varnish tanks, two 100 gallon tanks were set up in which the diatomaceous earth was continuously mixed with the incoming varnish stream. Varnish was pumped from here through the filters and into a clean tank in the system.

In addition, strainers which eliminate particles greater than 20 mils in diameter have been installed in the tank system. The particles which are particularly troublesome are, in general, below 20 mils in diameter.

Filtering of varnishes in tanks in shop use presents more problems than filtering of new varnish. New varnish will not have the detrimental foreign material such as metal chips, white lead, carbon dust, that varnish in shop use will accumulate. However, new varnish may need to be clarified by use of filter-aid and pressure filtering, centrifuging or settling, or some combination of these methods. The advantage of filtering newly made varnish is that it may be handled while hot, with re-



sulting low viscosity. Frictional losses are much less at lower viscosities, so that a greater throughput results. The flow rate is in inverse proportion to the viscosity.

Varnish in use in repair shops or manufacturing plants obviously cannot be heated because of fire hazard. Heat causes rapid polymerization, with a resulting short tank life. Filtering must be done at room temperatures, usually 20—35° C., with consequently higher viscosities. The viscosity will vary with the type of varnish and condition of the varnish in the tank. A rise of temperature in a varnish tank from 25° C. to 35° C. will lower the viscosity approximately 50 per cent; so it is important to filter at 25° C. or higher, if possible. In addition, it is possible to handle different types of varnish in a portable shop filter. When changing from one varnish tank to another, careful cleaning of the filter is required. Where there are ten to twelve different types of insulating varnishes in use, each filtering operation must be planned and carried out separately.

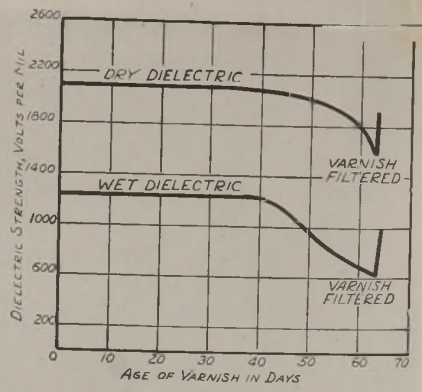
The efficiency of the filtering treatment is judged by a series of chemical and physical tests on samples taken before and after filtration. Viscosity at 25° C., per cent of solids, and specific gravities at 25° C. are checked. Significant results are obtained from dielectric tests and a heat endurance or life determination test made on a varnish film. Heat endurance is determined by depositing varnish films of .002" thickness on copper strips. These are continuously heated at 150° C. and the time noted to produce failure of the film on bending about a ⅛" mandrel. Dielectric tests consist of measuring the dielectric breakdown strength of a .002" thick varnish film on each side of a 5 mil copper sheet, both as received and after immersion in water for 24 hours.

Varnish Behavior Varies

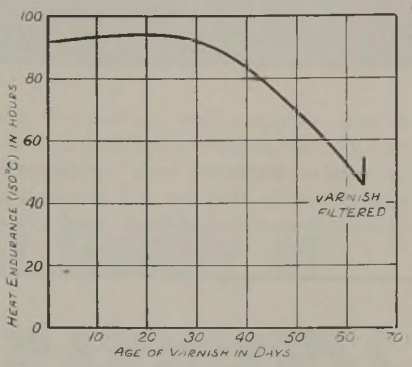
Filtering of shop varnish tanks has given information on the behaviors of various varnishes under continuous use. Information has been obtained on varnish filtered through portable pressure filters in lots of 100 gallons to 2000 gallons. Varnishes varying from asphalt gum dissolved in naphtha-type solvents to synthetic resins in toluene were filtered. Each varnish presents a different problem as to throughput and rate of flow to produce desired clarity and removal of contaminants. Samples of the varnish are taken before, during, and after the filtering operation. Percentage of body, viscosity, and specific gravity show whether or not there is a loss of solvent or varnish resin during the filtering operation. The results of the heat endurance tests and dielectric tests before and after the operation show whether or not harmful foreign materials were present and if they have been removed.

Improvements in dielectric properties produced by filtering the varnish are remarkable. An average increase in dry dielectric strength in the order of 30 per cent and in the wet dielectric strength in the order of 200 to 250 per cent were found. Heat endurance and the mechanical properties of the varnish improved from 10 to 20 per cent upon filtering. In one case a badly contaminated sample was filtered with a resulting improvement in heat endurance of over 100 per cent. Plastic asphalt type varnish improved in this characteristic over 40 per cent after filtering. An increase in heat endurance indicates that particles of colloidal matter which damage the varnish film have been removed. The improvements cited are examples of varnish in poor enough condition to show the harmful effects of extreme contamination. Varnish tanks should not be allowed to fall to such a poor level under ordinary conditions. It should be realized, however, that while the varnish characteristics of tank varnish can be restored to the approximate level of new varnish, they cannot be improved significantly over that level.

Reference to Curves 1 and 2 shows biweekly checks on the dielectric



Curve 1—Wet and dry dielectric strength of a heat reactive varnish before and after pressure filtering. The dielectric strength remains fairly constant for 40 days, then starts declining. At the end of 60 days it has reached a point about one-half normal value. After filtering it has returned to its normal value.



Curve 2—Heat endurance of a heat reactive varnish before and after pressure filtering. The adverse effect on heat endurance is easily discernible. Filtering did not entirely correct this as there remained a fine colloidal material not readily removed by filtering.

f varnish from the same 2000 gallon tank for a period of 60 days. After forty days, the wet and dry dielectric strengths started to decrease and the wet dielectric strength reached a point about one-half the normal value in sixty days. After filtering, the dry dielectric breakdown returned to its normal value of about 2000 volts per mil.

It is interesting to note the effect of the addition of a varnish incompatible with the varnish in the tank. Less than 3.0% of such a varnish was added to a sample from this 2000 gallon tank twenty days before filtering. The adverse effect on heat endurance is easily discernible (Curve 2). As indicated by the curve, the condition was not entirely corrected by filtering. This is an example of a fine colloidal material that cannot readily be removed by filtering.

In another case a tank showed very little change in dielectric properties after filtering. Dielectric breakdown strengths were high both before and after. However, the tank contained a considerable amount of coagulated varnish, and needed filtering. Foreign material of this type does not ordinarily harm the dielectric properties of the varnish film, but may cut or break the insulation during later processing, causing serious mechanical damage.

In most instances there was no change in percentage body, viscosity, and specific gravity during filtering. This indicates no change in varnish composition. Serious objection has been raised in the past to filtering varnishes of this type, due to loss in body or resin. Using the closed type of pressure filter, the only loss noted was solvent, which could be replaced easily.

From compilation and correlation of these data with manufacturing experience, it has been found that frequent filtering of insulating varnishes is necessary during shop use to maintain the high insulating level of the varnish film and to prevent possible mechanical damage of insulation by foreign particles. Portable pressure filters proved satisfactory for this operation. It is apparent that the type of contaminant depends upon the material treated in the tank. The length of time between filtering operations depends upon the use or activity of the tank.

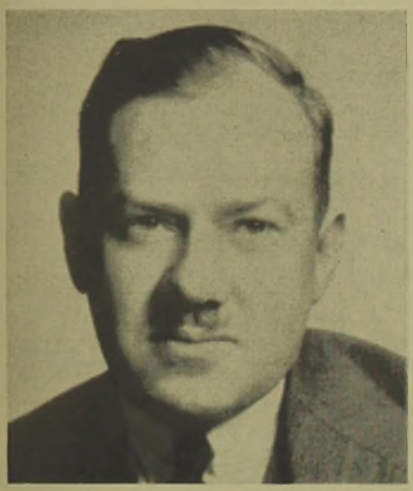
Each filtration of contaminated insulating varnish has been found to save from $.25 to $2.50 a gallon in material and labor costs and to increase dielectric strength about 30 per cent, wet dielectric strength about 200 per cent.

Insulation varnishes are complex chemical mixtures, and care should be exercised in using them. The use and maintenance of varnishes are chemical engineering operations; therefore it is important that they be under the control and supervision of persons with the proper training and experience. Filtration of electrical insulating varnish is a step forward in the conservation of those critical materials used in its manufacture.

HEADLINERS in the NEWS

DR. HORACE E. RILEY of the Research Div. of the Bakelite Corp. has been appointed general chairman of the 108th meeting of the American Chemical Society in New York, Sept. 11-15.

DR. AUGUST MERZ, Calco Chemical Div. of American Cyanamid Co., has been named honorary chairman of 108th A. C. S. meeting to be held under auspices of the North Jersey Section.



DR. LLOYD M. PIDGEON, University of Toronto, has been awarded the McCharles prize of $1000 in recognition of his development of a process for production of magnesium from dolomite.

EUGENE HOLMAN was recently elected president of the Standard Oil Co. (N. J.). Trained as a geologist with broad experience in the oil industry he has been with Standard since 1928.

CHARLES C. CONCANNON has returned to post as Chief of the Chemicals Unit of Bureau of Foreign and Domestic Commerce after returning from Chile where he advised on establishment of chemical industry.

AUGUSTE ROOSEBOOM has become associated with R. W. Greeff & Co., Inc., in the position of vice-president. For the past six years he has been with the Shell Union Oil Corp.

ALLAN A. WALTER has been elected Controller of Freeport Sulphur Co. He was previously associated with the Firestone Tire and Rubber Co. in Akron, Ohio, for many years.

LAURENT J. LABRIE has been appointed Technical Director of both the Chicago and New York plants of Paisley Products, Inc. He was formerly chief of Heavy Chemicals Unit, OPA.

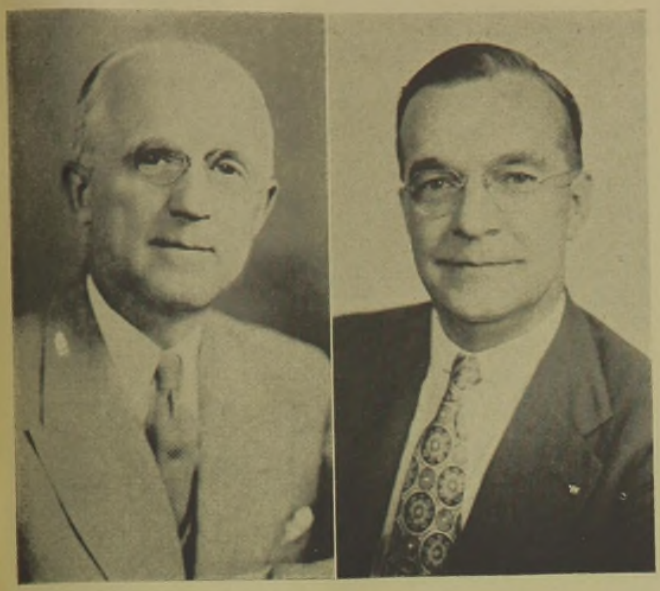
DCAT Hears Army and Navy Officers on Medical Supplies

Officers who have been in the actual field of combat related the activities of the United States Army and Navy Medical Corps and the part played by the products of the drug and chemical industry on the battlefronts at a recent luncheon meeting of the Drug, Chemical and Allied Trades Section of the New York Board of Trade. Harold M Altshul, shown at the right, of Ketchum & Company and chairman of the section's affairs committee, presided as toastmaster.

Brigadier General F. A. Blesse who recently returned from a year and a half of service in the North African theatre spoke of his experiences in caring for the wounded and handling medical supplies.

Commander H. A. Gross, Medical Corps, United States Navy, now Executive Officer of U. S. Fleet Hospital No. 114. Commander Gross described his experiences at Pearl Harbor and in battles in the Pacific.

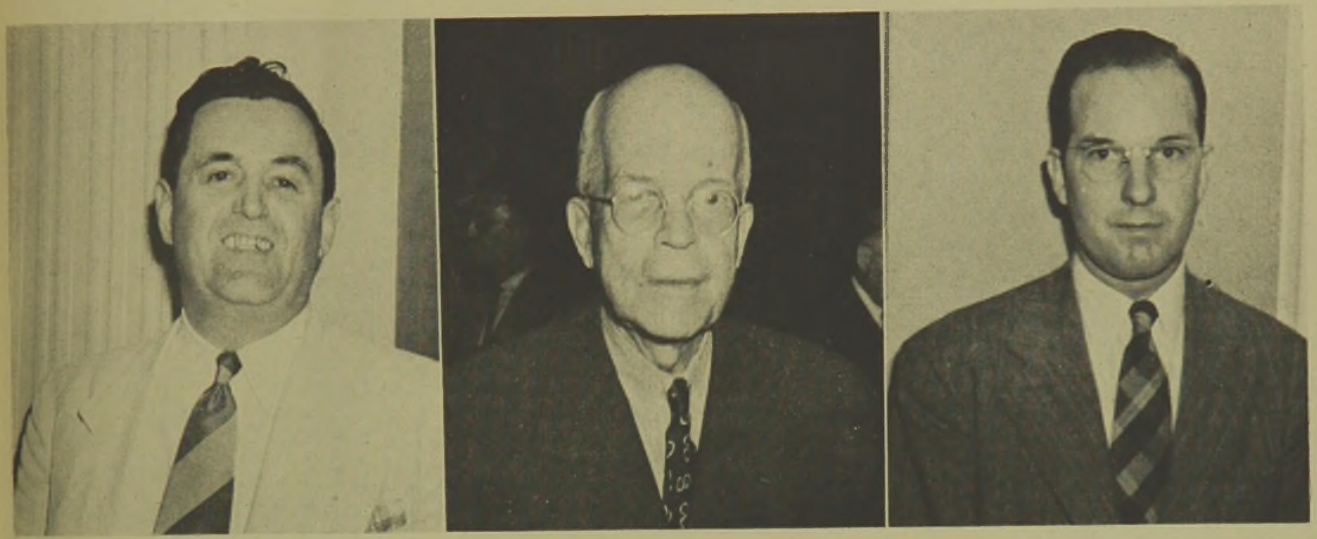
Above, left to right: Some of the members and guests at the head table were: Mathew G. Ely, president of the New York Board of Trade; E. T. T. Williams of Becton, Dickenson Co. and Chairman of DCAT; Robert B. Magnus of Magnus, Mabee & Reynard and treasurer of DCAT; Guy L. Marsters, of Norwich Pharmacal and vice-chairman of DCAT; and Captain E. R. Eaton, M. C., U. S. N. R.



ASTM Holds Annual Meeting in New York

With a record-breaking registration of members and visitors, totaling 2063, 16 formal technical sessions with several informal round tables, more than 250 meetings of the society's technical committees, and a large number of actions on specifications and tests for materials, including over 50 new standards, the Forty-Seventh Annual Meeting of the American Society for Testing Materials in New York, June 26-30, was a notable one.

P. H. Bates, far left, Chief, Clay and Silicate Products Division, National Bureau of Standards, was elected president of the society and Arthur W. Carpenter, Manager, Testing Laboratories, The B. F. Goodrich Co., was named vice-president.



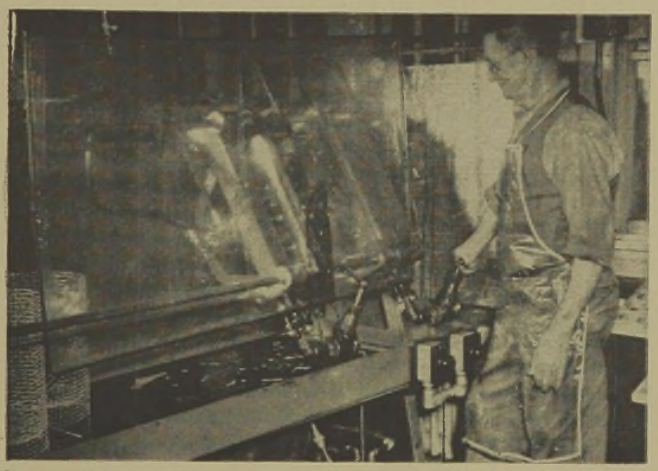
Above, left to right: Henry L. Kennedy of the Dewey and Almy Chemical Co. presented a paper entitled "Entrained Air—Its Effect on the Constituents of Portland Cement Concretes"; Tom Hix, formerly general chemist of the Universal Atlas Cement Co., who was made first honorary member of Committee C1 on Cement; and C. J. Walton, Aluminum Company of America, co-author of a paper on the immersion testing of aluminum-copper alloys presented before the non-ferrous metals and alloys session.

CANADA AT WAR: Displays at the recent Canadian Chemical Conference and Exhibition dramatically portrayed the expansion of Canadian chemical production capacity. The picture at the left above shows the booth of the Allied War Supplies Corp., a Crown company administering on behalf of the Chemicals and Explosives Branch of the Department of Munitions and Supply which operates 32 chemical and explosives plants. At the right are shown the booths of Defense Industries, Ltd. and the Alberta Nitrogen Products, Ltd.

Chemical Picture News

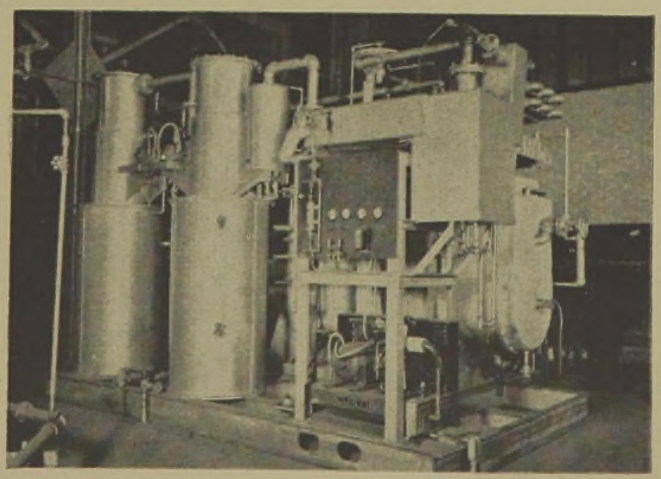
THE BADGE OF OFFICE of the presidency of the Chemists' Club changes hands as C. R. Downs, left, new president of the club receives from C. R. DeLong, retiring president, the ancient copper pot, the symbol of office since 1915.

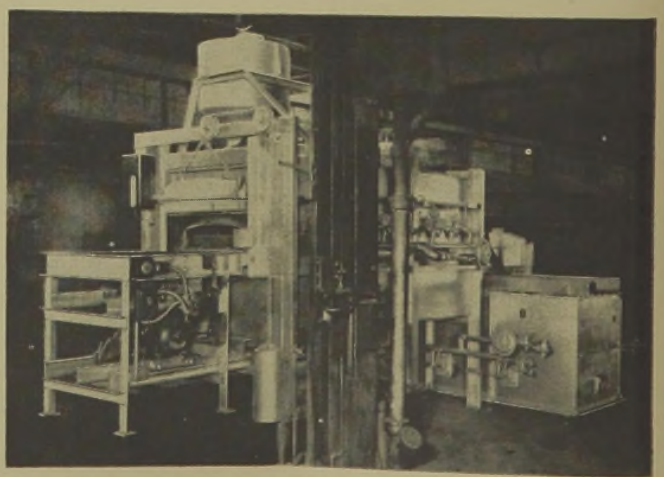
DISCOVERER OF METHOD for quickly analyzing aviation gasoline, rubber and TNT by use of infra red rays, James A. Wilson of the Esso Laboratories receives gold medal and cash award from Frank Howard, pres. of Standard Development, left, and W. J. Sweeney.



SPLASH CURTAINS for the protection of machine operators are one of the new uses for transparent sheets of compar, a flexible rubber-like synthetic (vinyl resin derivative) developed by the Resisto-flex Corporation.

A NEW METHOD of preventing "shrapnelling" of oxygen and carbon dioxide cylinders has been developed by Walter Kidde & Co. Untreated cylinders can explode into pieces when hit by flak or bullets but wrapped with wire the cylinder is cleanly pierced.





ATMOSPHERES FOR HEAT TREATING metals are used in the production of special alloys. Above, at the left, is shown a surface combustion preparation unit in a steel mill. This unit has a capacity of 8,000 cubic feet per hour of inert nitrogen. At the right is shown a unit consisting of a furnace utilizing a prepared atmosphere and molten salt quench tank for the production of metal parts of high hardness without brittleness. It is able to handle many small parts in minimum space.

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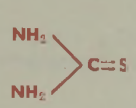
...Either LCL or Carloads

WHETHER you need Thiourea for current production or for experimentation in connection with your long-range planning, you can get it immediately from Monsanto. Some of the many uses for Thiourea are listed at the right...your experimentation may reveal new applications or may lead to the discovery of entirely new products or processes. For samples, data, prices and technical assistance in applying Thiourea to your product or to your postwar planning, contact the nearest Monsanto office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second St., St. Louis 4, Missouri.

District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

MONSANTO THIOUREA



Also known as thiocarbamide, sulfocarbamide and sulfourea

White free flowing crystals

Moisture:	0.5 maximum
Ash:	0.05 maximum
Iron:	8 P.P.M. maximum
Specific Gravity:	1.406

TEN PRESENT and POTENTIAL USES OF THIOUREA

Starting Point in:

1. Manufacture of resins
2. Manufacture of medicinals
3. Manufacture of synthetic chemicals
4. Manufacture of Thioglycolic Acid
5. Manufacture of adhesives
6. Photographic compositions
7. Compositions for treating rayon
8. Dyestuff synthesis
9. Oxidation inhibitors
10. Manufacture of insecticides

These suggested uses are for illustration and are not to be construed as recommending violation of any patent.

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MONSANTO CHEMICAL COMPANY, Organic Chemicals Division
1700 S. Second St., St. Louis 4, Mo.
Without cost or obligation on my part, please send: ☐ Experimental Sample of Thiourea; ☐ Data on application of Thiourea to

(NAME OF PRODUCT)

Name _____
Company _____
Street _____
City _____ Zone _____
State _____
Note: A technical service specialist will call at your request

BETWEEN THE LINES

Defeated Germany May Yield Valuable Data on Chemicals from Coal

Assuming that a rigorous policy is followed toward all German industry with a bearing on military potentialities, an Allied victory may well bring some additions to the knowledge of making chemicals from coal in this country. Germany's wartime dependence on her coal deposits for materials ordinarily obtained from other sources is well known.

INCLUDED in several hundred patents of German origin sequestrated by the Alien Property Custodian recently, are a number concerned with hydrogenation, conversion of solid fuels into valuable derivatives of various kinds, and other processes dealing with chemical uses of coal.

According to present policy, these patents will be made available to American industry. This has led to some speculation as to the possible stimulus to such industries in the United States based on coal by-products. It is reasonable to suppose that one way or another, most of the processes involved are known, or actually used by the manufacturers concerned, who may even have some developments of their own which are fully as guarded trade properties as were the German patents. However, the full accessibility of the latter may now open some doors.

Popular interest in the subject is apparently confined to generalities relating to the miracle of coal derivatives. Doubtless if the full possibilities inherent in the folio of patents now held by the APC were to be made the subject of a drum-thumping campaign, a wave of public anticipation somewhat akin to that now imagining the post-war automobile might follow. The realities of coal chemistry are sufficiently intriguing, without the German patents.

Coal Tar Crudes

Distillation of crude coal tar yields some quantities of light oils, such as benzol, in addition to naphthalene, phenol, cresylic acid, cresols, creosote, pyridene, road tar, pitch, etc. The annual sales value of these products is given as approximately $60,000,000.

As a coking by-product, it is not surprising to find that steel companies account for about 77 per cent of the total crude tar output, and are represented by 66 per cent of sales of crude tar. Substantially all of the crude tar produced from coal in the United States is manufactured by some 70 corporations operating about 95 plants, including besides the steel companies merchant companies engaged primarily in producing coke for sale to the iron industry or other consumers, and public utility companies (coal is one of the principal raw materials for power generation).

The division of production occurs, after steel, approximately as follows: merchant companies, 16 per cent of output and 22 per cent of sales; utilities, 7 per cent of output and 12 per cent of sales. Although crude coal tar is a by-product from coking operations, the value of coal tar represents less than 7 per cent of the total sales value of coke and kindred products, according to recent information.

Annual sales of coal tar averaged 347,000,000 gallons for the years 1936-1939, but rose to 392,000,000 gallons in 1941, and to 461,000,000 gallons in 1942. The average price for coal tar for the 1936-39 period is given as 4.7 cents per gallon, 4.6 cents in 1940, but 4.96 cents in 1941, and 5.58 by March 1942.

Coke oven operations produce crude light oils, crudes containing tar acids and tar acid oils, phenolates, carbolates, crude pyridines, etc. Distilling the crude light oils results in such derivatives as benzol, toluol, xylol, and solvent naphtha. Distillation of crude tar-acid-bearing materials gives acids such as phenols and cresylics, from which cresols and xylenols are made, naphthalene, light oils and creosote.

Coke oven operators themselves perform most of these distilling operations. Chemical contents of crude light oils, and crudes containing tar acids and tar bases, vary with the type of coal, distribution of heat in the ovens and duration of the coking cycle in the specific operation—speeding up coking time as for accelerating steel production, results in lowering the tar acid content of the crude tar-acid bearing oils and an increase of creosote and other products. As an economic element, war production has thus probably increased the volume of low-priced creosote at a loss of higher-priced phenol and cresylic.

It is the same with crude light oils; the relative yields of the refined products are contingent principally on the coal used and the coking time. The proportion of each derivative to the total yield varies with each crude shipment processed, not only for chemical reasons, but also because distillers have been able, by particular processing procedure, to utilize the chemical potentialties according to the most advantageous market condition. In other words, producing according to a demand pattern, production of a higher-priced constituent is pushed; in general however, the relationship of producer and trade is a fairly intricate matter.

Alien Patents May Be of Value

Returning to the alien patents on coal hydrogenation and destructive distillation, a hasty examination discloses well over a score of applicable documents, besides agreements of one kind or another.

It is speculative, but the possibility of the ending of the war in Germany in the foreseeable future also suggests that besides these patents, there may well ensue a sort of division of Germany's remaining chemical raiment after that event, if the present plans of disarming Germany are thoroughly pursued. Obviously that country's use of her coal deposits, and those of captured areas has been a vital military factor.

The fate of this outstanding industry abroad is of course, closely linked with interests elsewhere, and is by no means settled as yet. But, speculatively and assuming that a rigorous policy is followed toward all German industry with a bearing on military potentialities, there may well be some additions to the list of industrial coal processes now held by this country, as well as by others who may have come into possession of patents abroad. It remains to be seen, if this should follow, what use chemical manufacturers might make of the possibilities.

Tanning Materials PS

RECALLING the discussion of tanning materials shortages on this page last month, reports from the American Leather Chemists Association indicate that efforts are being made to develop new sources of tannin from American sumac and canaigre, fleshy-rooted plant of the Southwest. Sumac has been used all through history for tanning and dyeing, and for a long time was grown in Sicily as a commercial crop. It does not appear to have had much use elsewhere, but recent reports indicate that this source, and canaigre, may be used to a larger extent, if the present stringency continues long enough.

Sulfa's Unsung Hero . . .

PHOSPHORUS OXYCHLORIDE

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AVAILABLE FOR PROMPT DELIVERY IN TANK CAR QUANTITIES BY

"Big Bertha"

ring the past year, enormous quantities Victor Phosphorus Oxychloride have en required as a chlorinating agent in the oduction of sulfa drugs, vitamins, and ner vitally essential pharmaceuticals.

That the huge supplies demanded were ivered promptly and safely is by no ans a coincidence. Many months ago ctor foresaw a potential emergency . . . signed, built and put into operation a ge new phosphorus oxychloride plant d a special fleet of lead-lined tank cars.

Actual demand exceeded expectations d month after month Victor's phosphor- oxychloride plant has operated at far ond its rated capacity. As a result, addi- nal tank cars were needed to handle the ra production.

Because of increasingly critical war-time ays in transportation, Victor decided to ak with precedent. Instead of purchas- more of the standard 3000 to 4000 lon tank cars, a huge 6000 gallon, rein- forced, lead lined, insulated tank car equipped with special heating coils was acquired and put to work.

In the past year, "Big Bertha," as this mammoth tank car is affectionately called, has become a familiar and welcome visitor at some of the most important war plants in the country . . . and quite the opposite of the death-dealing "Big Bertha" of World War I, has played an important role in saving many human lives through the wonders of medicine.

For years Victor Chemical Works has specialized in phosphates, formates, and oxalates . . . today is the world's leading producer of these compounds. During these years it has been our privilege to help industry solve many important problems with phosphorus compounds, formates and oxalates. May we serve you, too?

Victor Phosphorus Trichloride Is Also Available in Tank Car Quantities

Victor CHEMICAL WORKS

HEADQUARTERS FOR PHOSPHATES FORMATES • OXALATES

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NEW PRODUCTS & PROCESSES

Commercial Availability of Silicones Announced by Dow Corning

First commercial production of "Silicones," new organo-silicon polymers, has been announced by Dow Corning Corporation of Midland, Michigan. Development of silicones on a semi-production basis has been in progress for a considerable time. Several of these products are now being made available by Dow Corning for applications essential to the war effort. Dow Corning products include water white fluids for high and low temperature use, electrical varnishes and insulating resins for high temperature operating electrical equipment, and lubricating greases for high temperature and chemical resistant uses. Very little factual information has been made available on organo-silicon products, although, because of their unusual properties, they have solved many problems where conventional materials have failed, according to a recent company statement.

Dow Corning Corporation was formed in February, 1943 by Corning Glass Works and The Dow Chemical Company to manufacture and develop silicones more intensively. Corning Glass Works had been conducting research in organic derivatives of silicon for more than a decade. It is interesting to note that this early work was initiated by their research workers because of the advent of glass-like plastics. Since glass is a silicon product, it was believed possible by them that organic derivatives of silicon should yield products having some unusual and valuable properties, perhaps similar in some degree to those of glass.

As so frequently occurs, the research of the Corning scientists led down unforeseen paths. In the course of their investigations water white liquid polymeric silicones were discovered having unusual chemical and physical properties. These materials, which are very interesting from an engineering standpoint, are now available under the name of Dow Corning Fluids. They are manufactured in various viscosities ranging from liquids as thin as water to those which barely flow at room temperature. Their most outstanding property is an exceptionally low rate of viscosity change with temperature, compared to that of previously used liquids. Certain types are made that do not freeze at dry ice temperatures and these same products can be used at temperatures up to 400-500°F.

Obviously the exact purposes for which these materials have been developed cannot be discussed at this time. However, they are now in quantity production and samples together with detailed information on their properties can be obtained from the manufacturer.

Among the other products that stemmed from Corning research are electrical insulating varnishes and resins now available from Dow Corning Corporation. These materials are the culmination of early efforts by Corning research workers to find suitable coating resins for use with glass textiles for electrical insulation or for other purposes where elevated temperatures are apt to be encountered. In general, none of the organic varnishes was substantially better, from the standpoint of heat resistance, than the cotton or paper usually used in electrical windings. Hence there was a definite need for resinous dielectrics that would not decompose and carbonize when electrical equipment was overheated.

Dow Corning silicone resins for electrical insulation extend the range of operating temperatures possible in electrical equipment beyond the limit of thermal stability of conventional organic materials. One of the resins is available as a coating and impregnating varnish which may be applied to Fiberglas cloth, asbestos cloth, asbestos paper and Fiberglas served wire or the like by conventional dipping and drying methods. It requires baking at a temperature of 250°C. for one to three hours to cure to a non-tacky state. Another is an impregnating varnish which sets with heat at 200°C. These materials do not carbonize or darken when subjected to prolonged heating at the curing temperatures. In combination with Fiberglas, asbestos and mica, these Dow Corning impregnating and coating resins permit the design of many types of electrical equipment for higher safe operating temperatures with consequent increase in capacity, reliability, and life performance.

Dow Corning Corporation has a commercial plant under construction at Midland, Michigan that will be in operation later this summer. Its new laboratory and office are completed and in use. Dow Corning officials state that additional organic-silicon products may be expected and will be announced as soon as they become available commercially.

High Temperature Silicone Grease

One of the new silicone products now being offered by Dow Corning Corporation is a material having a vaseline-like consistency for use as a grease in lubricated plug cocks and other valves requiring lubrication. It has been found especially valuable in plug cocks which must operate at elevated temperatures or handle corrosive chemicals.

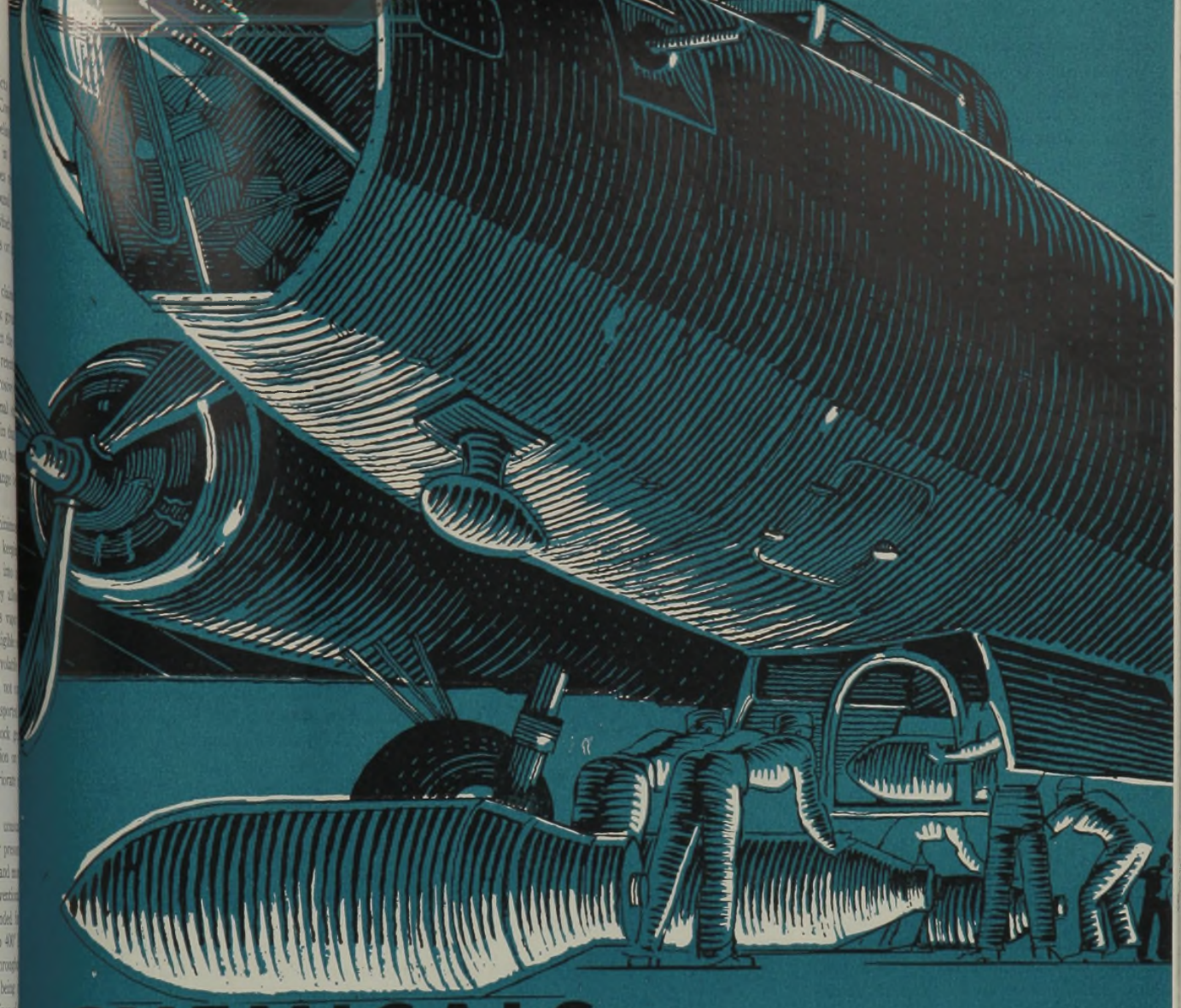
The properties which are claimed to make Dow Corning plug cock grease an outstanding material for use in the lubrication of plug cocks are its retention of consistency, resistance to corrosive chemicals, non-volatility and thermal stability. This new product is unusual in that it remains a soft grease and will not harden or melt over the temperature range between —40° F. and 400° F.

This plug cock grease minimizes the corrosion of metal valves by keeping corrosive liquid from coming into contact with the metal and thereby allows the valve to operate freely. Its vapor pressure is so low as to be negligible even at 400° F. This insures that volatile material from the lubricant will not contaminate the product being transported in the line. Dow Corning plug cock grease is inert, has no corrosive action on metals and does not smell or deteriorate rubber, synthetic rubber or plastics.

The consistency of this unusual new grease makes it suitable for pressure gun application, which is faster and more convenient than the use of conventional stick lubricants. It is recommended for temperatures from —40° F. to 400° F. and valves will operate freely throughout this temperature range. Tests being run on plug cocks in the product lines of hydrocarbon cracking plants indicate that much higher operating temperatures are possible in lubricated valves for this service. It has been the experience of some chemical plants that Dow Corning plug cock grease provides a single material which effectively replaces the numerous types of greases hitherto required for their various chemical services.

Novel Amine Contains Sulfur

Thialdine (5,6-dihydro-2,4,6-trimethyl-1,3,5-dithiazine), a heterocyclic intermediate containing both sulfur and nitrogen in the ring, has recently been developed by Carbide and Carbon Chemicals Corporation and is currently available in commercial quantities for prompt shipment. It is a colorless, crystalline solid that is soluble in alcohol, ether, and hydrocarbons, but relatively insoluble in water. It exhibits reactions typical of secondary amines. Thialdine has a powerful odor resembling ammonium sulfide, but readily forms salts that are comparatively odorless. This



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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STAUFFER CHEMICAL COMPANY

amine has possible application as an intermediate for dyestuffs, insecticides, rubber chemicals, pharmaceuticals, and ore-flotation operations. Thialdine has interesting insecticidal properties even when used in aqueous solutions in concentrations as low as one part by weight to about 7,000 parts of water.

Mercapto—Alcohol

Mercaptoethanol, a liquid with the properties of both an alcohol and a mercaptan, has recently been developed by Carbide and Carbon Chemicals Corporation and is now available in limited quantities. This water-white liquid ($HSCH_2CH_2OH$), which is also known as monothioglycol, is completely miscible with water, benzene, ether, and most organic solvents. The sulfhydryl group is more acidic than the hydroxyl and is usually more active.

Mercaptoethanol should be used in the preparation of pharmaceuticals, dyestuffs, rubber chemicals, flotation agents, pickling inhibitors, insecticides, synthetic resins and plasticizers for synthetic resins. It is of special interest as a water-soluble reducing agent that attacks protein-disulfide linkages. Its solvent powers make it of interest for sulfur dyestuffs, whereas certain of its derivatives are intermediates for wetting agents. In addition, mercaptoethanol forms metallic salts with the type formula HOC_2H_4SM, that have potential applications in the metal-refining industries.

New Dyestuff Solvent

"Kromfax" solvent is an exceptional dyestuff solvent now being offered by Carbide and Carbon Chemicals Corporation. "Kromfax" solvent ($HOCH_2CH_2$-SCH_2CH_2OH) can usually be used to replace all or part of the glycerol, acetin, diacetin, or triacetin used in dissolving textile colors. It is particularly useful in pasting difficulty soluble basic dyestuffs in direct printing.

New Ethanolamine

Methyldiethanolamine is another of the amines now produced by Carbide and Carbon Chemicals Corporation. This liquid has a characteristic amine-like odor and is completely miscible in water and benzene. Since methyldiethanolamine is a tertiary amine with two replaceable alcohol groups, it should be valuable in the preparation of a great variety of nitrogen-bearing compounds. It shows promise in the manufacture of dyestuffs, textile chemicals, insecticides, and emulsifying agents.

Water-Soluble Glycol

Ethylhexanediol, a high-boiling, colorless glycol, with limited water solubility is currently being produced in commercial quantities by Carbide and Carbon Chemicals Corporation. Ethylhexanediol is the first glycol of limited water solubility t has been produced in commercial quantities and is a possible raw material for the manufacture of materials where improved water resistance and higher solubility in hydrocarbons are desirable. Ethylhexanediol is also of possible use as an intermediate for perfume fixatives and synthetic resins. In addition, it has probable cosmetic application since it resembles glycerol in its softening action on the skin.

The heavy demands of the armed forces for ethylhexanediol in insect repellants will probably limit its availability during the war period to strictly military applications.

Dehydrated Wetting Agent

"Tergitol" penetrant 4 paste, a slurry of "Tergitol" penetrant 4, is now offered by Carbide and Carbon Chemicals Corporation. This paste is made up of 50 per cent dehydrated sodium tetradecyl sulfate and 50 per cent water. It is exceptionally pure, containing practically no inorganic salts or mutual solvents. "Tergitol" penetrant 4 paste enhances the activity of bactericides and is said to increase the efficiency of antiseptics from four- to ten-fold. In addition, it has possible applications as a detergent of the "soapless soap" types.

Electronic Heating Sets Cord Twist

All rayon tire cord manufactured by Industrial Rayon Corporation is subjected to electronic heating in a new process invented by the company's technical staff to solve problems in the twist-setting of textile yarns.

The twist of the rayon tire cord is set a high frequency electrical field. Heat generated in the cord by this operation is distributed so uniformly that cones containing 18 pounds or more of rayon tire cord may be effectively treated. Such giant cones are used in the weftless method of tire construction.

The process is completed in a matter of minutes and results in the production of a cord in which the twist is uniformly set. Control of the moisture content of the cord may be facilitated by wrapping the cones of cord in moistureproof paper and processing them in this form.

The equipment originally installed for this process has been in operation at Industrial Rayon's Cleveland plant for more than eight months and includes high frequency power generating units having outputs of approximately 22,500 BTU per hour each. They were furnished by the Girdler Corporation, through its Thermex Division, and each unit is capable of handling several thousand pounds of packaged tire cord in a 24 hour period.

Additional high frequency twist-setting units are to be installed by Industrial Rayon to care for the expanded capacity of its Cleveland plant and the new tire cord department of its Painesville plant, both of which are scheduled to enter production in the third quarter.

Patent applications covering the use of high frequency heating for twist-setting of textile products generally, including tire cord, have been assigned to Industrial Rayon. The new process is also being used by The B. F. Goodrich Company, under license from Industrial Rayon, in connection with production of rayon tire cord. Radio Corporation of

Twist of rayon tire cord is quickly set in new electronic heating process.

America supplied the high frequency power units used by B. F. Goodrich.

New Liquid Resin

Nevillac OA, a new liquid resin of improved odor has been introduced by The Neville Company as the first of a series of improved grades which are being developed to enlarge the Nevillac Resins group.

Nevillac OA is similar to Nevillac 10° (PHO) differing chiefly in improved odor and superior color retention, and slightly in several other characteristics. These include lower specific gravity and consequently somewhat lesser weight, and less viscosity.

Fields of use of the new Nevillac will include adhesives of the waterproof, optical, shoe, packaging and pressure sensitive types; paper coatings both waterproof and greaseproof and for ordnance wrap; paints and varnishes including laminating varnishes; artificial leather and leather finishes; raincoats; printing and duplicating inks; and possibilities for generally broadened applications due to its improved characteristics.

Average physical properties of Nevillac OA are:

Specific Gravity @ 30°/15.6°C	0.980 to 1.00
Viscosity (Gardner-Holdt) @ 25°C	W (average)
Distillation by volume	Essentially between 300 and 375° C
Max. % off @ 300°C	5%
Refractive Index @ 20°C	1.5355
Odor	Sweet, characteristic
Color	Pale amber
Color retention	Good (much better than Nevillac 10° (PHO))

The new product is soluble in almost all organic liquids (except water and glycols) including alcohol, hydrocarbons, ketones, esters, ethers and chlorinated hydrocarbons. It is completely compatible with most synthetic resins including cellulose esters and ethers, vinyl acetate, vinyl butyral, zein, coumarone-indene resins, GR-S rubber, Hycar rubber, and partly compatible with polyvinylchloride and vinyl acetate and chloride copolymer.

Novel System for CO_2 Recovery

A novel process has been designed and installed at the Welland Chemical Works Ltd. (Canada) for the recovery of carbon dioxide gas from its synthetic ammonia division.

This 120 ton per day ammonia plant is supplied with a mixture of water and producer gases which, after treatment in CO oxidation units, contains some 28 per cent carbon dioxide; 51 per cent hydrogen; and 17 per cent nitrogen. Following compression to 16 atmospheres the gas is passed through a train of purification scrubbers whereby most of the carbon dioxide is removed by solution in the scrub water.

Water from the scrubber discharge line is subjected to selective degasification so that carbon dioxide of 98.8 per cent purity is obtained, suitable for use in another department of the same plant.

The degasification installation requires no direct labor, and also permits the recovery of some of the hydrogen formerly vented. The value of the gases recovered in the last year has repaid the cost of the treatment several times over.

Process for Potassium and Ammonium Perchlorate

The first release permitted by the Canadian government on the operation of its war-created potassium and ammonium perchlorate manufacturing facilities states that the process employed for the manufacture of ammonium perchlorate is believed to be the only commercial installation of this nature in North America.

Basically, sodium chloride is electrolyzed and oxidized at the anode of the cell to sodium chlorate. By further catalytic oxidation in separate cells the sodium perchlorate is produced. This chemical is then converted in metathesis tanks by appropriate potassium or ammonium salts to yield the corresponding perchlorate.

Detecting Copper in Nickel Plating Solutions

Investigation has shown that the organic reagent dithizone can detect copper rapidly in a nickel plating solution and that it is capable of detecting quantities of copper as low as a few micrograms, Dr. B. B. Knapp, Chemist, declared in a paper entitled "Rapid Determination of Copper in Nickel Plating Baths" presented recently before the annual meeting of the [illegible]ty in Cleveland.

The speaker added that it is known nickel plating baths can tolerate only small amounts of copper without giving inferior deposits. Its effect is to darken the nickel plate and make it brittle.

The new method embodies the mixed color principle which only involves matching the color of the unknown with that of a set of standards. The entire determination is carried out in a test tube and copper content can be measured over the range of 0.004 to 0.5 grams per liter.

Delousing Bag

Development of a delousing bag for individual treatment of soldiers' and sailors' clothes marks a big improvement over the World War I method of killing infestations.

The bag is constructed of neoprene-coated cotton fabrics produced by the "Fabrikoid" Division of the Du Pont Company. The fabric is two-ply, combined as well as surface-coated with the man-made rubber. According to a recent company statement strapping and cement, with which the bag is put together, are Du Pont developments. One of the largest makers of the bag is Dorset Manufacturing Company, New York City.

To delouse his clothes, the service man inserts a glass ampule of methyl bromide, wrapped in cloth, into an inside pocket of the bag. He then dumps his whole outfit, including shoes, into the bag and rolls it up at the top. The volatile liquid is dispersed by stepping on the glass ampule and walking over the whole bag to assure thorough permeation of the contents.

Development of delousing bag for individual treatment of clothes or blankets marks improvement over World War I method of killing infestations.

FOR LOW-COST INDUSTRIAL BINDERS AND ADHESIVES

Versatile . . . economical . . . effective . . . Hercules Dresinates* are finding increasing use in many industries—speeding production, improving results.

Dresinates are useful as extenders for phenolic resins in certain types of binders and, as waterproofing and plasticizing agents, they are finding application in starch and glue adhesives.

Dresinates, too, are well worth investigating as wetting agents, emulsifiers, and detergent assistants. They are low in cost—available in quantity, and are manufactured in various types to suit specific requirements. Technical data and samples for your particular requirements may be obtained by writing to Hercules.

DRESINATES*—the neutral sodium and potassium salts of modified rosins—are cutting costs, speeding operation, and improving products in many industries.

AS EMULSIFIERS . . . in cutting oils, drawing compounds, paint emulsions, asphalt emulsions, pine oil disinfectants.

AS DETERGENT-ASSISTANTS . . . in soaps, laundries, alkaline metal cleaners, textile processing, floor-cleaning compounds.

AS WATERPROOFING AND PLASTICIZING AGENTS . . . in starch and glue adhesives.

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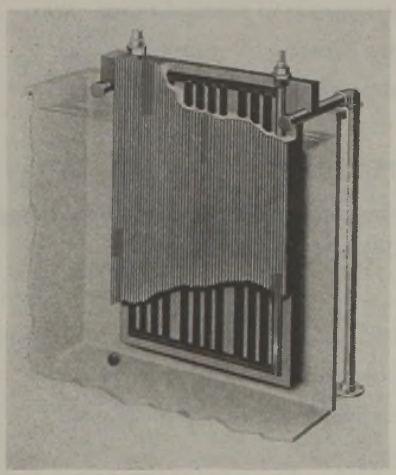
NEW EQUIPMENT

Heat Exchanger QC 418

A new type of heat exchanger, made of "Karbate" chemically inert graphite material, has been perfected for use in chemical and process industries by National Carbon Company, Inc. Designed specifically for chemical applications, the corrosion resistant "Karbate" heat exchangers possess high heat transfer values and are resistant to practically all acids, alkalis and solvents. They are unaffected by acute thermal shock and may be used freely in intermittent operations, or in alternately hot and cold chemical baths.

Of plate type, the heat exchangers employ the principle of extended, or corrugated, surface to attain maximum heat transfer area within small overall sizes. The compactness of the exchangers increases their inherent mechanical strength. At the same time, it reduces the tank space required for the heaters, further minimizing the hazard of mechanical shock during process operations. As shown in the illustration, the heater is a 4" thick plate with a number of internal 1½" diameter communicating channels for steam or cooling medium.



National Carbon Company standardized production of the heat exchanger units in four design groups, incorporating both parallel and series flow channels, thus making possible 30 different combinations to meet the widest range of heating and cooling requirements. The heaters may be installed in sections, depending upon tank capacity or solution temperatures required, and are suitable for nearly all tank sizes or shapes.

A number of the heat exchangers have been in use in various processes for a year or more and afford sufficient service data for comparative purposes. Such heaters, 4" x 10" x 48" in size, operating on 25 lbs. steam and maintaining tank temperatures of 180°—190° F. have been in service in approximately 10% nitric acid and 3% hydrofluoric acid in tanks measuring 3' x 4' x 4'. There has been no visible sign of deterioration in these units in the year or more of their operation. In the same application, no metal heat exchanger has been found that would stand up for more than a few days.

Self Contained Power Hammer QC 419

The Syntron Company has announced a new style, completely self-contained, Gasoline Hammer Paving Breaker type of demolition tool.

This hammer is comparable in power to the larger-sized compressed air paving breakers—weighs 96 pounds—is arranged for easy operation by one man—and uses moil points, narrow chisels, gads, wide chisels, front wedges, clay spades, backfill tamping tools, asphalt cutters, sheathing drivers or ground rod driving tools, etc., all with 1⅛" x 6" shanks.

Throttle control of the blow permits placing the tool on the spot desired to be worked, without jumping around.

With a solid star drill, and using water to flush the cuttings out of the hole, the hammer will drill rock to a depth of 30".

The major advantage of this tool is that it is completely self-contained—and does not require an air compressor, air hose and fittings, ignition battery, ignition coil and heavy cable, or any other source of power or accessory.

In principle, it consists of a 2-cycle gasoline engine in an inverted position—with two pistons, one an engine piston and one a hammer piston. to the crankshaft at the top of the hammer and drives the flywheel ignition magneto, and a fan for forced air cooling.

Starting is by a rope pull, the same as any outboard engine.

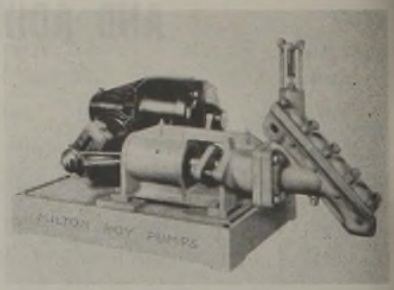
The free hammer piston acts as a movable cylinder head for the engine piston, and as the explosion occurs, is driven downward to strike directly on the shank of the tool being used, and then returned to the "up" or firing position, not by springs, but by low pressure exhaust gases.

Fuel (gasoline mixed with oil) consumption is relatively low—the hammer being equipped with a fuel tank having a capacity sufficient for several hours operation.

While the bulk of the Company's production of several hundred of these hammers per month must continue to go to the Armed Forces, a few are available for shipment on high priority rated orders.

Step-Valve Pump QC 420

Designed specifically for controlled volume pumping against negative differential pressures, this Milton Roy Step-Valve Pump retains all of the essential features of the Milton Roy double-ball check valve. Outside spring-loading provides ready adjustment for desired load. The single cover plate is readily removable and provides complete accessibility without disturbing intake or discharge piping. This valve affords complete freedom from air-binding. There is minimum restriction of passages since the pumped liquid moves in an almost straight line under the ball checks, not around them.



This type valve is available with Milton Roy Pumps in capacities from 10 g.p.h. up to 1300 g.p.h. and is supplied for pumping viscous materials such as liquid latex, acid sludges, tars and asphalts, salt slurries and textile fibres in suspension.

New Truck Design QC 421

A new Truck-Man, designed for moving skidded loads of one ton or under, has been announced by Yard-Man Inc., Jackson 24, Michigan.

One of the important improvements is a patented two-speed drive which makes both a low and a high speed instantly available. The low speed is adapted for

NO "Global Strategy" NEEDED

with POWELL Engineering at your service ....

Fig. 375—Bronze Gate Valve for 200 pounds W. P. Has screwed ends, union bonnet, inside screw rising stem and a special hard bronze disc.

Guessing and gazing are out when it comes to buying your flow control equipment. Because, for even the simplest operation, the valve must be of correct design to obtain maximum efficiency. This not only includes basic type, such as Globe, Angle, Gate, "Y", Check, Relief and Non-Return, but such factors as suitable stem action, bonnet construction, working pressure and especially the materials used in the body and mountings. Thus, for certain services, an all iron valve is not only entirely adequate but most economical. But in many cases bronze, steel, pure metals or even special alloys are indicated. POWELL *makes them all.* And to assist you in selecting the correct valves to meet your individual requirements, POWELL maintains a staff of engineering experts who are always at your service for consultation and advice.

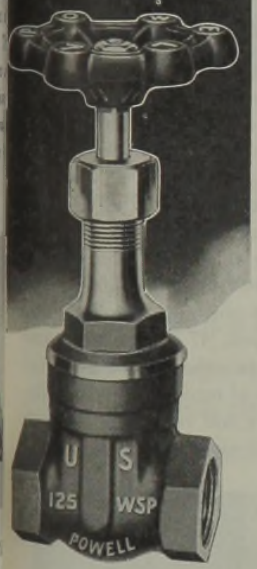


Fig. 500—Bronze Gate Valve for 125 pounds W. P. Has screwed ends, screwed-in bonnet and inside screw rising stem. Sizes ¾" and smaller are equipped with taper wedge solid disc; sizes 1" and larger, with taper wedge double disc.

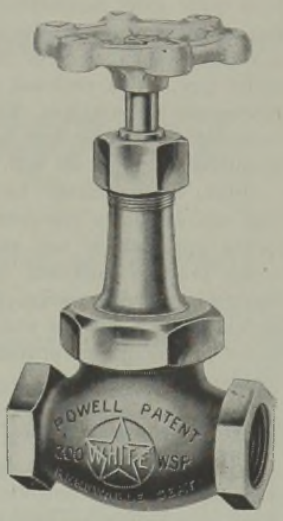


Fig. 1708—Bronze Globe Valve for 200 pounds W. P. Has screwed ends, union bonnet, renewable seat and regrindable, renewable hard bronze semi-cone plug type disc. This valve is especially suitable for throttling service.

The Wm. Powell Co.

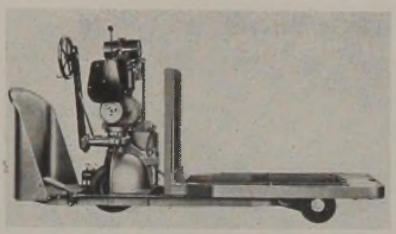
Dependable Valves Since 1846

Cincinnati 22, Ohio

POWELL VALVES

starting, climbing ramps, going in and out of freight cars or other tight places, and for moving material over rough floors. For light loads and movement without loads, the high speed is instantly available. The Truck-Man turns in its own length.

Steering has been improved by the use of a large ball thrust bearing which reduces steering effort to but a fraction of the effort formerly required.



More comfort, with accompanying lessened fatigue, greater safety and increased efficiency for the driver is achieved by a new operator's seat, which has been developed in collaboration with the Safety Council of the Ford Motor Company in the Willow Run Bomber plant. In addition to providing a seat with a restful, form-fitting back, it provides a support when the operator is standing and it also serves as a protective shield for added safety. The use of this new seat is particularly advantageous when women operators are employed, according to reports from users.

The operation of the Truck-Man has been made more dependable through the use of a new, more sensitive fly-ball type governor, which replaces the old pneumatic type. It is enclosed, and is much more sensitive in action. The entire unit is sealed so the operator cannot disturb it without breaking the seal.

Other improvements include heavier load wheels with a four-inch tread and a larger gas tank of one gallon capacity which provides sufficient fuel for eight hours of normal operation. "V" type belt brakes automatically set when the machine is not in action, thus providing an added measure of safety.

Control Instruments QC 422

Addition of three new instruments to its line of industrial controllers, and refinements in a fourth, has been announced by Wheelco Instruments Company, Chicago 7, Illinois.

Two of the new instruments, designated Inputrols, are designed to control input of power, heat or flow of liquids or gases to any process equipment. The third, a Throttltrol, is designed to correct variations in heat requirements of furnaces and process equipment by positioning a valve in the fuel line. The company's Rheotrol, a manually operated controller for regulating input of electrically operated furnaces, ovens, heaters, kilns, etc., has been refined and is now offered in a flush-mounted case.

Inputrols are offered in automatic and manually set models. The basic elements of the instruments are a mercury switch mounted on a carriage, a rotating horizontal cylindrical cam driven by a small synchronous motor, and a spiral on which the mercury switch carriage is mounted. In the automatic model, which is used with a pyrometer, the spiral is turned automatically to position the mercury switch carriage at the proper point along the rotating cam. In the manual model, the spiral is set by hand to the input point desired by the equipment operator.

The Inputrol scale is illuminated and in terms of per cent of maximum input. If its pointer is at 60, for example, the instrument's mercury switch will be in its "ON" position 60 per cent of the time, or 36 seconds of each minute. Inputrols may be flush or surface mounted.

The Throttltrol is essentially a simplified valve-positioning device designed for use with any control instrument having a high and low contact. It corrects variations in heat requirements due to change in load, control settings, air and fuel pressure, BTU values and combustion efficiency. At a given setting, it will permit a fuel valve to open only the desired distance when the two-position control instrument is in its "ON" position. In this manner, it permits a more even and constant flow of fuel to the burner and minimizes the danger of "overshooting" that is apparent in two-position controllers when the fuel supply is either full on or entirely off.

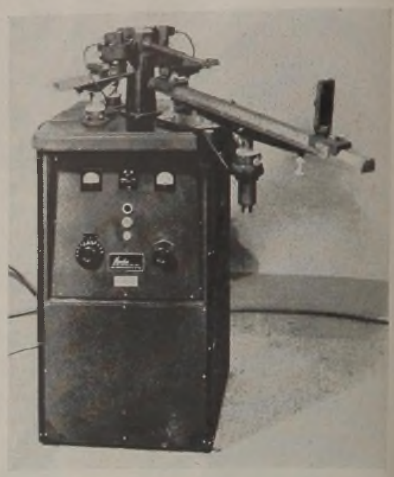
The Rheotrol is now offered in a new flush-mounted case. The instrument provides stepless, wasteless control of current supply. It replaces the standard rheostat and, by eliminating the current waste through resistors, provides improved efficiency. It places any temperature in the equipment's range at the command of the operator.

X-Ray Unit QC 423

A new X-ray diffraction unit has been perfected by North American Philips Company, 100 East 42nd St., New York, for solving analysis problems in chemical and metallurgical fields.

X-ray diffraction is not new in itself. However, the utilization of new accessories and techniques now available will prove valuable, according to the company in the following fields: Welding, casting, forging, ferro-concrete, plastics, asphalt, oil, coal, leather, textiles, ceramic, chemical, plywood, steel valves, high pressure tanks, porcelain cables, rubber, food (cheese, ice cream), and others.

The new NORELCO X-ray diffraction unit has a four-windowed tube enclosed in a bronze housing. Diffraction patterns of four different specimens can be obtained simultaneously. A number of types of X-ray tubes can be provided included in which are targets of [illegible] molybdenum, cobalt, iron, chromium and copper. Tubes can be changed quickly, usually in 2 minutes, using only a screwdriver.

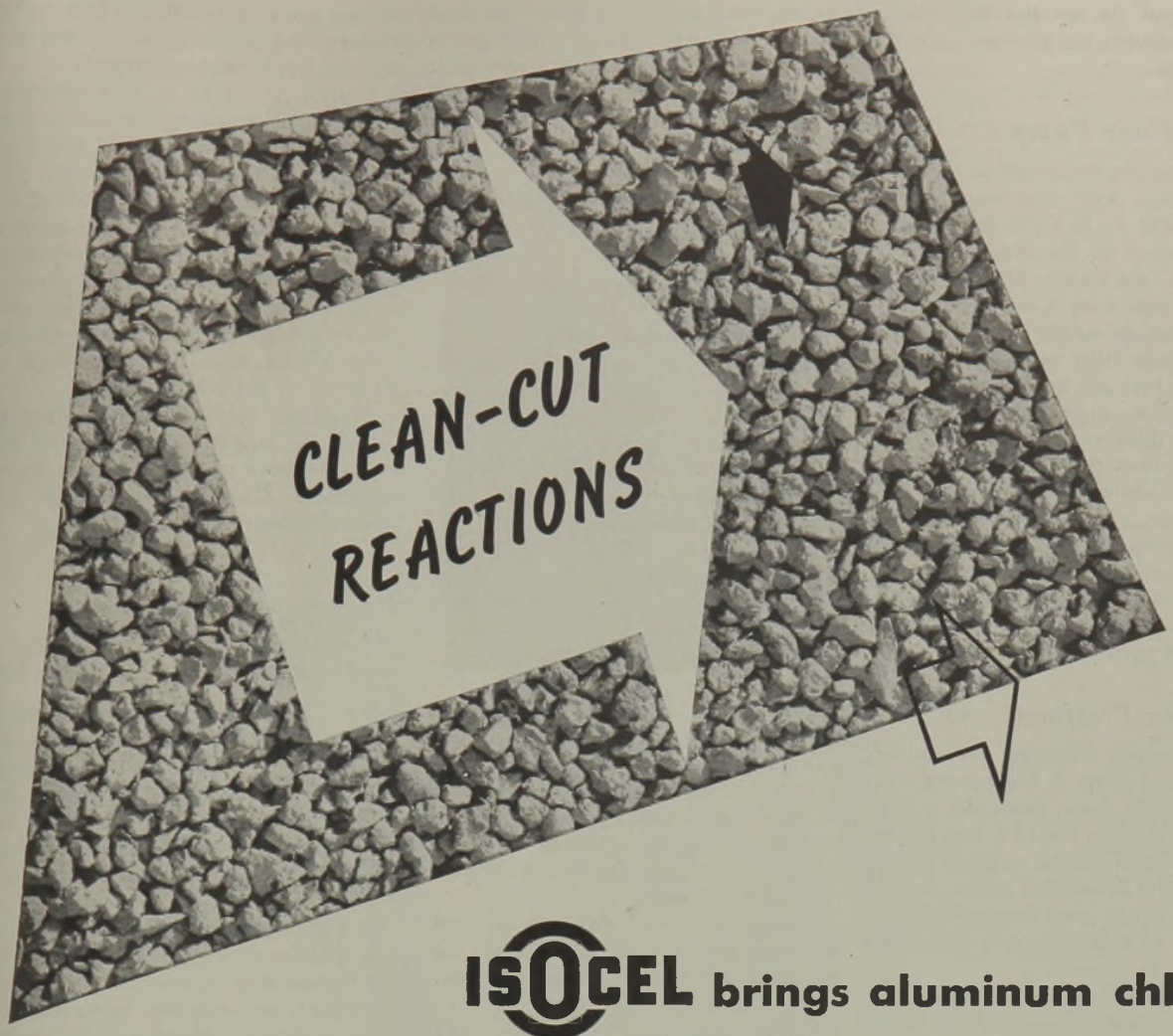


Claimed to be shockproof and rayproof, the unit utilizes full wave rectification which permits higher output and longer life from the tube. Filament current supply is stabilized, control of kilovoltage and milliamperage is smooth and stepless, tube is protected automatically if water supply fails, equipment has start-stop pushbutton control, and provision is made for use of automatic exposure timer.

Plastic Preheater QC 424

To meet the demand for automatic high frequency equipment for preheating of plastic preforms, the Thermex Division of the Girdler Corporation, Louisville, Kentucky, has developed the No. 2-P Thermex which operates at a frequency of 25 to 30 megacycles. Using 230-volt, 60-cycle, single phase current this model has an output in excess of 340 BTUs per hour. This compact Thermex unit measures 28 inches by 28 inches, stands 47 inches high, and weighs only 614 pounds. It is a practical and flexible piece of equipment with built-in heating cabinet and removable 12 inch by 15 inch drawer-electrode.

Being completely automatic, there is nothing to do but plug this Thermex in and load and unload the preform drawer. Closing the preform drawer all the way in turns on the high frequency power and timer. At the end of the prescribed time, which may be anywhere from 5 to 10 sec-



ISOCEL brings aluminum chloride UNDER CONTROL

Isocel is a prepared catalyst — a bauxite carrier impregnated with aluminum chloride. It produces a clean-cut, smooth isomerization reaction — and controls or entirely eliminates the reactor corrosion often experienced when aluminum chloride is used alone or in sludge form. This hard granular material is available for all processes utilizing aluminum chloride as a catalyst.

We have a highly specialized laboratory for the study of catalysts and catalytic reactions. We will be glad to help you adapt Isocel to your own processes, or to assist you in developing new catalytic materials of this general type.

We have specialized in the development o bauxite both as a catalyst and as a catalys carrier. In developing Isocel, we have alsc studied applications of bauxite as a carrier fo many other catalytic materials. Before figurinc the costs of a new catalyst or reagent using ad sorbent materials, let us tell you how econom ically we can make it.

We will gladly furnish large or small scale samples of catalysts of this type to particula specifications. Just write us.

POROCEL CORPORATION • BAUXITE ADSORBENTS AND CATALYSTS

260 SOUTH BROAD STREET, PHILADELPHIA 1, PA.

onds up to 2 minutes, the red indicating light goes out, the operator removes the tray, and unloads the preforms into the mold cavities.

Rotary Vane Pump QC 425

An entirely new line of special vane type rotary pumps, with capacities ranging from ⅔ GPM to 10 GPM has recently been announced by the Blackmer Pump Company, Grand Rapids, Michigan.

The new pumps are of very compact design, they operate quietly and are light in weight, built-in relief valve optional, furnished with base and flexible coupling for direct connection to prime mover, for "V" or flat belt drive and with special design brackets to meet the mounting specifications of the customer. Constructions available: All iron, bronze fitted, all bronze.

Due to the special "bucket design," these pumps are self-adjusting for wear, maintaining normal capacity throughout the life of the buckets, which are easily replaced when worn out.

Traveling Platform QC 426

The Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, have developed a new Stabilized Traveling Platform that can be raised or lowered without swing as firmly as though held by vertical guides. It can be traveled to any point longitudinally or laterally in an area covered by the crane on which it is operated.

The Cleveland Tramrail Stabilized Platform was designed for spray painting large air cargo ships and to aid with some of the assembly operations. The floor area of the platform is divided into two sections: approximately one-third at the rear is for drums of paint and other equipment carried; the large space in front is for the painter's use.

Besides the usual upper limit switch for preventing the platform being hoisted beyond the upper limit, an important feature provided to aid safety when lowering, is the slack cable release. Through means of this feature, the platform is stopped immediately when lowering if any part of it comes in contact with any object sufficiently to cause slackening in any of the hoisting ropes.

The unit illustrated is of the all-welded steel construction. It will carry a load of 5 tons and has a hoisting speed of 18 f.p.m. This type of stabilized platform is suitable for operation through a vertical height up to 30 ft. and may be furnished for operation at any hoisting speed from creeping to 50 f.p.m., or more.

Applications where this can be used advantageously have been suggested for the steel, paper, textile and food industries.

Gas Furnace QC 427

Hot gas, a mixture of products of combustion and air or recirculated gases, is produced at almost any desired temperature by the new Agitair direct oil fired, hot gas generating furnace recently announced by Air Devices, Inc. Agitair furnaces are used for spray towers, food baking and drying, and other food and chemical processes, where the material being processed is not affected by contact with the hot gases. Recirculating type Agitair furnaces are also available for use with superheaters or heat exchangers.

Control is said to be fully automatic. Constant discharge temperatures are maintained by modulated controls and a reversing type burner control motor. This furnace will operate down to 25% of full capacity. Draft regulator insures complete combustion and prevents excessive lining temperature. The hot gases generated are without smoke or odor except the odor due to sulphur in the fuel. A viscosity valve system insures constant feed of Bunker C or No. 5 fuel oil.

Adjustable fresh air intake dampers control the amount of air admitted between the inner and outer furnace shells. Adjustable dampers also regulate the amount of draft in the firebox.

Bureau of Mines Apparatus for Measuring Static Electricity QC 428

Static electricity, the mysterious force that can cause destruction of war plants and other vital installations, may become less formidable as the result of a new device developed by the Bureau of Mines for determining just how potent an electric spark must be to ignite explosive mixtures of gases and vapors.

Despite painstaking precautionary measures, static electricity still strikes swiftly and unexpectedly in munition works and in rubber and plastics manufacturing plants, sometimes causing a heavy loss of life and extensive property damage.

Dr. R. R. Sayers, Bureau Director, reported recently that the new apparatus is intended to provide additional information regarding how "hot" a spark is required to ignite certain explosive mixtures and how only certain types of sparks may cause detonations. Greater knowledge of the action of sparks under various conditions will permit industry to adopt more satisfactory safeguards, the Director added. At the Bureau's Central Experiment Station, Pittsburgh, Pa., tests already have been run on natural gas and benzene. Further experiments are underway.

Extremely versatile, the apparatus permits studies of the influence of spark length, shape, size, and material of electrodes, gas density, additions of inhibitive or sensitizing gases, changes in circuit constants, and other effects. With slight modifications and suitable auxiliary equipment, direct comparisons can be made of the ignitibility of different types of sparks —sparks which follow a gradual rise of potential, prolonged sparks or discharges, impulse sparks, rapidly recurring sparks, and "wipe" sparks.

Construction of the apparatus and descriptions of its use are included in a new publication just released by the Bureau.

WE DEVELOP AND MANUFACTURE WATER DISPERSED MATERIALS

If you are a manufacturer who dips, coats or impregnates, or uses adhesives or rubber-like materials, let us know your requirements. It is likely that we can develop for you a water dispersed elastomer or composition that will meet your specific needs for an economical rubber-like material.

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Forced Changes in Packaging During War Likely to Bring Improvements for Post-War Use

Through necessity caused by various shortages, the chemical industry has been forced to a tremendous amount of substitution and change in packaging since the outbreak of the war, and while these substitutions have created no end of hardships for the industry, there is also a bright side to this forced substitution. In normal times in order to make changes in packages, a great amount of discussion, surveying and testing was entailed, which at times discouraged progress in container development. As necessity forced rapid changes upon the industry, the situation was changed and containers adopted which heretofore would never have been accepted. We are now finding out that many of these substitutions can and will become permanent after the war and that a very definite change in packaging is to come.

T. Pat Callahan

Reduction of strength in some containers and an increase of strength in others will definitely enter into the use of containers in the post war period. A committee has already been appointed to study the proper strength of fibreboard containers for the various products which are being shipped in them. Due to reuse of steel containers of light gauge construction, the ability of steel containers has been proven to the extent that heavier gauges formerly used may be substituted by lighter gauges. Protection of the interior of steel containers by the use of synthetic resins and lacquers has developed tremendously. This will have a large bearing on the shipment of chemicals in steel drums after the war. The added production of various metals which can be used in container construction will find their place in the packaging of chemicals. The changes in design and construction of various packages to meet the requirements of the war agencies will definitely affect the use of various chemical containers after the war. Multiwall paper bags which have been developed since the war are safely transporting all forms of foodstuffs to the far-flung battle fronts, and while these containers are not available at the present time for other urgent war business, it is our opinion that improvements in packaging to this extent will play a very important roll in the packaging of chemicals when conditions return to normal.

It is well to evaluate all changes in containers necessitated by present conditions so that proper consideration may be given them, and full advantage obtained from the many important improvements in chemical packaging coming out of the war.

Transportation of Dangerous Gases in Cylinders

One of the most important considerations of the Bureau of Explosives is the safe transportation of hazardous gases in cylinders. This agency has devoted no end of time to studying, testing and regulating the safety requirements for transporting these gases, and it is believed that they have had incorporated into the Interstate Commerce Commission Regulations sufficient safeguards in manufacture and handling of containers as to reasonably protect the handlers and users against injury. All the regulations prescribed by the Interstate Commerce Commission and the Bureau of Explosives are to no avail if necessary precautions are not adhered to by the shippers, handlers and users of these containers.

When a shipper of a dangerous product which has to be filled into a cylinder turns this material in the cylinders over to the transportation company for delivery to his customer, he guarantees to the carrier that he knows that all the requirements concerning the testing, filling and shipping of the cylinder have been rigorously followed, and that he is beyond any doubt certain that all regulations of the Interstate Commerce Commission and Bureau of Explosives have been carried out.

He also must realize that upon him devolves a certain responsibility for safety, which if not adhered to, can cause serious consequences and leave him open to very serious repercussions. Poisonous gases, inflammable gases and all high pressure gases are definitely potential hazards, which require continual supervision that the standards prescribed be lessened to any extent.

The various labels and placards prescribed by the Interstate Commerce Commission to be applied to cylinders used for the safe transportation of dangerous gases have been adopted after very careful consideration by the Interstate Commerce Commission after consultations with the Bureau of Explosives and all interested shippers. While it is a positive requirement that the shipper attach the prescribed label or placard, the purpose of this application is to inform and warn the carrier to "handle with care." The carrier must be certain that he complies with all the regulations prescribed by the Interstate Commerce Commission as to handling, loading, etc.

The customers or users of dangerous gases must be as well informed as to their hazards as the shipper. It is his responsibility to inform all persons handling or using the cylinders of the hazards which are present. Most large shippers of dangerous gases in cylinders have technical advisors who freely furnish safe information concerning precautionary methods to be adopted.

The use of cylinders for the handling of dangerous gases is a safe method providing all persons observe the rules and regulations governing their filling, shipping and using. Invariably accidents occur when someone overlooks the precautions for safe handling.

Revision of Order L-197 Important to Shippers

So far as the chemical industry is concerned, the revision of Limitation Order L-197 is without question one of the most important container orders that has been issued to date by the War Production Board, and a review of the basic points in connection with the amendment are set forth herein.

However, before listing these basic points, it is recommended that all chemical users of steel containers acquaint themselves with all the provisions of L-197 as amended May 27, 1944. As this amendment, due to restrictions and limitations, establishes quotas which must be computed by the individual based on past usage, and while we give you the basic points, it must be remembered that the War Production Board has set up within this order "Use Control" and does not limit the right to purchase new drums except for an inventory restriction of 60 days of all types and sizes of steel drums. Under the revision, W. P. B. is not allocating steel containers and no priority is necessary to purchase. The Army, Navy, Aircraft Resources Control Office, Maritime Commission or War Shipping Administration are excluded from the provisions of this order.

This limitation order as amended on May 27 has two schedules; namely,

Schedule A and B. Under Schedule A a person may use new steel drums for each class of commodities listed to the extent of his packing quota for that class of commodities. This packing quota allows him to use no more tonnage of new drums for the packing of any class of commodities listed in Schedule A for industrial orders than 95 per cent of the tonnage of new drums he used for that class of commodities in the corresponding quarter of 1943. As an alternative to basing his quota for any quarter upon the usage of new drums shown in the corresponding quarter of 1943, a person may determine his packing quota for any class of commodities for any quarter by taking 23¾ per cent of the total usage of new drums for packing that class of commodities for industrial orders during 1943. A person may not change his method of computing quarters in the course of any calendar year.

If a person packed a commodity listed in Schedule A in fibre drums during 1943, he may appeal to the War Production Board for permission to establish a quota for steel drums based on the percentage allowed, and in this manner may substitute steel drums where fibre drums were used in the corresponding quarter of 1943 for a particular commodity listed in Schedule A. The use of steel in place of fibre on a quota basis is restricted to only certain commodities listed in Schedule A and does not apply to all commodities in this list.

We again reiterate that the actual Order L-197 as amended May 27, 1944, be studied by all users of steel drums in order to be certain that compliance with these limitations and restrictions of the War Production Board are carried out.

How to Help Container Situation

The War Production Board in a circular issued recently points out a serious problem concerning cartons, bags and wrapping paper and under the heading "Why the Problem is With Us," we quote the folloping: "At least 1,000,000 tons of V-boxes are scheduled for production in 1944 requiring roughly 25% of all containerboard to be produced. These heavy V-boxes of high quality are estimated to consume some 40 to 45% of all kraft pulp alloted to fibre boxes, which leaves a reduced quantity of lower quality boxes for domestic use. While some increase in production of kraft pulp and containerboard is expected in 1944 this increase is not nearly enough to offset the unprecedented demands of the Army and larger civilian requirements.

"Similarly, very great demands for waterproof papers by the Army has reduced the supply of kraft wrapping paper and grocery bags to the danger point. These two new demands are emphasized because they both require kraft pulp and have contributed directly to the shortage of fibre boxes, wrapping papers and grocery bags, a reduced supply of which must satisfy the demands of an economy expanded by wartime conditions."

With this in mind, a list showing how the available supply of boxes, bags and wrapping paper may be made to do has been published and this is quoted below:

"1. Reduce the printed area of the boxes to facilitate reuse.

"2. Avoid using staples. It is time-consuming for the average employee to remove them.

"3. Redesign your boxes for the most economical use of material. If you have not already requested from your supplier a survey with respect to the most economical container for your product, we suggest that you do so after you have asked your operating department the following questions:

(a) Can you ship in larger units?

(b) Is the shape of the container economical or could a change in shape use less sq. ft. of material? Savings of 14% are possible.

(c) If you use slotted cartons, are they economical in regard to length of flaps? Savings to 26% are possible.

(d) Does the carton open at the smallest panel, thereby maintaining the double flap area at a minimum?

(e) Are you using heavier material than necessary?

(f) Are you using solid fibre board when corrugated would do? Corrugated board effects a saving versus solid fibreboard. This saving might be as much as 100 lbs. per M sq. ft. of board for a 200 lb. test case.

(g) Is your inner container too weak, requiring the outer to be too strong? or vice versa? A rearrangement of materials might effect an overall saving.

(h) If inner packing is used, are economies possible through a better engineered interior packing?

(i) If your container is stitched, need it be? Taping requires less material.

(j) Have you investigated the possible use of three piece boxes of various types? Frequently they require less material than slotted cartons.

(k) Do your container sizes avoid excessive trim waste of rolls that your suppliers stock?

(l) Is the style of your container of an economical design that avoids excessive waste in a boxmaker's plant?

(m) If you double package, can you safely eliminate one package?

(n) Can you eliminate sizes and standardize the others?

4. Do [illegible] d

over purchasing new or used cartons.

"5. Make local deliveries wherever possible without using shipping cases.

"6. Furnish the local W. P. B. Redistribution Officer and used container dealers with a list of any obsolete cartons which are on hand. Many plants have such cartons which were purchased for products which were prohibited when the war began.

"7. Don't burn fibre shipping containers, brown wrapping paper and brown paper bags. Get them back to the mills so they can be used in making more boxes.

"8. Don't wrap items which already are packaged adequately.

"9. Bring your grocery bags back to the store for reuse.

"10. Don't put garbage in brown paper for disposal. Use a newspaper instead."

The supply of materials from which cartons, bags and paper are made will become far more critical than it is at the present time, and we cannot stress too much the importance of complying with these requests of the W. P. B. in order that shipments may continue to be made.

Reconditioned Steel Drum Industry Advisory Committee

The War Production Board has recently announced the formation of a Reconditioned Steel Drum Industry Advisory Committee which was formed at the request of the industry. The first meeting has already been held and preliminary discussion of problems to be faced during the post war period of surplus liquidation was discussed. In general the Advisory Group favored some method of informal government channeling of surplus drums to users most in need of them through the reconditioning industry.

The quantity of used drums to ultimately become available is not yet known. Discussions were exploratory, pending redistribution policy decisions by the Surplus War Property Committee.

Members of this new committee comprise some of the largest reconditioners in the country.

Limitation Order L-317 Revised

On May 29, 1944, the War Production Board amended limitation Order L-317 (Fibre Shipping Containers) by adding a requirement that each purchase order must have a certification that the purchaser is familiar with Order L-317 of the War Production Board and that the fibre shipping containers (or reshippers) covered by the purchase order will not be accepted or used in violation of the terms of that order.

WATER FIT TO DRINK...

Keeps men fit to fight!

Running water on a battlefield is usually water running down the side of a slit trench. And that's not exactly drinkable!

So wherever our Army advances, the Corps of Engineers goes along to provide a water supply safe for a thirsty man to drink. Right up to the very front go the engineers and their mobile water purification units . . . seeking out the best water to be had . . . and then making sure it is safely purified.

PERCHLORON, product of the Pennsylvania Salt Manufacturing Company, is the source of the chlorine used in many cases. Due to its high chlorine content, a can of PERCHLORON can do a big job . . . since there is no significant loss of its strength and effectiveness en route. A specially designed Crown Can . . . a controlled breathing *resealable* container . . . provides protection in shipping and during use.

That's one more Crown Can that goes right up to the fighting line . . . another product of Crown's assembly lines doing its part to speed the day of Victory.

★ ★ ★ CROWN CAN ★ ★ ★

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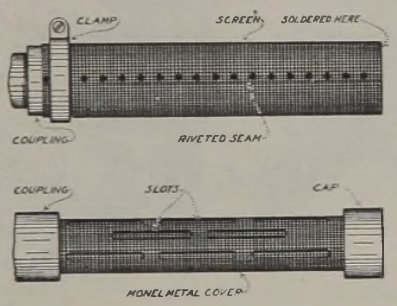
PLANT OPERATIONS NOTEBOOK

by W. F. SCHAPHORST

How to Screen Oil Supply

You who use oil in diesels, under boilers, or elsewhere, may be interested in this excellent "pipeless strainer" which was recently shown to this writer by an engineer friend who gave permission to describe it and show this sketch.

An oil strainer as commonly made consists of a perforated pipe covered with a fine mesh wire cloth. The perforated pipe give the strainer the necessary rigidity to resist collapse, and the wire cloth keeps out the undesirable solids, lumps, dirt, etc.



This engineer decided that the perforated pipe would be unnecessary provided he could find a wire cloth of sufficient stiffness to serve the purpose alone, and that is what he did. He secured a rugged, durable, fine mesh wire cloth of the noncorrodible variety and succeeded in making a very satisfactory strainer out of it —much superior to the old-fashioned type. The wire cloth solders readily, can be fastened into place easily and securely and is cleaned quickly. A perforated pipe not only retards flow but costs additional money. Besides, the total open area through which the oil can flow is much greater without the perforated pipe than with it. The idea "makes a hit" with everybody who sees it, says the engineer. This writer considers it a good idea and it is certainly based on sound engineering design. For high pressures a slotted pipe is advisable as shown in the lower sketch. The top sketch is "pipeless."

How to Reverse Without Twisting Belt

On a number of occasions this writer has come across belt drives similar to Fig. 1 in which pulley B is the driving pulley and A is the driven pulley. The reason for this unusual arrangement is that pulley A must rotate in a direction opposite to B, which would not be obtainable, of course, if a regular open drive were employed.

To reverse the direction of the driven pulley the most common method is simply to cross the belt, and it is the method to be recommended where belts are narrow or where there is sufficient distance between shaft centers so that there will not be too much internal friction in the belt due to abrupt bending or too much rubbing of the belt against itself at the crossing point.

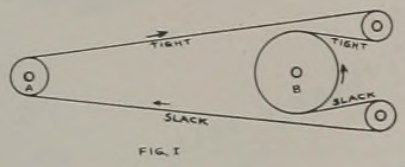


FIG. I

Fig. 1 is "unique," true enough, but such an arrangement is objectionable because of the fact that one of the idler pulleys must resist the pull of two tight belts as indicated, the words "Tight" and "Slack" having been lettered between the pulleys in both Figures 1 and 2. Thus the upper idler pulley in Fig. 1 is subjected to a greater bearing thrust than is the main driving pulley B, the latter having a tight belt approaching and the slack belt leaving, which is as it should be for a driving pulley. In other words the upper idler pulley has a bearing thrust that is nearly as great as the bearing thrusts of pulleys A and B combined. That is all wrong. Whenever idler pulleys are employed both approaching and leaving belts should always be slack. Idlers should be operated with as little friction as possible.

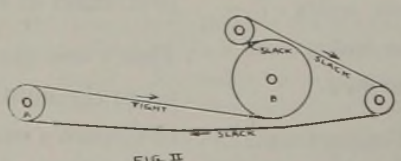


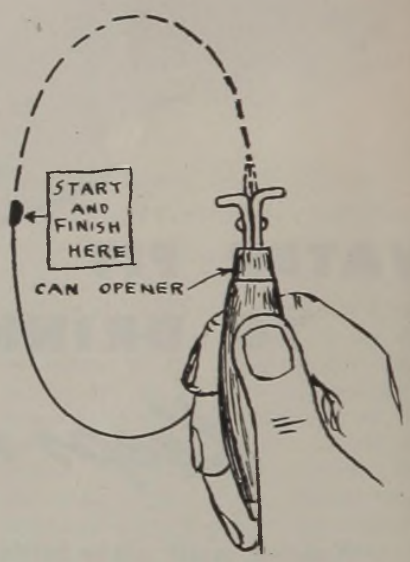
FIG. II

Now take a look at Fig. 2. This arrangement is preferable to Fig. 1 for the reasons cited above. The drive is reversed, the belt is not crossed, and the idler pulleys are not subject to great bearing thrust because in both instances the approaching and leaving belts are slack.

In the event that there should be insufficient space for an installation as shown in Fig. 2 it would be better to install a third pulley if necessary. By so doing the slack side can hug the driver pulley all the way around, and the friction will still be considerably less than with the tight idler method shown in Fig. 1.

Sheet Metal Cutting

Every reader, I dare say, will be glad to know this handy kink which the writer recently discovered and has used successfully—the use of an ordinary can opener for cutting openings in sheet metal—openings of any shape, and even for cutting sheet metal in two. I find that for certain purposes a can opener is far superior to a pair of metal shears, a chisel, or other method commonly used. The objection to shears is the interference of the metal to the working hand and the fact that the metal must be bent away to some extent in order that the shears can be put through.

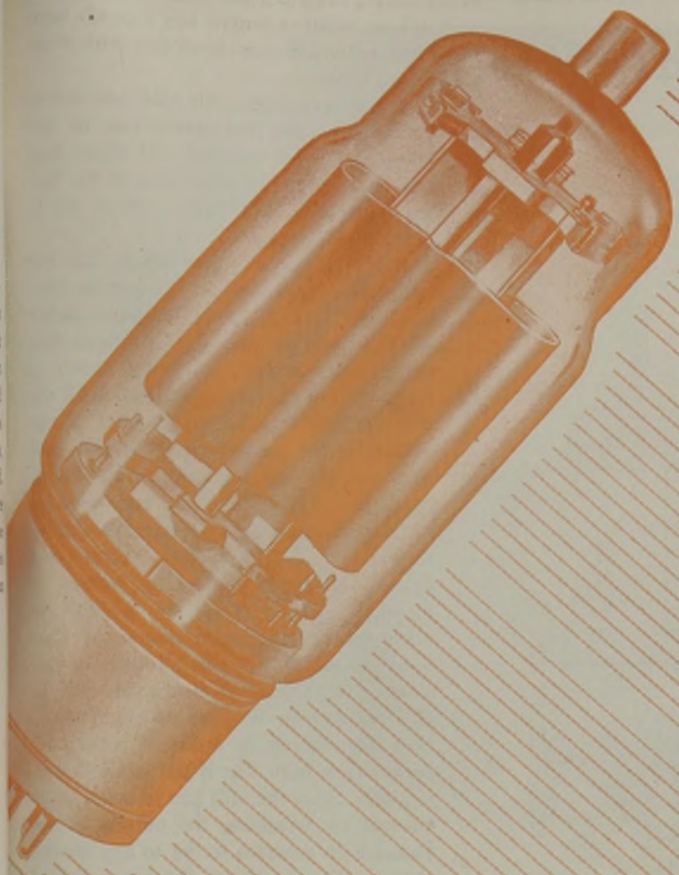


A can opener does not present any such interference difficulties and as a result both parts of the sheet metal—the part cut away and the part remaining—do not become bent.

Write to Manufacturers About Mechanical Troubles

This writer has learned after thirty years of association with many manufacturers that users of mechanical equipment on the whole are backward about writing letters. Most users of machinery would rather work a whole week than sit down and devote a solid fifteen minutes to writing a letter about mechanical troubles.

An important advantage about writing is the valuable advice that can usually be had, gratis, by simply penning one's troubles to the manufacturer, or to several manufacturers. Most firms do their level best to comply with all reasonable requests made by customers and prospective customers. So, don't hesitate to write a letter next time you have trouble.



Measured purity contributes to the wonders of ELECTRONICS

Electronics—the new science of putting the electron to work!

Today . . . the electron tube helps control the quality of countless products of war . . . guides the destinies of armies and fleets all over the world.

Tomorrow—this miracle-working tube which sees, hears, tastes, feels and smells with amazing sensitivity—will revolutionize our peace-time lives.

It will invade industry in all its aspects, save energy, save time, save money, protect life and property.

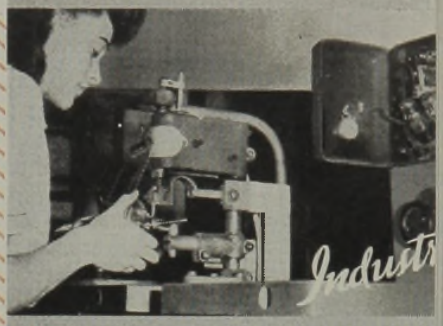
Baker is playing its part in contributing chemicals of extraordinary purity to make possible the coating of the filament used in the electron tube. Here, *purity is demanded*—so that transmission of electronic power may not be impeded.

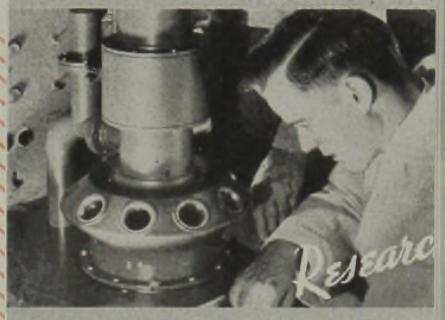
This is only one of the many instances where *purity,* as exemplified by Baker Chemicals, has increased efficiency in today's forward march of industry.

Baker's Chemicals (purity by the ton) have been supplied to many manufacturing concerns for the manufacture or processing of many products.

If you have special chemical requirements for war- or post-war production products, we invite you to discuss your needs in confidence with Baker.

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





Three lower pictures courtesy Radio Corporation of Ame

Back the Attack with War Bonds

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

LABORATORY NOTEBOOK

Improved Laboratory Polariscope

In the January 1944 issue of *Bulletin of the American Ceramic Society,* J. Gallup describes an inexpensive home-made polariscope which has the following desirable features: 1—A uniform light intensity over the field; 2—A uniformly polarized field; 3—A uniform color over the field: 4—Binocular vision without eyepieces or lenses to cause eye fatigue; 5—A wide field of view; 6—Freedom from extraneous light, i. e., freedom from reflected room light; 7—A vertical system which allows the strained object under view to be laid directly over the bottom polarizer beside the strain standards, leaving both hands free for manipulating the standards; 8—A convenient arrangement for viewing small curved objects immersed in a beaker of liquid of appropriate index to remove reflection effects; 9—A direct-viewing arrangement without the confusing reversal of image which occurs with the use of a mirror analyzer; and 10—A readily removable tint plate.

The necessary equipment consists of a 3200° Kelvin bulb for the light source, a sheet of black Carrara glass which is set at the polarizing angle and is used as the mirror, a piece of Polaroid "J" film for the polarizer, a piece of Polaroid "H" glass for the analyzer and a piece of mica which is used for making the tint plate. The construction of the polariscope is given in detail.

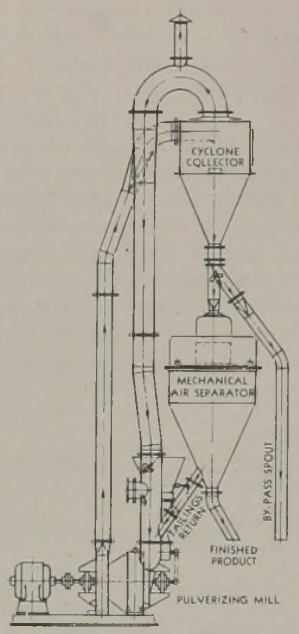
Laboratory Mill

This unit is the smallest of the Raymond line of commercial size mechanical air separators. It is useful where small or medium-size batches of material are to be classified, either for test purposes or industrial runs and is entirely suitable for laboratory applications.

The feed enters the separator through the hollow vertical shaft in the center, discharging on to a revolving distributor plate, and then recirculating through the separating chamber by the action of the fan and whizzers. The fines are collected in the outer cone, passing out through the center bottom spout, while the oversize is discharged from the inner cone through the side tailings spout.

There is a series of vertical damper slides around the periphery of the machine by which minor changes in fineness classification can be made while the separator is operating. The top and bottom sections of the separator can be lifted apart at the middle joint, which has slotted holes and hinged bolts.

The 30-inch separator may be used in closed circuit operation by installing it above a pulverizer and introducing the feed direct from the cyclone.



The diagram shows the Raymond pulverizer in closed circuit with the 30-inch mechanical air separator. This is an ideal unit where pulverizing and classifying are necessary. It is a combination offering great flexibility, from coarse to extreme fine, the oversize being returned to the mill for re-grinding. Where a very coarse, or approximately granular, product is required, a screen may be used for classifying the finished material.

New Distilled Water Apparatus

No radical change has been made in the normal water still for a long time. If the efficiency of one of these commonly used stills is calculated the result is very likely surprising. The fact responsible for this inefficiency is that the number of calories required to heat the cold incoming water up to boiling point is small in comparison with the heat required to convert the water to steam.

Besides this question of inefficiency, there is the ever present problem of "furring up." All stills in which tap water is used must naturally deposit contents of the water on the walls as the concentration of the solution goes up. Despite de-concentrators and other devices, unless some specific water softening scheme is undertaken, the efficiency of the still will get progressively worse.

The February 1944 issue of *Industrial* [illegible] tion" still on which a patent has recently been obtained which was developed with these points in mind.

A standard size, such that one gallon an hour of distilled water can be obtained, has been selected. If more than this is required the simplicity of the layout will make it advantageous to use a battery of these.

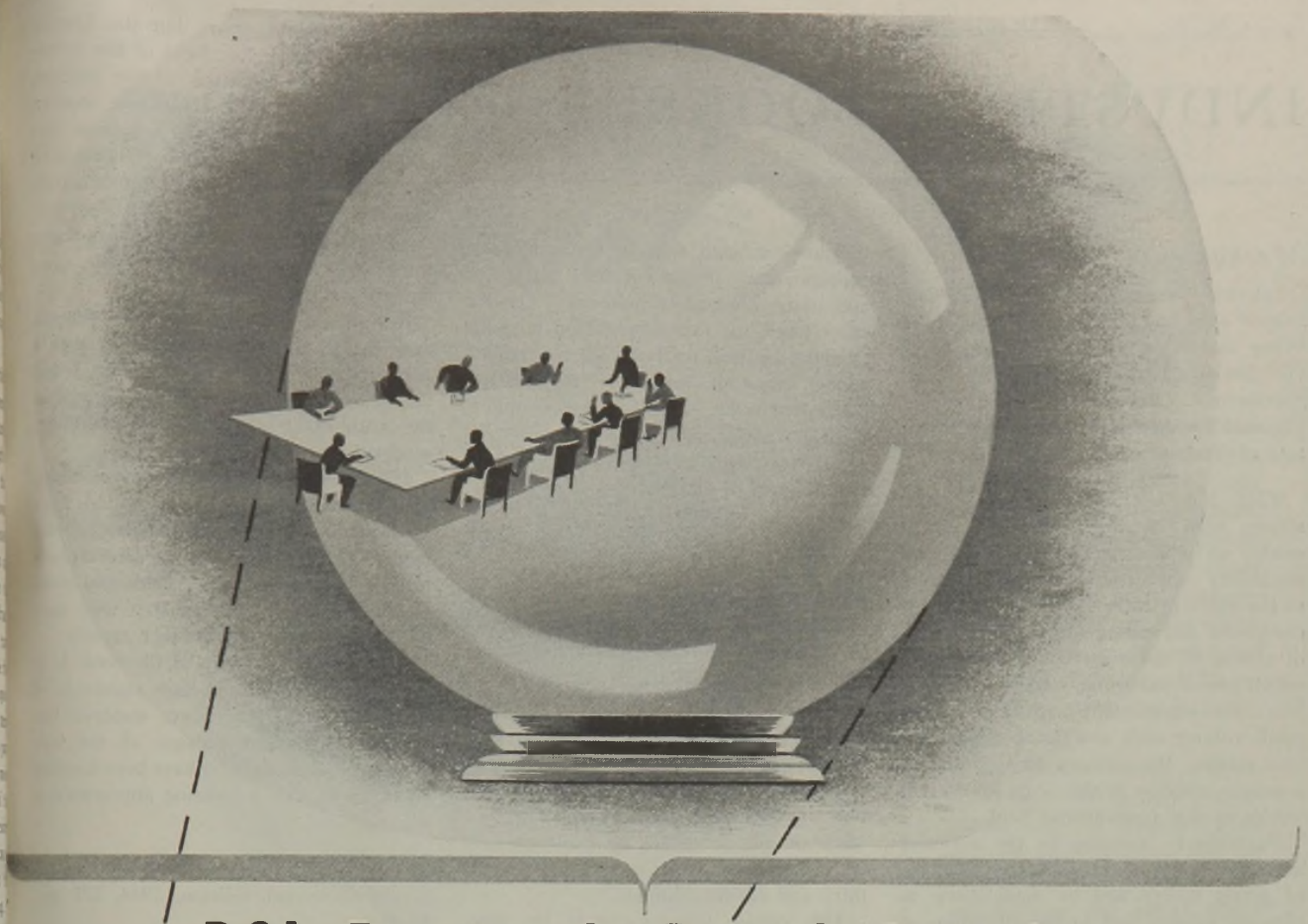
The principle of operation is that the raw steam comes in on the bottom left-hand side. It passes up the outer jacket which is only air cooled. This air cooling gives fractionation, carrying down a proportion of the steam together with the dirt and any high boiling liquids. These collect in the bottom of the jacket and pass out through the trap on the right-hand side. The clean steam goes over the top of the outer jacket and passes down through the multi-surface spiral condenser and comes out of the bottom as distilled water. It is not possible to settle on any particular degree of fractionation which will suit all types of raw steam. In order to be on the safe side the still has been so designed that the proportion fractionated at ordinary room temperatures is high, but if the steam is particularly clean the still can be made more efficient by wrapping the outside of the jacket with asbestos string to any desired extent. This increases the proportion of steam passed over and decreases the amount of stripping, or back-flushing.

The still should be in some room which is not normally heavily contaminated with fumes. It will usually be found that stills are placed in corners of laboratories and that the distilled water comes out fairly cold and absorbs appreciable quantities of these vapours.

The cooling water should be so adjusted that the distilled water comes out as near boiling point as possible. It should have to drip only a short distance through the open air. It will then be found that it will not re-absorb most of the low boiling vapours and the carbon dioxide, etc., which are driven off at this high temperature and which pass into the air when the hot water drips into the receiver. If this experiment is tried with the average still, it will usually be found that there is an appreciable improvement in the p_H of the distilled water.

The method of operation is to turn on the cooling water to any reasonable extent and then to turn on the steam valve and adjust it so that the issuing distilled water is nearly boiling. It will be seen, of course, that there is no pressure inside the glass jacket at all, unless so much steam is admitted that it comes out of the overflow. The valve should therefore be opened cautiously.

It is often found that the steam lines are full of rust and dirt to begin with, and if this is very bad the steam should be trapped in a lagged glass vessel before passing into the still.



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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INDUSTRY'S BOOKSHELF

Mechanics of Chemistry

QUANTUM CHEMISTRY. By *Henry Eyring, John Walter,* and *George E. Kimball.* John Wiley and Sons, Inc., New York, 1944; vi + 394 pp.; $5.00. Reviewed by *W. H. Stockmayer,* Research Laboratory of Physical Chemistry, Massachusetts Institute of Technology.

THE NATURE of this book is consistent with its title and size. It is neither an exhaustive treatise on quantum mechanics nor an expanded introduction to the subject; rather, it is a consistently condensed and mathematical presentation of almost all those aspects of the science which are of particular interest to chemists. By intentionally covering in one small volume such a wide range of subject matter, the authors have produced a unique addition to the large number of works in this fundamental field.

Particularly welcome to the reviewer are a treatment of the necessary elements of group theory and its applications to directed valence and to the vibrations of polyatomic molecules (including extensive sets of stereographic projection diagrams and character tables); and a thoroughgoing chapter on the fundamentals of the rate theory which has been so usefully applied in the last decade by the authors and their many associates. In addition to the expected conventional topics, the book also treats briefly of optical rotatory power, coherent and Raman scattering, restricted rotation, electric and magnetic susceptibility, van der Waals forces, and quantum statistics. Faced by such a comprehensive array, one is not impelled to dwell on omissions; yet the reviewer was surprised to find no mention of the correspondence principle, nor of the Fermi-Thomas atom. He also regrets that in the excellent exposition of the theory of the covalent bond the repulsive states are dismissed without even a passing reference to the "van der Waals radii" of atoms and molecules.

In general, the book is very well written, and it is difficult to single out any particular sections for favorable or adverse criticism. This is perhaps natural, for the authors have had direct experience with almost all of the topics they treat. The heterogeneous authorship is rarely evident, and the material is correlated so that the reader rarely need deviate from the order of presentation.

In the reviewer's opinion, a chemist embarking on an independent study of quantum mechanics would probably find this book difficult without a considerable supplementary dosage of less condensed and more illustrative material. On the other hand, for this very reason it seems to make an ideal textbook for a graduate course, since it leaves to the teacher his proper tasks. Finally, the economical inclusion of so many topics assures its popularity with the more experienced practitioners of the art.

Revised Standard Text

PRINCIPLES AND APPLICATIONS OF ELECTROCHEMISTRY. VOLUME I, PRINCIPLES, by *Jermain Creighton.* Fourth Edition. John Wiley and Sons, N. Y. C., 1943, 477 pp., $5.00. Reviewed by *Robert C. Gore.*

THE APPEARANCE of a fourth edition of this standard text and reference work on the principles of electrochemistry is testimony of the reception given the third and earlier editions.

This edition follows closely the plan, style and subject matter of the third edition. Because of the author's broad definition of electrochemistry as that division of chemistry which deals with the relations between, and the mutual transformations of, chemical and electrical energy, it is possible for him to include a large number of subjects. Included among these are the usual discussions of Faraday's Laws, dissociation theory, conductance, ionic migration, electromotive force, polarization, electrolysis, the laws of mass action, activity, dissociation constants and structure, equilibria, hydrolysis, neutralization and ampholytes.

Several topics not included in former editions have been discussed in this. Added subjects are transference in fused salts, the structure and properties of the electric double layer, the moving boundary method of measuring electrophoresis, streaming potentials in fused salts, polarographic analysis, the Wien effect and glow discharge electrolysis.

Those persons who liked the third edition will continue to enjoy this revision. The author says that the book was written in order to present a systematic course of instruction in electrochemistry for chemistry students and to provide a reference book. These two aims have been admirably met.

The book was not intended as an exhaustive treatise and it is not that. The discussions of several of the topics are not as complete as serious workers in each field might desire but the brevity can be excused in the light of the necessary physical limitations of the volume.

Some of the more significant modern ideas and researches have not been discussed in the text although references to them have been added. This unfortunately gives an appearance of too hasty a revision. Some of the tables of constants might have been revised to include more modern data.

Several of the vacuum tube devices, such as the amplifier on page 81, seem a little antiquated. Moreover, few people would care to use the reference given at the bottom of that page when many more modern ones are available.

However, in spite of these minor faults, anyone mastering the text would have considerable knowledge concerning the field. The volume will be useful both to those workers in other fields and those specialists in electrochemistry who may desire to review any subject rapidly.

The physical makeup of the book is in keeping with the usual high standards of the publishers. The cover material has noticeably suffered because of the war but the reduced margins have been handled so skillfully that a pleasing appearance is maintained.

VOLUME II. APPLICATIONS, by *W. A. Koehler,* Second Edition, 1944, 573 pp., $5.00.

THIS SECOND volume of the two volume work is an interesting and valuable survey of the various practical applications of electrochemistry. The applications discussed are power generation, cells and batteries, electroplating, electrorefining, electrometallurgy, electrolysis, corrosion, electroanalysis, electric furnace applications, electronics, ozone, nitrogen fixation and miscellaneous electrochemical processes.

Topics added in this edition include continuous tin strip plating, magnesium from sea water, hydrogen peroxide manufacture, fluorescent lamps, induction heating of dielectrics, new carbon bisulfide and phosphorus furnaces and the nickel-cadmium alkaline storage battery.

A forty-three page review of theoretical electrochemistry, with a practical slant, is also included for the sake of convenience in this volume.

A minor omission noticed in the chapter on electric furnaces in non-metallurgical industries was the important commercial production of fused optical crystals such as rocksalt, potassium bromide and lithium fluoride.

This text is attractive, well illustrated and documented with numerous references. Anyone interested in the applications of electrochemistry can ill afford not to have access to this book. This work is practically alone in filling an important gap in our technical literature.

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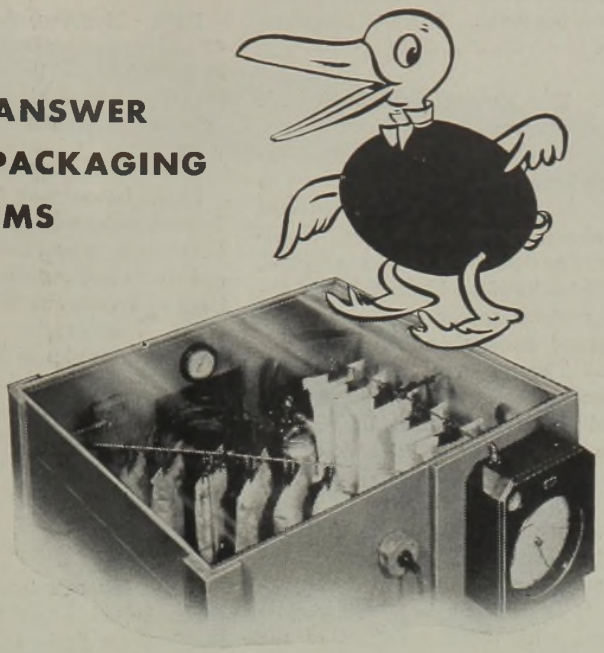

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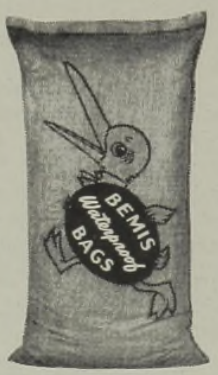

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BOOKLETS & CATALOGS

Chemicals

A653. ALLYMER. Data Sheet No. 44-1 gives the general properties and characteristics of Allymer C. R. 39, a monomeric liquid of low volatility which gradually solidifies to a hard, insoluble, infusible, glass-clear solid when heated in the presence of a peroxide catalyst, making it well suited to use in the casting of transparent sheets, in impregnation processes, and in the production of laminates by very low or contact pressure methods. Pittsburgh Plate Glass Co.

A654. METAL PROTECTIVE PAINTS. A booklet, "How Zinc Saves Steel from Rusting," discusses the functions and formulations of metal protective paints, with emphasis on zinc coatings. New Jersey Zinc Co.

A655. MAGNESIUM. The story of magnesium with extensive quotations from the recent Truman Committee investigations is presented in a 76-page paperbound booklet. Dow Chemical Co.

Equipment—Methods

F123. BUTADIENE PLANT EQUIPMENT. A large booklet filled with excellent photographs of the world's largest butadiene plant calls to attention the installation of Clark Bros. Co., Inc.

F124. COMPRESSORS. A 32-page catalog covering compressors and vacuum pumps in sizes from ½ to 10 horse power, including the well-known Type "30" line of air-cooled machines with two notable additions, a 3-stage dual-pressure portable and two 3-stage high pressure units, has been published. Six pages of excellent installation views show various applications. Ingersoll-Rand Co.

F125. DAMPER PROBLEMS. A new, illustrated Heacon Damper catalog provides helpful data on modern industrial damper problems with case histories and diagrams showing the increased efficiency of proper damper installations in a wide variety of installations. Such factors as binding in dampers, warped shafts, dynamic balance, power requirements, and simplified maintenance of damper installations are discussed. Thermix Engineering Co.

F126. FIRE EXTINGUISHERS. A basic maintenance system including questions of supervision, record-keeping, and recharging of all types of fire extinguishers is outlined in a 12-page booklet directed to the plant foreman or fire chief. Classification of various types of fires is defined, and code-marks of the Underwriters' Laboratories which appear on the labels of all accepted extinguisher models is explained. The proper placement of extinguishers for quick and efficient use, and wall and floor markings to aid their speedy location in emergencies are described. Walter Kidde and Co.

F127. FIRE EXTINGUISHERS. A booklet on "Recharging Instructions for Carbon Dioxide Extinguishers" has been published. It is made up in pocket size, is illustrated with detail drawings of the equipment required and procedure to be followed in recharging both system cylinders and portable extinguishers. C-O-Two Fire Equipment Co.

F128. FOUNDRY SHAKEOUTS. Illustrations and descriptions of standard, multiple-unit, self-discharging and portable full-floating foundry shakeouts are found in a new 12-page Bulletin No. 124-A. A chart of dimensions of standard shakeouts is included. Robins Conveyors, Inc.

F129. GAS REMOVING. To those industries in which removal of gases from either cold or hot water is important, Bulletin 4076 "Degasification of Water" is important. It illustrates a number of equipments that are available for removal of gases from water at various temperatures, the means provided for removal of oxygen and carbon dioxide from water without the use of steam, the removal of small quantities of ammonia, the removal of hydrogen sulphide and carbon dioxide simultaneously, as well as illustrating different designs of Cochrane deaerators available for elimination of gases in connection with boiler plants. Cochrane Corporation.

F130. HEATING, AGITATING. Bulletin 43 describes steam jet agitators for heating and agitating pickling baths and chemical properties with diagrams and photographs of various types of applications. Heil Engineering Co.

F131. LABORATORY APPARATUS. A new 20-page Bulletin 76 entitled "Metallurgical Laboratory Apparatus" describing new and specialized instruments for rapid analyses of metals and alloys has been published. Photographs and clear explanations of principles of operation of carbon and sulphur determinators; combustion furnaces, tubes, boats and accessories; electroanalyzers, motor stirrers, hardness testers, microscopes, ultra-violet sources for fluorescent examinations, and other improved items are included. Central Scientific Co.

F132. MEASUREMENT CONTROL. A 4-page bulletin describes Photoswitch Densitometer Series D90, a recently introduced photoelectric control for transparency measurement of liquids, gases, films, filters, plastics and similar materials. Photoswitch Inc.

F133. MOLDING MACHINES. Specifications covering five models, with hopper feed capacities ranging from 6 to 24 ounces, detailed drawings, including plates and die layouts, and complete data on operating features of horizontal injection molding machines are included in Bulletin 621-A recently published. The heating cylinder of these machines is a new design, developed to give higher plasticizing capacity at lower temperatures and a reduction of pressure loss within the cylinder. Change of material in cylinder is easily accomplished without dismantling the unit from the machine. Together with zone heating control this unit meets requirements of many thermoplastic and thermo-setting materials. Watson-Stillman Co.

F134. RESISTANCE WELDING. A new bulletin GET-1189, on resistance welding, a method of metal fabrication, includes information on resistance-welding methods and equipment, the selection of equipment for best welding results, welding electrodes and their maintenance, and material and its preparation for welding. Photographs, diagrams, and charts add interest and clarity to this booklet. General Electric.

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CANADIAN NEWS

by W. A. JORDAN

Amalgamation of Societies Completed

Canada's three chemical societies become one after official declaration last month. Known as Chemical Institute of Canada, new organization will aim for membership of 7,000.

A NEW OUTLOOK and period in chemical society affairs of the Dominion is foreshadowed by the amalgamation, effected in June, of the Society of Chemical Industry (Canada), Canadian Institute of Chemistry, and Canadian Chemical Association, to form the single, national, Chemical Institute of Canada.

Although the three present societies will continue to operate separately until the end of the calendar year, their councils have already joined to form an interim council of the new Institute and have elected an interim board of directors to draft a constitution and complete the other details of organization. These bodies will serve until a national election of officers can be held early in 1945. In the meantime the three merging organizations have elected the following presidents to hold office until the end of the year:

Dr. R. S. Jane, Shawinigan Chemicals Ltd., Society of Chemical Industry; L. E. Westman, Association Director, National Selective Service, Canadian Institute of Chemistry; Dr. C. J. Watson, Dominion Department of Agriculture, Canadian Chemical Association.

Debates on the advisability of amalgamation and the formation of one truly representative national chemical body, have been popular at conventions for some years, but opinions did not crystallize into action until the Montreal meeting of last June. At that time a Joint Committee on Chemical Reorganization was appointed, which was replaced in December by a Central Executive Committee. These committees outlined the main features of the proposed new organization and devised a plan for its creation. As a result of a plebiscite held in March their reports received the almost unanimous approbation of the members of the three societies.

The history of chemical organizations in Canada extends back to 1902 when the Canadian Section of the Society of Chemical Industry (Great Britain) was formed. The S. C. I. in Canada currently has some 500 members with local sections in Toronto, Montreal, and Ottawa.

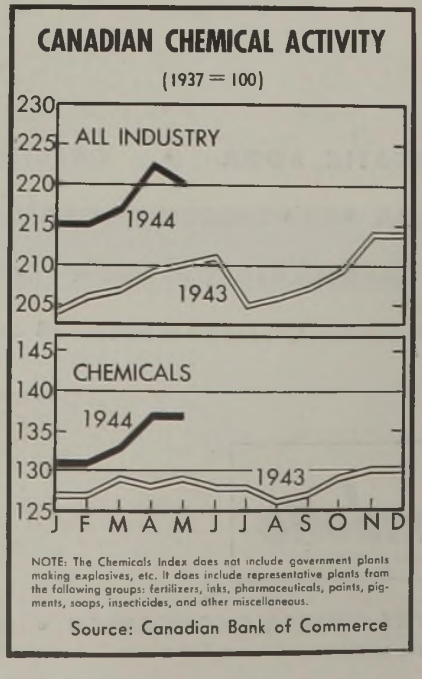
At the first Dominion chemical convention held in Ottawa in 1918 it was proposed that a professional society be established, and in 1921 the Canadian Institute of Chemistry was incorporated by Dominion charter. Its record has been one of slow but steady growth until now it numbers some 1700 professional chemists and chemical engineers among its members.

During the 1920's a number of local groups of those interested in chemical affairs grew up, and these, in 1928, were formed into a rather loosely-knit nation-wide federation as the Canadian Chemical Association.

The object of the new Institute is, briefly, to promote the interests of chemistry and chemical engineering, together with the social and economic well being of chemists, chemical engineers, and those concerned with the practice of chemistry. Facilities will be provided for the collaboration of scientists locally and nationally and for the necessary collaboration with other scientific organizations.

Two main types of membership will be available: professional, as a Fellow or Associate; and non-professional, as a Member or Affiliate. It is hoped that the Institute will have some 7,000 members.

Although no official comment has been made it is evident that one of the matters with which the Institute will be immediately concerned is collective bargaining legislation as it affects chemists and chemical engineers.



"Targets for Tomorrow"

"Targets for Tomorrow" was the theme under which more than 900 Canadian chemical men convened at the 27th annual Chemical Conference held in Toronto last month.

Apart from the numerous papers presented by American and Canadian scientists on current developments, the highlight of the program was the symposium on post war planning. Four main problems came under discussion: postwar employment problems of chemists and chemical engineers; organization and development of chemical research in Canada; wartime chemicals plants, their processes, products, and equipment; and economic aspects of the postwar chemical situation.

A detailed survey, the first released by the Government, of the processes and equipment of Crown-owned or supervised war plants, and an indication of the probable method of postwar disposition or utilization of the units or equipment was outlined by K. D. Running, L. C. Macrae, D. K. Collinge, and C. C. Weeks, of Allied War Supplies Corporation.

The task of the postwar Canadian chemical industry, as visualized by the Economic Committee composed of R. B. Walker, Dr. H. G. Yittler, A. O. Ponder, and W. H. Losee, will be primarily that of supplying the domestic market, and roseate thoughts of a substantial chemical export trade should be discounted.

The magnitude of the problem with which the industry will have to cope in the postwar era was revealed by a statistical analysis of the Canadian chemical industry. By charting the capital expansion over the past 25 years to ascertain the normal trend, and by projecting the graph, it would appear that today, not including shell filling plant investment and other such purely war-created developments, the capital investment in the industry is as it normally would have been in 1953. Putting it another way, under normal conditions of expansion, present plant capacity, will not be fully utilized in a peacetime economy for nine years.

Shawinigan Forms Development Department

Shawinigan Chemicals Ltd. has recently organized a Department of Chemical Development the functions of which will be contributory to the further diversification of Shawinigan's line of carbide-based chemicals.

A. F. G. Cadenhead, formerly director

of plant research, has been appointed director of the new department, with P. W. Blaylock, development engineer for plant and equipment design, as assistant director.

Tax Regulations on Research Eased

A considerable broadening of previous tax regulations governing industrial research is provided in the new budget presented in the Federal House. It modifies the Excess Profits Tax Act to render research expenditures allowable as a deductible expense.

In the case of expenditures of a current nature, the expense is allowed in the year the expenditures are made. In the case of capital expenditures, the expense may be distributed over a three year period commencing with the year of expenditure.

Ca Carbonate Expansion

Chem Ore Mines Ltd. has acquired the plant and property of White Valley Chemicals Ltd., Bobcaygeon, Ontario, and plans the immediate expansion of calcium carbonate mining activities. Initial operations call for an output of 25 tons per day of four commercial grades of calcium carbonate.

Officials intimate that the present plant will form but the nucleus of a large scale expansion for the treatment of their other non-metallic minerals. Chem Ore owns or controls nine individual properties totaling some 10,000 acres, carrying deposits of nephelite, barite, and white gypsum. The early construction of a unit to treat gypsum from Northern Ontario deposits is already under consideration.

Canadian imports of whiting approximate 240,000 cwt. per annum, of which 130,000 cwt., originates in the U. S. A. Gypsum imports total 14,000 cwt. of which 10,000 cwt. is from the U. S. A.

Explosives Program Resumes

Canada's wartime chemicals and explosives program, which has been scaled down progressively in the past year, is now being brought into full production again. Output for the latter half of this year is slated to be far greater than in any previous period, with a 20 per cent overall increase over 1943 planned, according to official advice.

Production of some chemicals in the program will be more than quadrupled, although calcium carbide output is not expected to rise appreciably, and the military demand for ammonium nitrate will not be of such an order as to materially affect fertilizer shipments.

Notable in the present chemical recovery is the reopening of the huge Nobel flashless propellent works, which has been closed for the past few months.

New Copper Sulfate Plant

Canadian Copper Refiners Ltd., a subsidiary of Noranda Mines, is planning the construction of a $500,000 plant for the manufacture of copper sulphate.

At present Canada has no production of the sulphate and last year imported 9,715,000 pounds, valued at $568,000. Eighty per cent of the imports originated in Great Britain with the remainder shipped in from the U. S.

Sulfate Plant Expands

The Brown Corporation is planning to expend approximately $3 million on improvements to its sulfate mill at LaTuque Quebec.

One of the principal installations will be new drying equipment, to be followed by other plant modifications still in the discussion stage. Officials are not commenting at present on the possibility of by-product recovery developments.

New Acetanilide Producer

Naugatuck Chemicals Ltd., affiliate of U. S. Rubber Co., has entered the pharmaceutical chemical field with the recent completion of a unit for the commercial production of acetanilide. Both U. S. P. and technical grades are being manufactured by the conventional aniline-acetic anhydride process, by this sole Canadian producer.

Hitherto the Dominion has imported some 200,000 pounds of acetanilide annually from the U. S. A., but with Naugatuck's rated capacity considerably in excess of this poundage it is apparent that henceforth imports will be virtually nil. Export possibilities are also being appraised by the Company.

Oxygen Co. of Canada Buys Cheney Chemicals

Oxygen Company of Canada, Ltd. of Montreal and Toronto has acquired the medical, gas and apparatus business of Cheney Chemicals, Ltd., Toronto. The business of both companies in Toronto will be carried on under the direction of Hugh D. Cameron, manager.

Personals

ANDREW R. GORDON has been appointed head of the department of chemistry of the University of Toronto. Professor Gordon has been a member of the university staff since 1925. He is a member of the Chemical Warfare Laboratories Advisory Committee under the Department of National Defense.

LLOYD M. PIDGEON has been awarded the $1,000 McCharles prize by the University of Toronto in recognition of his development of a practical process for production of magnesium from Canadian Dolomite. Dr. Pidgeon is head of the department of metallurgical engineering of the University.

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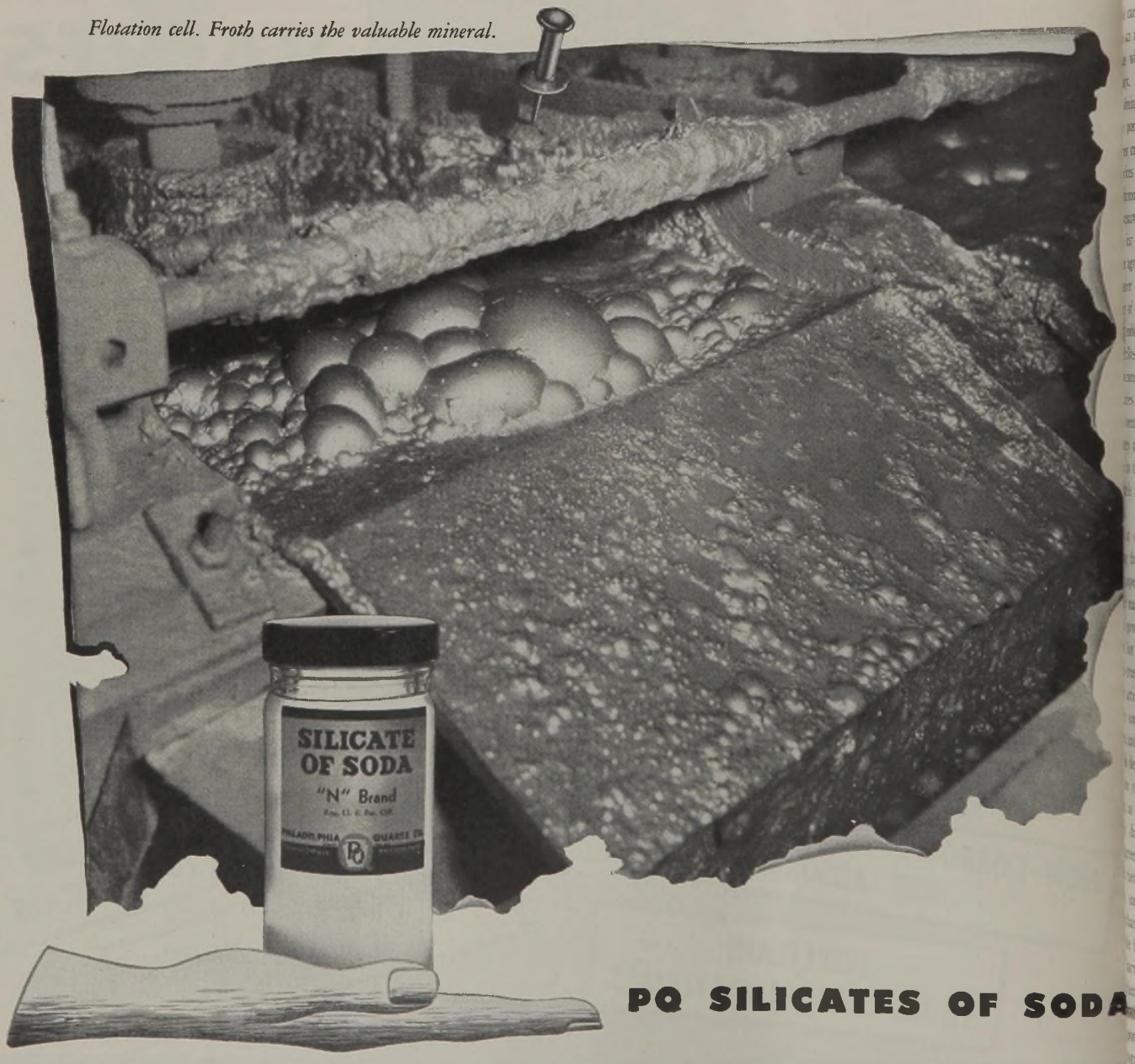

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NEWS OF THE MONTH

Government Cartel System Proposed

Price discrimination, market monopolies banned. Raw material reserves to aid control of prices, output. Policy to supplant private international cartels.

RECOGNIZING that some fundamental long range measures must be set up to relieve competitive distress in international commodities, the Departments of State and Justice have agreed upon the creation of international "governmental cartels" for a post war trade policy as an alternative to private cartel agreements which have been opposed in this country.

This Administration program contemplates the possible use of buffer stockpiles of raw materials as a means of controlling prices and production, and is a concrete formula which the Government will be prepared to offer other countries in a drive for the elimination of restrictive private agreements. The plan is also an alternative to the continued practice on the part of the Justice Department of vigorously enforcing the anti-trust statutes, regardless of the tolerance which other governments might show toward cartel activities within their borders. This policy has been criticized in some industrial quarters as handicapping American business in its dealings in countries where private cartels are not only tolerated but encouraged.

Arrived at openly by general agreement among the nations, and lacking the restrictive aspects of price discrimination and private market monopolies, these international governmental cartels could be substituted for private international cartels. Anti-trust officials concede the necessity for action on an international scale to achieve some stability in commodity movements and to protect countries whose economy is dependent largely on the export of one or two commodities. Such protection, as they see it, should be provided by direct governmental action through agreements between interested nations and tied in with other long range measures, such as the achievement of stable exchanges, the elimination of barriers to the free flow of capital, removal of trade barriers, and economic diversification, where necessary, to reduce the need for artificial production controls and price supports.

The program would operate through a series of international commodity agreements designed to limit production and support stable commodity price levels for fixed periods, ranging from three to five in the case of most commodities, somewhat longer where it is deemed necessary. Plans for Government cartel agreements are being projected along lines of individual consultations with separate nations, according to whether these have either a high production or use interest in the particular material to be discussed. There is less inclination to think in terms of a worldwide raw materials conference than to develop a program for taking up each commodity as a separate job.

It is stressed that the proposed "governmental cartels" are not intended to cover anything like the wide range of commodities which have been made the subject of production and marketing agreements between private companies. The program is based on the conviction that the bulk of these private agreements lack economic justification, and that where agreements of a temporarily restrictive character are clearly called for, they should properly become the subject of governmental rather than private negotiations.

The policy has been laid down in a detailed memorandum, prepared by State Department experts, which has received the full concurrence of anti-trust officials.

Increased Rubber Rate Factor in Alcohol Holiday

Continued production of alcohol-butadiene units far above their rated capacity, and increased overall output of butadiene from both alcohol and petroleum fractions were the chief factors in the decisions of WPB to return beverage plants back to whiskey production for one month, it has been reported in the rubber industry.

There is also a possibility, it was suggested, that current production of GR-S and other synthetics may be running somewhat in excess of manufacturers' ability to convert them into finished rubber articles. This is readily understandable, it was said, in view of the great demands for tires, fuel oils and many hundreds of other war essentials made from synthetics which are difficult to mill.

The apparently easier situation in alcohol, however, can be traced, as stated, to lessened demands upon it for the processing of butadiene, and in this connection it is learned that further increases have been obtained in the production of this synthetic ingredient. Col. Bradley Dewey, the rubber director, about a month ago placed the amount of alcohol butadiene in the production total at 63 per cent, and since then it is believed that this figure has been further reduced, possibly to below 60 per cent.

Distillers may be barred from using corn—a favorite raw material—in making beverage alcohol during the August whiskey-making holiday granted by the War Production Board.

Amecco and Hardesty Form Hardesty Chemical Co.

S. J. Cohen (left) is president and William C. Hardesty (right) vice president of Hardesty Chemical Co., Inc., a new company formed jointly by Amecco Chemicals, Inc. and W. C. Hardesty Co. to make sebacic acid, capryl alcohol, dibutyl sebacate, and their derivatives. Offices are at 41 E. 42nd St., New York City. Formation of the new company does not affect the operation or organization of either parent company.

Hercules Increases Rocket Powder Production

The supply of rocket powder—probably the most revolutionary weapon of the war—will be materially increased the latter part of 1944 when a 24 million dollar addition to a Hercules Powder Company operated ordnance plant in Wisconsin, Badger Ordnance Works, is completed, it was revealed by company officials.

So vital is the production of rocket powder, the Army has placed it on the critical list ahead of planes, aviation gasoline, tanks, and ships. Rockets have proved an important factor in the capture of several Pacific islands by the Marines at a considerable saving of lives.

The new propellant is being produced at Hercules-operated Sunflower Ordnance Works in Kansas and production is continually being increased.

Hercules Powder Company began research work in this field about six years ago and three years ago stepped up the research work considerably.

Importance of the war rocket in the arsenal of the Allied Armies was greatly increased by the Hercules production method which materially reduced the time required to manufacture rocket propellant powder.

The explosives development which has finally made the rocket an important military weapon is the great improvement in its accuracy, making it more comparable with the accuracy of a gun. Before this war rocket projectiles were very erratic in flight.

Doubling DDT Production Ordered

War Production Board approval has been granted for expansion of the DDT program providing for the entry of three new plants into the field and stepped up operations at two plants already engaged in output of the new insecticide.

The J. T. Baker Chemical Co., Phillipsburg, N. J.; the Elko Chemical Co., Clinton, N. J., and the Monsanto Chemical Co., St. Louis, have been given the go-ahead by WPB, and are ready to begin production of DDT. At the same time the Cincinnati Chemical Works and Merck and Co. will increase output at their respective plants.

These increases constitute the entire expansion program as contemplated by WPB, it is understood. Production from these plants will be satisfactory to meet all military needs, but will allow none of the product for large-scale civilian consumption. Small quantities of DDT, or dichlor-diphenyltrichlorethane, will be granted for experimental purposes looking to postwar civilian consumption.

Addition of the three new plants brings the DDT producing field to eight producers: the Hercules Powder Co., the General Chemical Works, Merck & Co., Cincinnati Chemical Works, du Pont Co. and Elko, Baker and Monsanto. It is believed that the new over-all group can virtually double present output.

Mathieson Alkali Fie...

H. P. Smith, left, formerly president of the George Chemical Compan and Thomas Tarpy Schulten, right, formerly with the General Chemic Company, have been appointed field representatives of the New York offi of the Mathieson Alkali Works.

Record Alcohol Output Reached

Production of 190 proof alcohol in the first four months of the year was at a record rate of 192,200,000 gallons, as compared with a production of 137,400,000 gallons during the first four months of 1943, members of the War Production Board's Industrial Alcohol Producers Industry Advisory Committee were informed, WPB reported.

The total 1944 alcohol supply is now estimated at 612,400,000 gallons of 190 proof alcohol, against an estimated requirement of 633,900,000 gallons, according to WPB's Chemicals Bureau.

Dr. Walter G. Whitman, assistant director of the Chemicals Bureau, informed the committee that preliminary estimates of supply and requirements for 1945 indicated requirements would be 634,000,000 gallons against an estimated supply of 639,800,000 gallons.

Government Acquires Standard Oil's I. G. Patents and Securities

A long legal controversy between the Standard Oil Company (New Jersey) and the Federal Government came to a showdown on May 24 when James E. Markham, Alien Property Custodian, ordered the company to surrender physically possession of certain securities and patents formerly owned by I. G. Farbenindustrie, the German chemical trust.

Government attorneys anticipated that the question of ownership of the securities and patents, already vested by the custodian, was one which would have to be settled by the courts. Negotiations with the company over a period of months to avert a court contest were said to hav failed.

Involved are 20 per cent of the ou standing stock of the Standard Catalyt Company, 50 per cent of that of Jasc Inc., and 50 per cent of that of the Hydr carbon Synthesis Corporation. The companies were formed, the Gover ment charged, by I. G. Farben and Stan ard Oil in connection with their pre-wa pooling arrangement. The company to turn over also about 675 patents an 100 patent applications.

The patents and applications cover in portant processes for the refinement an treatment of crude oil, the making synthetic gasoline and lubricating oil fro certain solid and gaseous carbohydrat and the manufacture of synthetic rubber.

"The property now required to b turned over to this office by the Standar Oil Company," said Mr. Markham, "wi be held and administered by this office fo the interest and benefit of the Unite States. The patents will be available fo licensing to American industry in accor ance with our usual policy in such ma ters, subject to any applicable provisio of the anti-trust decree."

That arrangement, supervised by th Department of Justice in the interest the war program, did not involve a se tlement of the question of actual owne ship of the patents and stock as of th decree date. The decree specifically le that question open, according to Gover ment attorneys.

The decree was entered later on th same day that the Alien Property Cu todian vested all of the right, title an interest of I. G. Farben in the properties but without specifically defining what th German interest was.

The position of Standard Oil has bee that title formerly held by the Germa concern was acquired by it (Standar Oil) over a period preceding the vestin

and t
fore, ... has contended, the Government cannot take as German property what had become American property.

Government War Chemical Plants Increase Output, Reduce Costs

Representative Albert J. Engel (Rep., Mich.) has reported to members of the House that a recent survey of numerous war plants conducted by the War Department subcommittee of the House Appropriations Committee reveals that explosives and chemicals production has been increased substantially during the war while costs have been reduced.

The committee report shows that: In April, 1941, it required 7.61 gallons of alcohol for each 100 pounds of smokeless powder produced; the same amount can now be produced with 1.9 gallons of alcohol. TNT output has risen from 26,000 lines a day to 96,000.

During January of '41, less than 11,000,000 pounds of powder and explosives were being produced, while in January, '44, more than a quarter of a billion pounds of powder and explosives were manufactured. In 1941 there were virtually no chemicals being produced by the War Department; in the first four months of this year these plants produced 386,713,000 pounds and 39,390,000 gallons of chemical needed in the making of powder and explosives.

IG Magnesium Interests Vested by APC

Interests of the I. G. Farbenindustrie in United States patents and patent applications having to do with the production and processing of magnesium and other light metals, their alloys and certain salts are vested in the Alien Property Custodian by vesting order 3560 filed May 29. The order also vests the interests of IG in an agreement with the Aluminum Company of America.

A total of ninety patents and four patent applications are listed in the order.

Chemical Conference Plans Underway

Recent surveys indicating that nearly every manufacturing process involves chemistry in some way will materially influence the selection of speakers for the National Industrial Chemical Conference, which will be a feature of the Third National Chemical Exposition to be held in the Coliseum at Chicago, Nov. 15 to 19, it is announced by the program committee.

The conference and show are sponsored by the Chicago Section of the American Chemical Society.

"Much of interest to executives of manufacturing plants will be revealed at the 1944 show and conference," said Dr. H. E. Robinson, assistant chief chemist of Swift & Company, who is chairman of the program committee.

"They will be afforded an excellent opportunity to get better acquainted with developments in applied chemistry and to study an industry which may yield them improved products and lowered production costs. This is more than a theory as attested by the trend among smaller manufacturers to employ chemists as advisers to management for product improvement and quality control and on the part of financial houses to rate such companies as more acceptable long term credit risks."

Dinsmore Estimates Rubber Requirements

Projecting an estimate of rubber requirements of the United States through 1948, and of world rubber supply and demand through 1950, Dr. R. P. Dinsmore, vice-president of the Goodyear Rubber and Tire Company, in an address before the National Association of Purchasing Agents, proceeded on "the basic assumption that the war will be essentially completed by a United Nations Victory, by the end of 1946."

In this event, he said, present available facts indicate a United States civilian need of 1,010,000 tons in 1948, a figure which compares with this country's highest previous consumption of 783,000 tons in 1941.

In his estimates of potential American requirements for various classes of rubber goods for the next four years, Dr. Dinsmore set 1947 as the peak of passenger tire production in that period, with a total of 80,000,000 such tires being needed in that year for both original equipment and renewals. The peak of truck tire production in the same period was set as arriving in 1948, with a total of 13,400,000.

Considerable increases also were forecast for consumption of rubber in mechanical goods and footwear production, as well as for other civilian uses, some of which will be new while others will continue pre-war developments.

The following table indicates potential requirements for various classes of rubber goods, based on known shortages and for 1945-1948 only:

	1945	1946	1947	1948
Truck & Bus Tires	233,300	260,000	286,500	296,000
Passenger Tires	221,400	330,800	440,000	424,000
Mechanical Goods	35,000	60,000	80,000	100,000
Footwear	15,000	30,000	40,000	40,000
Other Civilian Uses	10,000	30,000	80,000	150,000
Military	400,000	210,000	.....	.....
Export	150,000	150,000	.....	.....
	1,064,700	1,070,800	926,500	1,010,000
U S A Civilian	514,700	710,800	926,500	1,010,000
U S A Military	400,000	210,000	.....	.....
U S A Total	914,700	920,800	926,500	1,010,000

Butylene Diverted to High Octane Manufacturers

Heeding War Department calls for aid in the "pressing problem" of keeping the European and Pacific air offensives aloft and adequately fueled, the Office of the Rubber Director has announced plans for diverting up to 400,000 barrels of butylene, a petroleum product, from the synthetic rubber program to the manufacture of 100-octane gasoline.

About 1,000,000 barrels of high-octane gasoline can be processed from the allocation of butylene added to ethyl benzene which will also be made available from styrene plants. About 30,000 tons of Buna S synthetic rubber will be sacrificed to make the gasoline.

Cyclopentadiene in Technology

Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pa., is distributing gratis to interested specialists copies of a comprehensive review of the chemistry of cyclopentadiene with particular reference to its industrial applications in the production of plastics and in organic synthesis. In the same publication the properties of dicyclopentadiene are also described.

Cartel Registration Proposed

Hearings opened May 23 before the Senate judiciary committee on S1478, the so-called cartel registration bill of Senator J. O'Mahoney, of Wyoming, with Ralph Gallagher, president of Standard Oil Company of New Jersey as first witness. The bill requires any domestic or foreign corporation doing business in the United States to register with the Attorney-General to file a copy of any agreement with other companies which would in any way restrict the amount or type of commodity to be produced, regulate prices, or licensing or patent arrangements.

Aluminum Case Referred to Circuit Court

The government's antitrust case against the Aluminum Company of America was referred to the Circuit Court of Appeals for the Second Circuit by the Supreme Court of the United States June 12. The case has been pending before the supreme court for more than a year but has not been acted upon because of the lack of a quorum of qualified justices.

Referral of the case to the second circuit was in accordance with legislation

passed by Congress last week permitting the court to take such action in any case which it cannot hear because of the absence of a quorum. Under the procedure to be followed, the senior judge of the second circuit will appoint two qualified judges to hear the case and their decision will be final.

Romaine Appointed to WPB

Eldon V. Romaine, widely known naval stores technician and recently head of technical sales for E. W. Colledge, General Sales Agent, Inc., with headquarters in New York City., has been appointed as assistant to David Lewis, chief of the Naval Stores Unit, Chemicals Bureau, WPB.

Increased Phthalic Anhydride Production Urged

In view of the existing critical shortage of phthalic anhydride, the Chemicals Bureau of the War Production Board has requested that industry consider additional capacity to boost the annual output by 12,000,000 pounds. The increased production is necessary to satisfy greatly increased Army, Navy and Lend-Lease demands for phthalic anhydride insectifuges, and to make phthalic anhydride available for highly essential civilian needs—lacquer and cellophane production, dyes for civilian clothing, and food and drug requirements, according to WPB.

The scheduled production of approximately 126,000,000 pounds of phthalic anhydride for 1944 falls far short of demands, WPB pointed out at a recent meeting of the Phthalic Anhydride Industry Advisory Committee. On the basis of expansion of facilities now under consideration, peak production of 165,000,000 pounds a year is expected to be reached in the second quarter of 1945. Even this increased production, however, will be insufficient to satisfy military and Lend-Lease requirements. The additional 12,000,000 pound output proposed by WPB is expected to be adequate to balance supply and demand.

Discussing possible increased operation efficiency of presently installed plants, several producers predicted that their output in the next quarter slightly larger than that originally anticipated. Chemicals Bureau officials requested that industry submit a forecast of their production for the next three quarters.

With a view to the conservation of phthalate anhydride, committee members suggested that additional cuts of the percentage content of phthalic anhydride in alkyd resins might be feasible, and agreed to conduct further research in this respect.

Although maleic anhydride is considered by industry to be a good substitute for phthalic anhydride in alkyd resins, WPB told the committee that because of requirements for use on its own merits, it is now in short supply. New installation for additional maleic anhydride production are now being considered, and substitute materials for dimethyl phthalate to be used in the production of insectifuges are also being developed, WPB reported.

Shell Process Increases 100 Octane Output

Shell Oil Co., Inc., has received approval to disclose that a new process is contributing high quality base stock for 100 octane aviation gasoline, utilizing thermal cracking equipment which previously had been of no direct value in the 100 octane program, according to "Shell News," company publication.

Up to now mention even of the name of the process—Avaro—has been banned for security reasons.

The process was developed at the big Curacao refinery, owned by a member of the Shell group, where the fortunes of war would have idled considerable thermal cracking capacity. To make the equipment contribute directly to the war program, studies were made which resulted in the discovery of a process permitting the manufacture of a highly aromatic stock from heavy naphtha.

The name Avaro was coined to combine "aviation" and "aromatics." Shell is the only major oil company now manufacturing "Avaro" at present, but the process has been made available to the industry through the Technical Advisory Committee of the Petroleum Industry War Council.

Forest Products Development Bill Proposed

A bill (H. R. 4866) authorizing the Secretary of Agriculture to build forest products pilot plants has been introduced in the house by Representative Margaret Chase Smith of Maine. It would be the purpose of the pilot plants to make tests, investigations, and demonstrations for the developing of new, improved uses of wood and other forest products, prevent waste of forest resources, and foster new forest industries.

The department's Forest Products Lab-

). 1442)

wood:—Compreg, hydroxyline, impreg, papreg, and uralloy.

Government Posts Changed

The War Production Board has reported the appointment of Raymond R. Hull as chief of the Nitrogen Unit of the Chemicals Bureau to succeed Edmund Rowland, who has resigned. Mr. Hull was formerly deputy chief of the Nitrogen Unit.

Mr. Rowland was associated with WPB since October, 1942. He plans to return to his former associate, the Henry Bower Chemical Company, Philadelphia, Pennsylvania.

Before coming to WPB, Mr. Hull was vice president of I. P. Thomas and Son, Camden, New Jersey.

The resignation of William L. Sims, II. of Orlando, Fla., as price executive of the Chemicals and Drugs Branch was announced by James F. Brownlee, deputy administrator for Price of the Office of Price Administration, effective June 20, 1944.

Lester Chandler, price executive of the Rubber Branch, will assume the added responsibilities of acting price executive of the Chemicals and Drugs Branch.

Behrman Joins Velsicol Corporation

Lt. Colonel A. S. Behrman, who has recently returned to inactive duty (reserve) status after two years of active army service, has become associated with the Velsicol Corporation, Chicago, as vice president and director of research. Prior to his service in the army, Colonel Behrman was for many years vice president and chemical director of Infilco, Inc., also of Chicago.

Case Studies on Organic Solvent Injuries Published

A series of analyses cases of occupational injuries which have been attributed to inhalation of certain common organic solvents has been published, reprinted from *Industrial Medicine*. It points out that even so-called "non-toxic"

solve with occurred in small, unsupervised operations where the importance of ventilation was either unknown or ignored, and that the solution is to encourage provision of proper controls by management and the use of those controls by workers.

Wineries Resume Alcohol Production

Resumption of war alcohol production in eleven California wineries will soon take place because both Peruvian molasses and Canadian grain will shortly be made available to them for this purpose, Felix Butte, Jr., chairman of the California Wineries Rubber Committee, declared last week. He predicted that the wineries would shortly resume full output after the shutdown caused when the War Production Board halted the shipment of Hawaiian molasses.

Five local wineries were affected by the loss of Hawaiian molasses, and their war alcohol process has been shut down for about four weeks. The plants are the Sunnyside Winery, Roma Wine Co., Bisceglia Bros. Wine Co., B. Cribari & Sons, and the Garden Vineyards Winery, which are scheduled to operate under the new program.

WPB Readjustment Staff Organized

Donald M. Nelson has announced the setting up of machinery in WPB to handle the readjustments that grow out of changes in military production programs.

Under the Production Executive Committee, he said, there has been established a permanent working staff through which the procurement agencies and the various sections of the War Production Board can make a co-ordinated attack on the allied problems of cutbacks, readjustments and reconversion.

"The basic problem which arises out of any production requirements change is how to make the best possible use of the manpower and the manufacturing facilities which are no longer needed by the program which is being adjusted or cut back," Mr. Nelson said. "That is a problem which almost invariably cuts across the fields of both military and civilian production.

"This new staff, set up under the Production Executive Committee, which has proved such an effective means for joint action by the procurement agencies and the War Production Board, will be able to consider all of the factors involved in respect to production changes.

"It will get all of the necessary information on proposed production changes. It will match this with all of the necessary information, first on proposed new programs for military production, and second on proposed programs for additional civilian production. It will know what the possibilities are and what the needs are; it will know how such things as local manpower situations, or shortages of essential parts or materials, may affect the uses which can be made of plants or workers which are going to be made idle.

"Having this knowledge, the staff will be able to make recommendations concerning the timing, the manner and the local of production changes to the Production Executive Committee, and recommendations concerning the placement of new programs to the Requirements Committee.

"In this way those two agencies will have the data they need in order to deal most effectively with the making of cutbacks and the commencement of new production."

Hercules Powder Personnel Changes

Two personnel changes in the Virginia Cellulose Department, Hercules Powder Company, have been announced by Lloyd Kitchel, general manager of the department. Elmer F. Hinner, left, is now assistant general manager, and Charles H. Lickle, right, who is manager of cellulose purchases.

Chilean Nitrate Imports Asked

The War Shipping Administration is to be urged by the War Food Administration and the War Production Board to provide cargo space for the shipment of not less than 1,000,000 tons of Chilean nitrates to the United States for the 1944-1945 season, it was learned.

Rosin Deficit Reported

The possibility of a deficit of 600,000 barrels of rosin for the crop year ending March 31, 1945, was reported by the Chemicals Bureau of the War Production Board to the Wood and Gum Naval Stores Industry Advisory Committees, the War Production Board has announced. Anticipated production for the crop year 1944-45 was estimated by Government representatives to be 1,650,000 barrels of rosin (gum and wood) as opposed to anticipated distribution (domestic and foreign) of 2,207,000 barrels.

At their joint session this week, after earlier separate meetings of the two committees, representatives of the Chemicals Bureau warned that if production is not increased, it may be necessary to curtail consumption at some time in the future and to reduce correspondingly abnormally large inventories wherever held.

WPB is attempting to assist industry increase production by solving their labor problems together with the War Manpower Commission, and by helping to make the necessary field and plant equipment available to them, the committee was told.

New uses developed for rosin have accounted for increased requirements, WPB explained. One notable substitute use of rosin is for the replacement of alkyd resins, which are even more critical in supply than rosin.

The anticipated 1944-45 requirements for rosin as presented to the joint committees are as follows:

	Barrels
Foreign requirements	460,000
Paper and paper size	480,000
Soap	250,000
Paints, varnish and lacquers	165,000
Synthetic resins	185,000
Chemicals	230,000
Miscellaneous	437,000

For the next 30 days, the Chemicals Bureau will study the situation, considering such information as industry may be able to develop, in an effort to determine whether any further action may be necessary.

Kaiser Magnesium Plant Closes

Officials of the Permanente magnesium plant at Lathrop have announced the closing of the plant.

Operated by Permanente Metals Corporation, a Henry J. Kaiser subsidiary, the plant will be turned back to the Defense Plant Corporation on July 1.

The announcement said the shutdown was ordered by the Office of Defense Plant Corporations in Washington.

The plant, costing several million dollars, started operation in June, 1942.

DDT Future Production Requirements Studied

In a report of the findings of various Governmental agencies in research projects now being conducted, Government officials predicted that there would probably be a large-scale post-war use of DDT.

Government officials reported on the results of experimental studies on DDT chemistry, began two years ago in co-operation with the Office of Scientific Research and Development. These have been augmented by programs sponsored by Harvard University, the University of Maryland and Ohio State University.

Although present information indicates that DDT probably will have a large future agricultural use, its toxicity to beneficial insects may be a limiting factor in its agricultural applications, officials told the committee. When DDT is used to control the Oriental fruit moth, it also destroys insect parasites that are natural enemies of this moth, they said.

Another handicap to the agricultural use of DDT may be its selective nature, the official said. In the case of its use of the coddling moth, it has no effect on the red spider—and both are injurious to the apple tree. Under such conditions, the red spider, now a minor pest, if not controlled, might easily develop into a major nuisance, they said.

To help industry attain the proposed production goals, the Office of Scientific Research and Development and the Office of Production Research and Development have conducted DDT research projects in cooperation with the Chemicals Bureau of WPB.

Under the direction of the Office of Production Research and Development and coordinated with other chemical research, production problems are being worked out at Pennsylvania State College and Rhode Island State College. From these studies, reports will be made periodically to all DDT producers.

Tentative specifications for DDT were discussed by the committee. Approved specifications will be available in the near future, representatives of the Chemicals Bureau said.

Members of the DDT Producers Industry Advisory Committee, representing all firms that are now in large-scale commercial production of DDT and chloral, its intermediate, are as follows:

Fred Marsiglio—Merck & Co.

Fred Renner—Monsanto Chemical Co.

Dr. Ockar Frey—Cincinnati Chemical Works (an affiliate of J. R. Geigy, Basle).

Paul Mayfield—Hercules Powder Co.

T. H. McCormack—E. I. du Pont de Nemours & Co., Inc.

Lee Kolker—Eklo Chemical Works.

Pharmaceutical Manufacturers IAC Meets

Glass containers for bottling pharmaceutical products, fibre shipping containers, folding and set-up boxes and the materials situation were the principal topics discussed by the Pharmaceutical Manufacturers IAC.

While the glass container situation has eased in recent months to the point where quotas under L-103b are being met, production is not yet sufficient to permit relaxation of the order. One and two ounce bottles are very limited in supply, it was reported. The industry has, in many cases, shifted to the use of larger bottles because of the shortage of small sizes and also in an effort to conserve shipping cartons. Ampoules and vials have been made quota free by the recent amendment to the glass container order, a representative from the Container Division pointed out.

Appeals for additional glass containers for export of pharmaceutical products to Latin America will be given consideration by WPB, officials said. Total production scheduled for export during the first quarter of 1944 and a statement from the sponsoring government agency recommould be included with the appeal.

Manufacturers were asked by government officials to increase the number of units carried in each shipping container, especially for volume items such as epsom salts, witch hazel, castor oil, glycerine, etc. Recognizing the seriousness of the container problem, the industry is already reusing cartons passing through its plants, as well as effecting economies by simplification of boxes in which their pharmaceuticals are packaged, committee members said.

Containers Division representatives, warning the industry that the situation will grow worse before it improves, urged:

1. Continued conservation in the use of all types of cartons
2. Maximum reuse of containers
3. Salvage of all kinds of waste paper
4. Elimination of all package inserts except those containing directions for use.
5. Elimination of unnecessary wrapping of packages by retail druggists.

In discussing the materials situation, the Committee was told that some improvement was apparent in the sugar supply. At present it appears that there will be a small carryover at the end of the year. The pharmaceutical industry has recently been given a quota of 125% of base period use for the second quarter of 1944, and will probably receive the same quota for the third quarter.

Reports on other materials were less optimistic. Corn products are short, and the industry was asked to make use of cane sugar wherever possible. Alcohol supplies are still running below requirements, with the bulk of alcohol produced going to the synthetic rubber program. A definite shortage exists in Vitamin A, officials said. If the shortage continues, the pharmaceutical industry can expect a 20 to 25% cut in the coming year.

Wood and Gum Naval Stores Industry Advisory Commitee

The membership of the Gum Naval Stores Industry Advisory Committee is as follows: T. J. Aycock, Shamrock, Fla.; W. J. Boynton, Tallahassee, Fla.; A. L. Brodgen, Turpentine and Rosin

Factors, Inc., Jacksonville, Fla.; Filtered Rosin Products, Inc., Brunswick, Ga.; H. Langdale, American Turpentine Farmers Ass'n, Valdosta, Ga.; Harry Lurton, Peninsular Lurton Co., Pensacola, Fla.; J. C. Nash, Columbia Naval Stores Co., Savannah, Ga.; Robert M. Newton, Newton Naval Stores Co., Wiggins, Miss.; T. J. Taylor, Jr., Taylor-Lowenstein Co., Mobile, Ala.; J. E. Gillis, Jr., Soperton, Ga.

Mr. Wells Martin was Government presiding officer at the meetings of both committees.

The membership of the Wood Naval Stores Industry Advisory Committee included: Vassar Anderson, Southern Naval Stores, Columbia, Miss.; R. H. Crosby, Crosby Naval Stores, Picayune, Miss.; L. H. Dreyfus, Dixie Pine Products Co., Hattiesburg, Miss.; A. E. Forster, Hercules Powder Co., Wilmington, Del.; F. W. Kressman, Continental Turpentine & Rosin, Inc., Laurel, Miss.; H. A. Mackie, Mackie Pine Products, Covington, La.; S. J. Spitz, Newport Industries, Inc., New York, N. Y.

Valve Recommendation Submitted to Industry for Approval

A proposed simplified practice recommendation for iron and steel relief valves for petroleum, chemicals, and general industrial services, has been submitted to producers, distributors, users, and others interested for approval or comment, according to an announcement by the Division of Simplified Practice, National Bureau of Standards. These valves are primarily intended for air, gas, vapor and liquid service requirements for oil refineries, gasoline plants, synthetic rubber projects, and chemical plants; also for general industrial service.

The development of this recommendation was undertaken at the request of the Shipbuilding Division of the War Production Board, and is one of several such recommendations proposed for the purpose of insuring adequate production of all types of safety and relief valves.

The Petroleum Administration for War is the principal claimant agency for the relief valves found in the proposed recommendation and representatives of the Construction Division of that office collaborated with the segment committee of the Valve Industry Advisory Committee and the National Bureau of Standards in drafting the simplified list of sizes and varieties.

Mimeographed copies of the proposed simplified practice recommendation may be obtained upon request to the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

Industry Advisory Committees Advocated for Peacetime

At the Canadian Chemical Conference held in Toronto in June, Dr. D. P. Morgan strongly urged the continued functioning of industry advisory committees after the war.

"The criticisms of Government by industry and of industry by Government have been answered during the war effort to a considerable extent by the development of the industry advisory committee," Morgan said.

"More than 750 of these committees are now advising the War Production Board. The Chemicals Bureau now has close to 100, on which there are nearly a thousand representatives from industry. They constitute a very real factor in the successful co-operation between Government and the chemical industry in the war program. In this program every effort was made to give industry as much freedom as was possible under wartime conditions, and yet to bring industrialists together for combined action as far as possible without infraction of our anti-trust laws. Similarly, under peacetime conditions, in so far as is possible under our anti-trust laws, the industry advisory committee, it is believed, could serve industry and Government with the greatest possible advantage both for business and for the public interest.

"Assuming that the Industry Advisory Committee is headed by a competent Government presiding officer with an adequate staff behind him, this device affords a practical mechanism for a co-operative solution of the joint problems of industry and Government. To be sure, this would not be a reversion to free enterprise, but neither would it be State socialism. It would be a middle course which might yield interesting results from the viewpoint of the public interest.

"It is significant that the Baruch report recommended continuance and strengthening of these industry advisory committees in the postwar period."

COMPANIES

Carbon Black Production Increased

Increases in production of carbon black totalling more than 2 million pounds monthly have been announced by Robert I. Wishnick, president of Witco Chemical Company, 295 Madison Avenue, New York 17, N. Y. Rapid growth of demand for the several grades of carbon black for compounding with synthetic and natural rubber requires the increased output.

Improvements now under way in present plants of Continental Carbon Company, whose production is distributed solely by Witco, will increase its output of channel process black substantially and new construction planned will bring the

Wyandotte Executives Inspect Organic Pilot Plant

Wyandotte Chemicals Corporation Research, Development and Sales executives are shown inspecting the Wyandotte Chemicals Corporation organic pilot plant. Shown from left to right are Dr. W. F. Waldeck and Dr. Thomas Vaughn of the research department, J. J. Schaefer, director of development and Lawrence D. Linke, his assistant, Howard F. Roderick, director of research, and Bert Cremers, vice president in charge of sales, Michigan Alkali Division of Wyandotte Chemicals Corporation.

Wyandotte Chemicals has recently announced the formation of their new development department to be headed by J. J. Schaefer.

total increase to some 50%. Continental Carbon's new plant at Sunray, Texas, for producing Continex furnace black, a semi-reinforcing grade especially needed for compounding with GR-S synthetic rubber, began full operation June 1.

National Carbon Reorganizes Sales

A new sales set-up under which all company products will be handled nationally from seven divisional offices is being installed by National Carbon Company, Inc., it is announced. Four of the new offices are in operation and the others will be added by October 1.

All sales activities in the Southeast have been consolidated under a new Atlanta Division office. This division will comprise, in addition to Georgia, the states of Virginia, North and South Carolina, Alabama, most of Tennessee, and Florida.

The three division offices yet to be opened will be located at Chicago, Pittsburgh and New York. Much enlarged staffs will be active in all the Divisional headquarters, with the personnel made up of specialists and salesmen of long experience in all National Carbon lines.

Martin Laboratories Expands

To adequately house the increased experimental and research activities which Martin Laboratories is conducting, Harry M. Martin, president and founder of Mar-

U.S.I. CHEMICAL NEWS

July ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1944

Non-Critical Resin Announced by U. S. I.

S&W Arochem 348 Developed for Varnish Formulations with Soft Oils

Made entirely from non-critical raw materials, U. S. I.'s new synthetic resin, S&W Arochem 348, combines high melting point (obtained without the use of metals, phenol-formaldehyde, or dibasic acids) with the ability to aid in the bodying of "soft" oils. This combination facilitates the production of varnishes superior to ester gum varnishes, and appoaching the quality of modified phenolic or modified maleic varnishes.

Higher Viscosities Obtainable

Varnishes compounded with S&W Arochem 348, for example, are faster drying and have greater film hardness than comparable ester gum varnishes. They are freer from after-brittling and possess better elasticity, durability, and color retention. Varnishes of much higher viscosity can be obtained with Arochem 348 than with ester gum, when processed with dehydrated castor or similar oils. On the other hand, equivalent viscosities can be obtained with much less cooking. This means important savings in time, and varnishes of paler color.

Arochem 348 requires no special precautions or methods of handling; it is completely soluble even in very high-viscosity drying oils. Its specifications are as follows:

Resin Specifications

Acid Value	15–25
Melting Point (Mercury Method)	115–130°C
Color (G.H. 1933—50% Solution in Toluol)	10–12
Viscosity (G.H.—60% Solution in Toluol)	Approx. C
Specific Gravity	1.1

Holds Even Temperatures Using Ether as Coolant

An ingenious new heat exchange device cools liquids to pre-selected temperatures, and then holds them within narrow limits, according to a recent patent.

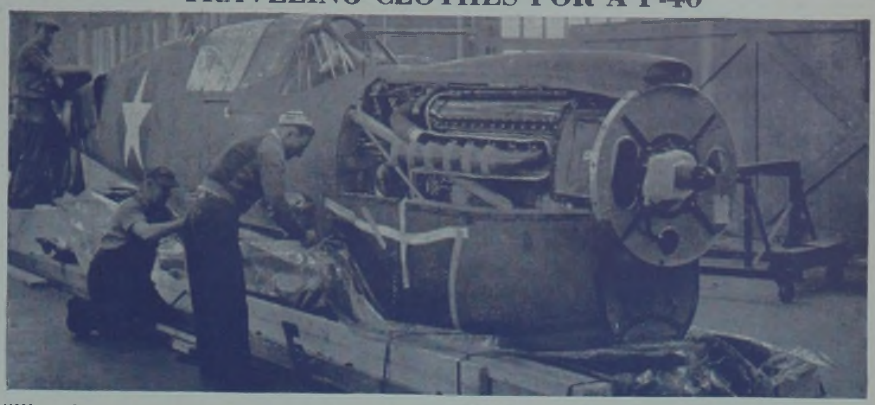
Taking advantage of the high volatility of ethyl ether, the new device provides for pre-selection of the temperature by adjustment of the pressure in the coolant chamber. Pressure is set to maintain the boiling point of the ether at the desired level. As the temperature rises above this level, evaporation of the ether accelerates so that a constant ratio is held between cooling needs and cooling effect.

Suggests Way to Better Blood Plasma Quality

The possibility that the normal chemical balance of human blood can be more closely maintained, and the value of the resultant plasma still further improved, is suggested by two bacteriologists. They propose collecting and storing blood in an atmosphere of carbon dioxide and thus preventing the loss of CO_2 which occurs when blood is shed in air.

It is this loss of CO_2 which normally results in a gradual increase in the potassium ion concentration in the plasma, and other changes which adversely affect the plasma.

TRAVELING CLOTHES FOR A P-40



"Wrapping up" planes or plasma, war's unusual packaging jobs call for—and get—unusual adhesives.

Production Short Cuts Seen With War-Born Adhesives

U. S. I. Solvents, Plasticizers and Resins Expected to Play Increasingly Important Roles as Essential Ingredients

Dating back comparatively few years to the introduction of cellophane, resin adhesives are the newcomers in a long line of chemicals employed in the vitally important job of "making things stick". As newcomers, they are currently the most interesting. Certainly they hold the greatest promise of future growth.

Types of Glue

Starch-base glues, because of their low cost and suitability for paper and other water-permeable materials, represent by far the largest volume of adhesive sales; doubtlessly they will continue as leaders in many packaging and paper-converting applications. Casein and latex glues have numerous accepted and important uses. Animal glues, while less significant volume-wise, continue to fill certain specific needs. However, it is in the resin adhesives, with their fast-setting properties and adaptability to a wide variety of materials, that the really fascinating postwar possibilities lie.

Bundles for Beachheads

"Amphibious" packaging of military supplies is strictly a war problem. But in the development of adhesives to provide waterproof seals, to adhere to the new waterproof papers, to withstand rough handling, to serve in tropic heat or arctic cold, advances of great peacetime promise have been made. The same is true in the development of plywood glues, which have revolutionized our ideas of wood as a structural material; of metal bonding agents rivalling welding in strength; of adhesives combining high holding power with high dielectric strength, resistance to insects, mold and fungi, or any one of many other special characteristics.

Speed and More Speed

Equalling the remarkable new functional abilities of these war-born adhesives in promise, are their almost incredible savings in application and curing time. Plywood can now be cured in minutes instead of hours; many packaging operations can be speeded up; labelling machines can be designed to operate faster. And in such industries as bookbinding, furniture making, and shoe manufacture, where production set-ups have been

(Continued on next page)

L. W. Bass Takes Post on U.S.I.-Airco Research Staff

Dr. Lawrence W. Bass has been appointed Associate Director of Chemical Research, to serve in this capacity jointly for U. S. Industrial Chemicals, Inc., and Air Reduction Company, Inc. He will be responsible for the development of plans for coordination and expansion of research of the two companies, as well as for the coordination of the work of the Research Department of each company with the work of the various operating departments.

L. W. Bass

Dr. Bass has been serving as Director of the New England Industrial Research Foundation in Boston. Previously, he was associated with the Rockefeller Institute, the Borden Company as Director of Research, and Mellon Institute as Assistant Director. He is Vice-President of the American Institute of Chemical Engineers and Non-resident Vice President of the Chemists' Club in New York.

Two Novel Engine Cleaners

Two patents have recently been issued, one in the United States and the other in Germany, on solvents to remove carbon deposits from internal combustion engines. The first covers a mixture of dibutyl phthalate and cresol. The second uses a mixture of wax, trichloroethylene, camphor, acetone, turpentine oil and amyl acetate.

Resin Structure Studied With the Aid of Acetone

In spite of the wide industrial use of phenol-formaldehyde resins, comparatively little definite information exists as to the chemical and physical nature of these resins. One reason for this lack of knowledge lies in the difficulty of studying thermo-setting resins; X-ray diffraction patterns and other conventional methods of investigation are inoperative with the cured resins.

Recently, two Massachusetts scientists have utilized the swelling action of acetone on cured phenolic films to produce patterns which can be examined under polarized light. By determining the time required for development of these patterns, they have been able to study the kinetics of the curing process and draw some interesting conclusions as to the structure of the ultimate resin.

Patents New Ointment for Skin Infections

According to a recently-awarded patent, solutions of iodo-acetone or iodo-acetophenone, dissolved in acetone and mixed with petrolatum, provide an ointment which is efficacious in the treatment of fungus and staphylococus infections of the skin and scalp.

Reduces Surface Tension of Diesel and Other Fuels

A recently granted patent covers liquid-fuel compositions in which a dialkyl carbonate is incorporated to reduce the surface tension, thereby improving atomization and preventing clogging of spray nozzles. The addition is also claimed to improve the anti-knock value and lubricating ability of the fuel. Carbonates mentioned include dibutyl and diethyl. Alcohols or ketones may be used to improve the blending.

Ergosterol Extracted from Penicillin Mold

In studying *Penicillium notatum*, the mold grown for the production of penicillin, three scientists have discovered a possible new source of ergosterol, the material which yields vitamin D_2 upon irradiation. As reported in a recent issue of *Science*, they found that the non-saponifiable matter from a butanol extract of the wet mycelium produced a sterol which could be readily purified and which possessed the distinctive properties of ergosterol.

War-Born Adhesives

(Continued from preceding page)

built around unavoidable delays to allow for glue setting, the possibilities for production short cuts are sizeable.

U. S. I. Products Used

U. S. I. solvents, plasticizers, and resins are widely used in connection with the new resin adhesives, as can readily be seen by considering some of them individually:

1. Phenol-formaldehyde glues used in making plywood, for example, are often applied in alcoholic solvents. Phenolic baking cements used in resistors, transformers, basing light bulbs, radio tubes, etc., because of their insulating properties, are also applied in alcohol solvents.

2. Cellulose adhesives are made from ethyl cellulose, cellulose nitrate, or cellulose acetate used with a resin, a plasticizer and a solvent. The plasticizer is usually either diethyl or dibutyl phthalate for nitrocellulose and ethyl cellulose, or diethyl and dimethyl phthalates for cellulose acetate. The solvent may be ethyl or butyl acetate, alcohol, or acetone diluted with benzene or toluene. These adhesives find use for such varying purposes as making laminated safety glass, sealing food packages, and stiffening collars and cuffs.

3. Polyvinyl cements also include dibutyl phthalate as plasticizer, and utilize ketone solvents such as acetone. These cements are very versatile, having the ability to join glass, wood, metal, plastics, cloth, mica, stone, and other dissimilar materials.

4. Acrylic resin cements have good electrical properties. They are soluble in ethyl and butyl acetate, and employ dibutyl phthalate as a plasticizer.

5. Chlorinated rubber adhesives are soluble in hydrocarbon solvents with esters and ketones in combination. These adhesives will join metal to rubber and are useful in connection with wood, leather, cork, and linoleum. They are also employed in rendering textiles, paper, cellulose derivative sheets, etc., impermeable.

6. In many types of adhesive tape, including some now used for camouflage purposes, special non-oxidizing ester gum is used for imparting tack.

7. Again, ester gum is used in waterproof bread-wrapping paper which is now sealable by the mere application of heat.

TECHNICAL DEVELOPMENTS

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

A new plasticizer for cellulose acetate is being offered as an alternate for some plasticizers now subject to priority restrictions. The product is reported to yield tough, rubbery solids which can be calendered into sheets, or used as adhesives. (No. 827)

U S I

Rot-resistant rope, twisted from extruded synthetic filaments, is reported to be standing up successfully in the presence of acid and alkali fumes, where vegetable-fibre ropes deteriorate rapidly. Sold now in sizes up to ⅝ inch, in regular coil and spool lengths. (No. 828)

U S I

A new corrosion-proofing liquid, is applied by dip, brush or spray to form a water-repellent coating which the maker states will not melt, run, or become brittle. Said to be inert to metal and harmless to normal skin, the new product serves as a lubricant in metal-working, is removable by petroleum solvent. (No. 829)

U S I

Plastic-synthetic rubber mixtures, which can be extruded, molded, calendered, or spread, are now offered for use in making shoe soles, hose covers, tank linings and other items. Said to combine the desirable characteristics of both the plastic and rubber, the blends are available in vulcanizable and non-vulcanizable types. (No. 830)

U S I

A new adhesive for applying labels to fibre, wood, paper, metal, and paraffine surfaces comes as a liquid which is applied cold by brush. Product is said to stick quickly and be water-insoluble when dry. (No. 831)

U S I

Higher insecticidal power, for household and livestock sprays, is said to be obtainable with a new toxic agent now being offered to insecticide manufacturers. Unusual stability, high knock-down and kill, and long-lasting repellency are economy factors attributed to the new product. (No. 832)

U S I

A new soap ingredient, said to soften even cold sea water, is now being used in soaps for the Army. Interesting prospects are seen for this sulfonated product which unites with hard-water minerals to form a finely-dispersed, non-settling precipitate. (No. 833)

U S I

A new synthetic rubber, promising to be especially suitable for use in heavy-duty truck tires, is announced. The new rubber is said to be strong, tough, and resistant to cuts and abrasion. It is also said to have greater resistance to heat, moisture, and oil than other synthetic rubbers. (No. 834)

U S I

A new sealing material is said to resist heat hardening and attack by vapors or fumes, and to have a variety of uses in closing cracks and seams against moisture and water absorption. (No. 835)

U S I

A new synthetic beeswax is suggested for use as a replacement for natural beeswax, or for blending. It is reported to give a stable emulsion particularly useful in ointments, cosmetics, and soaps. (No. 836)

tin
is at 251 East 139th Street, New York, announces the purchase and addition of the Ferguson Laboratories, Inc., to the present Martin Laboratories' facilties.

Hercules "Mixer" Wins Cover Contest Award

The Hercules Mixer, published by Hercules Powder Company, has been awarded third prize in the nationwide cover contest sponsored by the American Red Cross to promote the 1944 War Fund Campaign.

The Mixer, edited by Mrs. Evelyn Stoll Reinhardt, is one of the older continuously published house magazines in the nation, having been first issued in 1919.

When the American Red Cross asked company magazines to assist them in their War Fund Campaign, William D. White, a well-known Delaware artist and mural painter, and Edward L. Grant, of Hercules' Advertising Department, collaborated in drawing and laying-out the cover that won third prize in competition with nearly 200 company magazines from all parts of the nation.

Company Notes

LaWall and Harrison, consulting engineers at 1921 Walnut Street, Philadelphia 3, Pa., have opened new and expanded laboratory facilities.

The Maryland Insecticide Co. has been incorporated under Maryland law with a capital of 5,500 shares of a par value of $10 a share to engage in the manufacture of insecticides.

Heyden Chemical Corporation announces the removal of their New York offices to 393 Seventh Avenue, N. Y.

Thompson Promoted

DeWitt Thompson, formerly assistant general manager of sales for The Mathieson Alkali Works and a past president of the Salesmen's Association of the American Chemical Industry, has been promoted to Lieut. Commander in the U. S. N. R.

Krieger Color and Chemical Co., 6531 Santa Monica Blvd., Hollywood 38, California, announce they have officially changed the name of their plastic dye product, "Lucidip," henceforth to be called "Kriegr-o-dip."

The Buffalo Plastics Co. has been established in suburban Cheektowaga under the management of Richard T. Weir and George F. Thompson.

Sam Tour and Co., Inc., office and laboratories, engineers, metallurgists, and consultants, are now located in their building at 44 Trinity Place, New York.

The following companies have recently been awarded the Army-Navy "E" for excellence in production of war materials.

Army-Navy "E" Awards

Atlas Powder Company, Giant, Calif.
Bemis Bro. Bag Co., St. Louis, Mo.
Cole Laboratories, Long Island City, N. Y.
The Davison Chemical Corp., Baltimore, Md.
Farrel-Birmingham Company, Inc., Ansonia, Conn.—Fourth star added to flag.
Goodyear Tire and Rubber Co., Credartown, Ga., and Rockmart, Ga.
Infilco Incorporated, Chicago, Ill.—Star added to flag.

The Mathieson Alkali Works, Saltville, Va.

Merck & Co., Inc., Rahway, N. J., East Falls plant, Philadelphia, Pa., and the Stonewall plant at Elkton, Va.—Second star added to flags.

U. S. Rubber Co., Bristol, R. I.

ASSOCIATIONS

National Fertilizer Association Meets

The twentieth annual conference of the National Fertilizer Association was held in Atlanta, Georgia, on June 19-22.

A varied program including speeches on "Postwar Relations of Government and Industry," by C. J. Brand, executive secretary and treasurer of the Association; "Some Postwar Problems of Southern Agriculture," W. S. Brown, director, Georgia Agricultural Extension Service; and "Planning for Postwar Agriculture," N. E. Dodd, chief, Agricultural Adjustment Agency.

Textile Associations to Avoid Research Duplications

An understanding has been reached, by representatives of the American Association of Textile Chemists and Colorists and of the Textile Research Institute, at a recent meeting, to avoid any danger of duplication of effort by discussing with one another new research projects to determine any possible interference.

The Textile Research Institute proposes to undertake research work, both fundamental and applied, on all phases of textile Association of Textile Chemists and Colorists is primarily concerned with the wet processing of textiles and is pre-eminent in the development of standard test methods for the use of the textile chemist, dyer, colorist, finisher, converter and consumer of textiles.

Postwar Plastics Exhibit Planned

George Scribner, president of the Society of the Plastics Industry, made public today the organization's plans for an industry supported national plastics exhibition after the war. He said the first exhibition will be held either in Chicago or New York. It is planned to schedule the affair for the earliest convenient date following the armistice.

The exhibition will include a complete display of the new materials which have been developed during the war that are now under secrecy orders. The public will also have an opportunity to see for the first time many new plastics applications which are products of the industry's war effort. Space will be devoted to suggest all types of new applications.

Hanmer Heads Virginia Scientists

H. R. Hanmer, director of research for the American Tobacco Company, was recently elected president of the Virginia Academy of Science. This is the first time an industrial scientist has been named head of this organization of 900 members.

Industrial Research Institute Officers Elected

At the sixth annual meeting of the Industrial Research Institute the following officers were elected for the ensuing year:

Harold K. Work, manager, research and development, Jones and Laughlin Steel Corporation, Pittsburgh, chairman, and John M. McIlvain, administrative supervisor, research and development department, The Atlantic Refining Co.,

American Viscose Corp., Marcus Hook, Pa., and Harry M. Williams, vice president, The National Cash Register Company, Dayton, O., were elected to the executive committee.

High Polymer Division, APS, Inaugurated

The inaugural meeting of the new division of high polymer physics of the American Physical Society was held on June 23 and 24, 1944, at the University of Rochester, Rochester, New York. A program included approximately twenty selected papers on the elasticity, viscosity, and other physical properties of high-polymeric materials, as well as on the application of physical methods to manufacturing processes was presented.

Stream Improvement Fellowship Established

The National Council for Stream Improvement of the Pulp, Paper, and Paperboard Industries, Inc., 271 Madison Avenue, New York 16, N. Y., has announced the establishment as of May 24, 1944, of a multiple industrial fellowship in Mellon Institute, Pittsburgh, Pa., that will soon begin operation. The comprehensive research program of this fellowship, which will be conducted by specialists and for which the Institute will provide complete facilities, will pertain to the development of satisfactory methods for the disposal and utilization of wastes from the manufacture of pulp, paper, and paperboard. The personnel of the fellowship will soon be named.

The investigational and developmental program of the National Council for Stream Improvement will draw from all this experience and will get the constant cooperation of the Institute's health, engineering, sanitary, cellulose, and paper experts. The aim will be to develop new economic procedures for eliminating stream contamination resulting from the discharge of wastes.

Clinic Conducted on X-Ray Diffraction

The Polytechnic Institute of Brooklyn will conduct an intensive clinic "Industrial Applications of X-ray Diffraction" from July 10th to July 21st, to meet the shortage of trained personnel in this field, Dr. H. S. Rogers, president of the institute, announced.

In offering this first clinic of the kind in the east, Dr. Rogers said, it is hoped to aid industries manufacturing products which require carefully controlled techniques during preparation. X-ray diffraction not only serves in controlling products during manufacture, but provides information on completed products where information on the molecular structure is needed.

S. B. Penick Vice Presidents Elected

Dr. Thomas Lewis, left, and Harold Meyer, right, have been elected vice presidents of S. B. Penick & Company, it has been announced by S. B. Penick, Jr., president.

Industries in the eastern area have been invited to select their own laboratory workers for the Polytechnic clinic, which will be under the direction of Dr. I. Fankuchen, adjunct professor of crystal chemistry at the Polytechnic Institute.

PERSONNEL

Dorr Company Personnel Changes

Charles K. McArthur, well-known metallurgical engineer, was appointed manager of the Eastern sales division The Dorr Company with headquarters in New York on May 1st, succeeding C. L. Knowles who resigned to accept the position of Technical Director of the General American Transportation Company.

Mr. McArthur has been a member of The Dorr Company staff of engineers since 1926 and brings a broad experience both at home and in foreign countries to his new position. Directly assisting him are W. B. Gery, H. W. Hitzrot, R. Chelminski and F. P. Lasseter.

Simpson Awarded Fellowship

According to an announcement of Mellon Institute, Pittsburgh, Pa., Dr. Harold E. Simpson has been appointed to the incumbency of an industrial fellowship in that institution whose program of research and development will be sust by the Mississippi Glass Co., 200 ____ Avenue, New York 1, N. Y., the president of which is Dr. J. C. Hostetter. The investigations of the fellowship will be concerned with rolled or drawn glass, plain or wired, used principally for fenestration and for other structural purposes and methods of finishing and decorating such glass.

Cole Appointed Abbott Safety Engineer

Abbott Laboratories announces the appointment of Frank J. Cole, safety engineer, to direct an expanding safety program. Mr. Cole comes to Abbott after a successful career in Chicago, where he was safety engineer for Lumberman's Mutual Casualty Company and more recently for Belmont Radio Corporation.

Maurice S. Green, formerly of the National City Bank of New York, has been appointed Comptroller of the Glyco Products Co., Inc., of Brooklyn, N. Y., specialists in the development and manufacture of industrial chemicals.

Frank Howard has been elected president of Berkeley Chemical Corp., manufacturers of pharmaceutical and fine chemicals.

Roman Chelminski, formerly associated with the European activities of the Dorr Company, Inc., and Oliver United Filters, Inc., and other licensors of the Dorr Company, Inc., has joined the staff of General American Process Equipment.

Richard C. Dunlop, assistant research director of the plastics division of Monsanto Chemical Co., at Springfield, Mass., has been named associate research director of the division under Dr. Nicholas N. T. Samaras, newly appointed divisional research director. Howard Nason, also an assistant director of research of the division at Springfield, has been transferred to the company's Central Research Laboratories in Dayton, Ohio, to become director of development.

Rufus W. Clark, chairman of the board of Eaton-Clark Company, Detroit, Michigan, was honored at a dinner, June 2, to mark the 45th anniversary of his service with the company.

Robert J. McEwen has been elected

vice president and director of the Metal-salts Corporation.

J. F. Mitchell-Roberts, manager of the Foreign and Export Division of Oliver United Filters, Inc., has resigned his position with the company.

Dr. Robert H. Kean, Richmond chemist, was elected president of the Virginia Section of the American Chemical Company at its June meeting at the Country Club of Virginia.

Herman Rothstein has been made a vice president and director of the Apex Chemical Co., Inc.

Dr. Donald K. Tressler, manager of the General Electric Consumers Institute, has been named an honorary member of the Food and Nutrition Society of Brazil (Sociedade Brazileira de Alin tacao).

Richard H. Turk, executive vice president of the Pemco Corporation of Baltimore, was elected president of the Porcelain Enamel Institute at the annual meeting in Cleveland, Ohio.

William A. Whiteside was elected secretary of Quaker Chemical Products Corporation, Conshohocken, Pa., manufacturers of chemical specialties for the metal working and textile industries.

J. D. Lindsay, head of the department of chemical engineering at the A & M College of Texas, has announced the appointment of C. G. Kirkbride as Professor of Chemical Engineering.

Dr. Gustav Egloff, director of re-

...company, and president of the American Institute of Chemists, is to receive the degree of Doctor of Science, honoris causa, from the Philadelphia College of Pharmacy and Science, in Philadelphia.

Charles F. McKenna, Jr., has been appointed manager of the Special Products sales divisions of General Aniline and Film Corporation to succeed Roger Coleman, it has been announced.

Dr. Zay Jeffries, noted scientist and a pioneer in tungsten metallurgy and in the development of high-strength aluminum alloys, has been elected to the board of trustees of Battelle Institute.

Gordon J. Wiest, well known sanitary engineer in the Middle Atlantic District, has joined the Technical Service Department of the Pennsylvania Salt Manufacturing Company, Philadelphia, Pennsylvania, as of May 15, 1944, according to an announcement by L. L. Hedgepeth, manager of Technical service.

Magnus Appointed Chairman Disabled Veterans' Service Fund

Percy C. Magnus has accepted appointment as general chairman of the Disabled American Veterans' National Service Fund, according to a statement issued at the fund's headquarters, N. Y. Mr. Magnus is president of the firm of Magnus, Mabee & Reynard, Inc., importers and exporters of essential oils.

OBITUARIES

Kenneth J. King, chief engineer of the Commercial Solvents Corporation, with which he had been connected since 1933, died suddenly at Terre Haute, Indiana.

Newton I. Steers, who retired two years ago as president of the Du Pont Film Manufacturing Corporation, died May 15 at his home in White Plains, N. Y. He was 67 years old.

Louis Mansfield Rossi, aged 66, vice-president of Bakelite Corp., Unit of Union Carbide and Carbon Corp., died on May 25, in New York.

WAR REGULATIONS SUMMARY

ACETALDEHYDE — Transferred from Order M-243 to Order M-300. Small order exemption increased from 325 to 1,950 pounds. Effective July 1.

ACETIC ACID—Transferred from Order M-243 to Order M-300. Small order exemption raised from 470 pounds to 2,250 pounds of 100% acid. Effective July 1.

ACETIC ANHYDRIDE—Transferred from Order M-243 to Order M-300. Small exemption raised from 480 to 1,920 pounds. Effective July 1.

ACETYLENE BLACK—Placed under allocation control under WPB Order M-300. Effective July 1.

AMMONIUM SILICOFLUORIDE — Placed under allocation control under WPB Order M-300. Effective July 1.

AROMATIC SOLVENTS—WPB has amended Order 150, increasing the list of permitted use of aromatic petroleum solvents. The definition of Class A solvents is clarified by the addition of an initial boiling point of 185 deg. and a dry point not in excess of 365 deg. F. Prohibited end uses contained in Schedule A are reduced from 92 items to 38. The following three new uses are permitted for Class B solvents: (1) vinyl coatings (on military orders only) for spray application; (2) specification coatings (on military orders only) where Class B solvents are specified; and (3) brake lining, clutch facing, and coated abrasives. For the benefit of users, suppliers are required to state specifically in writing the type of solvents shipped.

BARIUM SALTS—Specific dollars-per-ton prices for technical grades of barium carbonate precipitated, barium chloride, and barium nitrate now take the place of March 1942 ceilings for these products as set under the General Maximum Price Regulation. The new prices represent an increase for carbonate and chloride and a reduction for nitrate.

BARIUM SALTS—These materials have been placed under allocation control under WPB Order M-300, effective July 1.

CHLORINE—All cylinders of chlorine of less than 2,000 pounds capacity are now permitted under small-order exemptions, regardless of the total weight in any one period. Formerly the small-order exemption was limited to a total weight of 2,000 M-19, amended June 26.

CHROMIC ACID—Small-order exemption reduced from 800 to 100 pounds by a temporary amendment to WPB Order M-18-b.

CINCHONA ALKALOIDS — Delivery of quinidine to an ultimate consumer for treatment of cardiac disorders is permitted upon receipt of a prescription signed by a person who is licensed to prescribe drugs. WPB Order M-131 amended.

DDT—Transferred from Order M-340 to Order M-300, effective July 1.

ETHYL CELLULOSE — For an indefinite period limited quantities of ethyl cellulose will be allocated for use in conjunction with alkyd resins which are allocated under Order M-139. Requests for allocation of ethyl cellulose, governed by Order M-175, should be submitted on Form WPB-2945, and the end use description should read "For use in conjunction with alkyd resins allocated under Order M-139."

EXPORTS—WPB Order M-300 has been amended so that export customers are no longer obliged to file small-order certificates. The amended order permits the exporter who has or anticipates exempt small-orders from customers outside continental United States to place a consolidated purchase order for the required material accompanied by a statement signed by an authorized official. The exporter may then accept delivery of the material without further certification.

FERTILIZERS—The OPA has combined all but a few minor fertilizer raw materials into a single price regulation, with specific prices for sales to fertilizer manufacturers and governmental departments and agencies. The new revised regulation (MPR No. 205) makes it possible for fertilizer manufacturers to check maximum prices for all of the principal raw materials purchased by them by referring to one regulation. Previously five price regulations affected the various products. The general level of prices for the raw materials is not changed.

GUM ROSIN—All sales of gum rosin are now under temporary 60-day dollars-and-cents price ceilings designed to halt rapidly rising prices of the commodity. The temporary prices will be replaced by a permanent regulation to be issued later. Ceiling prices per hwt. range from $5.10 for grade B to $6.50 for grade X. Temporary MPR No. 36, effective June 28.

IMPORTS — An amendment to WPB Order M-300 makes imports from Canada of the chemicals regulated by the order subject to its terms.

INSECTICIDES—Ceiling prices of rotenone and pyrethrum have been increased to maintain maximum importation of the raw roots and flowers into this country. The increase per pound on raw rotenone roots amounts to three cents, while the increase on pyrethrum flowers amounts to about $2.25 per pound of concentrate. MPR No. 298, revised, effective July 5.

INVENTORIES—WPB has issued an explanation of provisions of its inventory regulations, pointing out that persons whose war contracts are reduced or cancelled will not be in violation merely because amounts of materials they hold after a cutback are in excess of a practicable minimum working inventory or, in the case of controlled materials, in excess of a 60-day supply.

ISOPROPYL ALCOHOL—An amendment to Order M-300 provides for separate sets of reporting forms for each grade of isopropyl alcohol and requires a base period report from rubbing alcohol manufacturers.

METHYL ISOBUTYL KETONE—Allocation control of this material transferred from WPB Order M-322 to WPB Order M-300, effective July 1.

PHENOLIC RESINS—A limited supply of phenolic resins is now being allocated for general maintenance paint for trucks, railroads, and factory machinery.

PHOSPHATE ROCK—An average increase of twenty cents a ton in producers' present maximum prices for Florida pebble phosphate rock has been put into effect through Revised MPR No. 240, effective July 6. OPA states that the amount of increase granted is the minimum amount necessary to keep all producers in operation.

PHOSPHORUS—Allocation control of this material transferred from WPB Order M-230 to WPB Order M-300, effective July 1.

RIBOFLAVIN—This material was released from allocation control on June 21.

[illegible] supplies, limited quantities of normal butyl alcohol, normal butyl acetate, secondary butyl alcohol, and ethyl acetate are being allocated for nitrocellulose lacquer and thinner for civilian uses that have been denied in previous months.

SULFURIC ACID — Settlement for deliveries of sulfuric acid made between April 2, 1943 and March 15, 1944 under long-term "escalator" contracts, which have been "open billed" in accordance with previous regulations, may be made under provisions of such contracts, provided the total amount paid does not exceed the manufacturing costs of the acid, according to OPA. By the same action, which became effective June 13, 1944, similar settlements may be made on contract deliveries after March 15, 1944, if the buyer agrees in writing to absorb the permitted increase in price.

TUNG OIL—Ceiling prices on domestic tung oil established at 38.375 cents per pound in tank cars and 39 cents a pound in returnable drums, carlots, f.o.b. New York, Gulf ports, or Pacific Coast ports.

ZINC OXIDE—Use of lead-free zinc oxide in laboratory reagent chemicals, cellulose nitrate plastics, vulcanized fibre, and toilet soap, has been authorized by amendments of WPB Gen. Pref. Order M-11-a.

ZINC SULFIDE—In view of sufficient supplies of zinc sulfide pigments, WPB has revoked Order M-128 which established a monthly producers' pool of such pigments.

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CHEMICALSPECIALTIESNEWS

Better Aircraft Putty Developed

Aircraft putties heretofore in use either shrank considerably, became brittle with age, or were not flexible enough to withstand vibration, particularly at the low temperatures of the stratosphere. Also, finishing operations were retarded because previous putties dried slowly. Synthetic resin types stick to the putty knife during application.

The new Du Pont No. 228-711 aircraft putty has a buttery consistency and stays in place. It displays no tendency to flow and therefore maintains the desired surface contour. It does not sag on vertical surfaces. Both fast-drying and exceptionally low in shrinkage, the putty weighs one-fifth less than conventional putties, always an important factor in aircraft. The product is under test by a number of major plane manufacturers.

Husen Joins Krumbhaar Chemicals

Dr. Werner R. Husen has joined Krumbhaar Chemicals, Inc. at South Kearny, New Jersey, as technical director of sales. Dr. Husen is well acquainted with the problems of the paint, varnish, lacquer & printing ink industries through his connection for the past 11 years with The Commerce Petroleum Company, at Chicago, which is a distributor of Krumbhaar Synthetic Resins in that territory.

Navy Uses Fireproof, Non-Skid Paint

A new kind of paint, made of crushed industrial garnets and a new resin that won't burn, has been produced for the U. S. Navy. The paint is used to cover steel decks, to render them non-slippery regardless of wet or oil, and immune to the tremendous heat of bomb, shell and torpedo flashes which set ordinary paint to burning furiously.

This material is called "Dektred," a product of the Goodyear Rubber Co. It can be applied with a trowel or, like ordinary paint, by spraying. The garnets come from North Creek, N. Y. The paint is used on weather and flight decks especially gun emplacements, and in quarters, passageways, landings and stairways.

The thickness of the paint film is about ten times that of ordinary paint. The microscopic garnets stand a crushing weight of 2½ tons per square inch. In a scrubbing test, 1,000,000 scrubs by a brush wore away the fibers of ten brushes and left the garnet paint unchanged.

W. B. Lawson, Inc., To Manage Ferro Drier & Chemical Company

Robert A. Weaver, president of the Ferro Enamel Corporation, announces that the management of the wholly-owned subsidiary, the Ferro Drier & Chemical Company, will be taken over by W. B. Lawson, Inc., another wholly-owned subsidiary.

While the Lawson Organization has, in the past, handled all sales for Ferro Drier, it will henceforth have complete management of all activities except research, which will still be under the guidance of Dr. G. H. McIntyre, director of the parent company's extensive research laboratories.

Ferro Drier operates a factory at Bedford, Ohio, where metallic soaps, driers and chemical specialties are manufactured for paint and varnish companies as well as for the printing ink, plastic, rubber, marine, and metal industries.

The company also produced chemicals for the fungicidal and antiparasitic treatments of wood and textiles. Officers are W. B. Lawson, president; J. D. Henry, vice-president; and George W. Wallace, secretary-treasurer.

WPB Reports on Pigment Supplies

Although production of acetoacetanilide, which is used in the manufacture of organic yellow pigments, is now at the rate of 60,000 pounds a month, a record figure, a further increase to 80,000 pounds a month is expected in July, War Production Board officials reported to WPB's Chemical and Organic Pigments Industry Advisory Committee.

The increased output is expected to result from improved production methods rather than from any expansion in facilities, and WPB officials said that no further gains can be expected without the provision of new productive capacity.

Members of the committee were informed by WPB that there is now available approximately 230,000 pounds a month of paratoluidin, which is used in the production of red and yellow pigments, while the committeemen were urged to find new uses for orthonitrotoluene which is used in dyestuffs outside the pigment field. The supply of orthonitrotoluene, a by-product in the production of paratoluidin from paranitrotoluol, was reported to be excessive.

Rubber Cement Substitute Developed

Kemprene, a successor to rubber cement, is a non-inflammable, flexible, waterproof, stainless and wrinkleproof rubberoid cement. It has the properties of rubber cement, yet contains no critical materials. Both products are manufactured by Kemprene Products Company, Philadelphia, Pa.

Slocum Leaves OPA

Clarence W. Slocum, director of the Industrial Manufacturing and Industrial Materials Divisions of the Office of Price Administration, has resigned, effective May 15, 1944, James F. Brownlee, Deputy Administrator for Price, has announced. Mr. Slocum, on leave of absence as president of Beckwith-Chandler Company, Newark, N. J., manufacturers of industrial finishes, has been with OPA in his present capacity since September, 1943.

Jones Dabney Co. To Build West Coast Plant

The Jones Dabney Co., manufacturers of varnishes, lacquers and finishes and a division of the Devoe & Raynolds Co., through William C. Dabney, president of Jones Dabney Co., announced that it has purchased a tract of land in East Oakland, Calif.

Mr. Dabney stated that immediately after the war the company plans to erect a resin and synthetic resin manufacturing plant on this property to serve its West Coast customers. The company has no intention of producing paints, varnishes,

lacquers or finished products in the West Coast plant, which will be installed to supply its customers in that section with materials such as are used in finishes.

Copley Named Penick Field Manager

S. B. Penick & Co., New York, has appointed J. Walker Copley its field production manager for American crude drugs.

In his new post Mr. Copley will coordinate the company's domestic production of botanicals and allied products.

N. Y. Rules Vitamins "Drugs"

Attorney-General Nathaniel L. Goldstein of New York held that many concentrated vitamin products are drugs which can be retailed, under State law, only through pharmacies, drug stores and registered stores.

Industrial Alcohol From Bananas

Construction is expected to commence soon in Jamaica on the proposed pilot plant to manufacture alcohol from rejected bananas. If the results are successful, five further full-size plants will be built. Together, it is expected, these plants will be able to utilize three million stems of bananas annually.

Norberry Named Sales Director

W. G. Norberry has been named director of sales and distribution for the Baltimore Paint & Color Works, Baltimore, Md. Mr. Norberry was formerly with the Sherwin-Williams Company, where for the past three years he was in charge of dealer and market development work in several midwestern states.

Clement in OPA Post

John S. Clement, president of the Sandura Company, manufacturer of hard surface floor covering, Philadelphia, has been appointed director of the Industrial Manufacturing and Industrial Materials Price Divisions of the Office of Price Administration.

Lacquer Veneer Finishes

Since the curtailment of wood and metal, decorators and manufacturers have leaned more heavily on lacquer veneer finishes to provide surface beauty and interest. Meyercord lacquer veneer finishes enable the industry to obtain the effect of rare woods and marbles not commercially available, thus providing the decorator with an unlimited repertoire of dramatic new materials with which to work.

The company has found that the product appeals to the creative designer or decorator because it offers abundant material for imaginative play in both wood and stone, even reptile skin, precious jewels and fabrics. Millions of square feet of Meyercord lacquer veneer have been used on interior walls, radios, furniture, lamps and art objects.

Home Products Buys Paint Firm

Completion of negotiations by American Home Products Corporation to acquire the Prescott Paint Co. has been announced by Walter F. Silbersack, executive vice president and general manager of the corporation.

Prescott Paint Co., founded in June, 1934, is one of the pioneers of the modern water paint industry, specializing in making a new type of show-card color and in water-thinned paste paints.

Magnesite and Other Magnesium Compounds in 1943

The production of magnesium raw materials for the manufacture of magnesium metal, basic refractories, and for other essential commodities expanded in 1943, according to the Bureau of Mines, United States Department of the Interior. A variety of raw materials was used, including magnesite, brucite, dolomite, raw sea water, sea-water bitterns, and well brines. The mine output of crude magnesite reached the record quantity of 754,832 short tons valued at $6,071,596, compared with 497,368 tons valued at $3,874,334 in 1942.

Magnesite

Production of magnesium metal in excess of rated capacity of the plant of Basic Magnesium, Inc., Las Vegas, Nev., accounted largely for the tremendous increase in production of magnesite in 1943 over 1942. Refractory demands also were heavy. The American Iron and Steel Institute reported basic open-hearth steel furnace annual capacity as 83.3 million short tons as of January 1, 1944, compared with 77.6 at the begiming of 1943, and 76.5 for January 1, 1942. The new construction involved during 1943 created such heavy demands for refractory brick that magnesite and sea-water sources combined were insufficient to satisfy the periclase requirements, and much refractory brick was made with a lower periclase content than usual. The program of new construction was nearly completed by the end of the year, lessening the demand for brickmaking grades of magnesite, and refractory producers were revising their production schedules accordingly.

Commercial caustic-calcined magnesium oxide is obtained by calcining magnesite or by extracting it from magnesium-bearing liquors or dolomite. Caustic-calcined magnesium oxide is available in many purities and at widely varying prices. That obtained by calcining magnesite is the least pure, a characteristic analysis (calcined basis) being MgO 82.5 SiO_2 11.0, Fe_2O_3 2.0, Al_2O_3 0.5, and CaO 1.8 per cent. Such material, however, is quite suitable for oxychloride cements and fertilizers. Somewhat higher grades (83 to 95 per cent MgO) are generally used in making magnesium chemicals, including Epsom salts. For making magnesium metal an even higher grade is required, lime in excess of 2½ per cent being detrimental.

The Bureau of Mines estimates that in 1943 refractory magnesia was consumed in the United States as follows: In brick, 36; in cement, 26; and in grain, 38 per cent. Similar percentage breakdowns cannot be published for the uses of caustic-calcined magnesia, as there are only one or two supplies for most specific uses; however, the following are the largest consuming industries, listed in order of quantity consumed in 1943: magnesium metal (by far the largest), oxychloride cement, synthetic rubber catalyst, fertilizer, rayon catalyst (the oxide is converted to Epsom salt for this purpose), electrically-fused refractories, and magnesium chemicals.

Magnesia derived from magnesite, brucite, dolomite, sea-water bitterns, raw sea water, and well brines, sold or used by producers, 1938-43

Year	Caustic-calcined		Refractory		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1938	7,400	$228,498	38,738	$730,978	46,138	$959,476
1939	7,400	310,102	86,077	1,699,723	96,234	2,009,825
1940	16,261	512,607	140,668	2,802,537	156,929	3,315,144
1941	30,225	1,052,077	201,481	5,052,879	231,706	6,104,956
1942	41,889	2,028,126	273,661	7,823,963	315,550	9,852,089
1943	191,792	11,497,505	301,382	9,341,183	493,174	20,838,688

Magnesia sold or used by producers in the United States, 1942-43, by kinds and sources
[Quantities and values reported apply to finished products, not raw materials]

Finished products	From magnesite		From brucite, dolomite, and sea-water bitterns		From well brines, dry-lake brines, and raw sea water	
	Short tons	Value	Short tons	Value	Short tons	Value
1942:						
Caustic-calcined	25,344	$1,049,493	93,521	$3,907,396	7,467	$497,434
Refractory	189,218	4,397,766				
	214,562	5,447,259	93,521	3,907,396	7,467	497,434
1943:						
Caustic-calcined	137,300	7,941,587	8,649	547,888	45,843	3,008,030
Refractory	185,992	4,426,152	89,283	3,664,258	26,107	1,250,773
	323,292	12,367,739	97,932	4,212,146	71,950	4,258,803

Prices

Dead-burned grain magnesium as sold by Northwest Magnesite Co. remained at $22 a short ton f.o.b. Chewelah, Wash., during 1943. This price has been virtually static since 1928. Prices for the mined and synthetic magnesias of the Westvaco Chlorine Products Corporation were unchanged in 1943 except that bulk mined periclase, 90-per cent MgO, was raised from $38.74 a short ton in 1942 to $40.50 in 1943. Following is a price schedule of representative magnesias sold by this firm in 1943 (carlots, f.o.b. California): Caustic-calcined magnesite, bulk, $52.75; powdered, $58.75; calcined (sea-water) magnesia, bulk, $54; powdered, $60; mined periclase, bulk, 85 per cent, $38.24; 90 per cent, $40.50; sea-water periclase, bulk, 85 per cent, $36.00; 90 per cent, $36.50.

The Office of Price Administration published specific dollars-and-cents ceiling prices of basic refractories in MPR 416 of June 28, 1943.

Review by States

California. — Johns-Manville Products Corporation, Redwood City, prepared 85-per cent magnesia insulation for steam pipes and boilers, using crude magnesite as a raw material. The Marine Magnesium Products Corporation continued to extract high-quality magnesia for medicinal and other purposes from raw sea water at S. San Francisco, using the Chesny process. The Permanente Cement Co., an affiliate of Permanente Metals Corporation, shipped magnesite from Gabbs, Nev., for dead-burning and caustic-calcining at San Jose, Calif. Plant Rubber & Asbestos Works, San Francisco, produced 85-per cent magnesia insulation at Emeryville and Redwood City, using sea-water bitterns as the raw material.

Westvaco Chlorine Products Corporation added a fifth kiln at Newark in the spring of 1943 to calcine crude magnesite from Luning, Nev., for oxychloride cement, thus freeing another kiln at this plant for the increased requirements of a synthetic magnesia employed as a catalyst in making synthetic rubber. The firm now uses both calcined dolomite and calcined oyster shells to precipitate magnesia from sea-water bitterns. The magnesia content of the dolomite is precipitated with that of the bitterns. The Westvaco Chlorine Products Corporation mined magnesite at

its Western mine at Livermore and its Bald Eagle mine at Gustine, both in California. The ore reserves of the Bald Eagle mine were virtually depleted in 1942, but some high-quality material was produced for blending with Luning magnesite, considerable of the latter being calcined at the Bald Eagle kiln.

Michigan.—Michigan Chemical Corporation, St. Louis, Mich., completed 2 new brine wells, one in the Dundee formation, the other in the Sylvania, to provide adequate additional raw material for an expansion to its magnesia plant, added in 1943. The magnesia is a special caustic-calcined oxide for use in compounding neoprene and other synthetic rubber. The original magnesia unit, completed in 1942, is also producing caustic-calcined magnesia, but partial conversion to periclase is planned for 1944. The magnesias are characterized by very low content of boron, manganese, and phosphorus.

Nevada.—The huge magnesium metal project of Basic Magnesium, Inc., at Las Vegas, which produced at better than its rated capacity of 9⅓ million pounds of magnesium a month in the latter part of 1943, required large quantities of magnesite. The mineral was mined, ground, purified by froth flotation, and calcined at Toiyabe, Nev. The calcined product was shipped to Las Vegas for reduction.

The Sierra Magnesite Co. owned jointly by Westvaco Chlorine Products Corporation (Newark, Calif.) and Henry J. Kaiser and his associates (Oakland, Calif.) mined magnesite from the Segerstrom property and other claims near Luning, the crude mineral being shipped to Newark and San Jose, Calif., for calcining. At Newark the material is caustic-calcined for oxycloride cement and chemical use, whereas at San Jose it is caustic-calcined for domestic uses and for export, and dead-burned for refractory use.

Texas.—C. E. Heinz continued production of magnesite at Llano, shipping it crude to a firm in Joplin, Mo., for grinding, and to Gardner and Cates, new magnesite producers at Llano, for calcining for fertilizer use. Meramec Minerals, Inc., shut down its Llano mine temporarily and had no output in 1943.

Washington.—The Northwest Magnesite Co., chief producer of refractory magnesite in the United States, mined its Finch and Allen-Moss deposits and operated its seven kilns at Chewelah at near capacity in 1943. Part of the magnesite mined was purified by froth flotation. The calcined product was used chiefly for maintenance grade refractories, although the flotation concentrates and some of the regular output went into refractory brick production.

The Bureau of Mines prepared a circular during 1943, I. C. 7269, on the subject of marketing magnesite and products.

Dolomite

Crushed dolomite, both raw and calcined, was used in increasing quantity as a basic open-hearth dressing and for routine furnace maintenance in 1943. Total sales of dead-burned dolomite are given in the following table.

Other Magnesium Compounds

The Bureau of Mines traditionally collects production data on "natural" magnesium salts, though in recent years the definition of "natural" has been enlarged to include magnesium hydroxide and magnesium chloride from raw sea water. In the former case the hydroxide anion comes not from sea water but from lime, and in the latter case the chloride anion comes not from raw sea water but from the electrolysis of salt. To obtain complete coverage, the Bureau of Mines now canvasses the magnesium chloride made from magnesite by Basic Magnesium, Inc., and from dolomite by International Minerals and Chemical Corporation, Mathieson Alkali Works, and Diamond Alkali Co., and such data are included along with natural magnesium chloride crystallized from well brines and other natural sources. Virtually all magnesium chloride produced was reduced to metal in 1943.

On the other hand, only magnesium sulfate recovered from natural brines is reported, the data not including that made by neutralizing caustic-calcined magnesia with sulfuric acid solution. Magnesium sulfate is used in aqueous solution as a rayond coagulant, in tanning, in pharmaceuticals, as a fertilizer, and for other purposes.

The figures for precipitated magnesium carbonate include material derived from magnesite, dolomite, and well brines, and consist mostly of basic carbonate for 85-per cent magnesia insulation.

The United States has been very fortunate in its supply of basic refractories in comparison to some of the other warring countries, notably Germany, which Great Britain, which lacks magnesite but has solved the shortage by a wider use of stabilized dolomite brick and grain and of serpentine-magnesia mixtures.

In Great Britain, refractory dolomite is stabilized by calcining it with serpentine, whereby the lime is converted to stable tri-calcium silicate. This procedure differs from American practice, by which the lime is converted to dicalcium silicate with addition of stabilizing iron oxide. The American product softens at a lower temperature than the British on account of its content of the low-melting calcium ferrites, but this is no drawback for maintenance use. In Britain, however, much stabilized dolomite must be sufficiently refractory for brickmaking; hence formulas are used which require as little stabilizer as possible.

G. E. Seil and Alvin Schallis have reviewed in fairly comprehensive fashion methods for separating magnesia from dolomite, the former in the July 1943 issue of the Journal of the American Ceramic Society, page 218-238, and the latter in Bureau of Mines Information Circular 7247 entitled "Economic Consideration in the Recovery of Magnesia from Dolomite."

Magnesium compounds (other than magnesium oxide) sold or used by producers (exclusive of those used by producers in making other magnesium compounds) in the United States, 1942-43

Product	1942 Short tons	1942 Value	1943 Short tons	1943 Value
Precipitated magnesium carbonate	66,042	$5,596,698	63,900	$6,083,647
Magnesium chloride, 100-per cent basis	[1]210,000	7,468,518	646,136	45,858,183
Magnesium sulfate, 100-per cent basis	[1]20,200	1,029,662	26,416	1,320,104
Other	643	143,486	610	134,150
	296,885	14,238,364	737,062	53,396,084

[1] Figures recorded in Mineral Market Report MMS No. 1062, "Magnesite and Magnesium Compounds Production Greater in 1942," June 23, 1943, calculated to basis of 100 per cent.

Dead-burned dolomite sold by producers in the United States, 1938-43

Year	Short tons	Value	Year	Short tons	Value
1938	366,626	$3,095,355	1941	1,069,887	$9,111,172
1939	671,561	5,447,554	1942	1,229,357	10,817,634
1940	867,909	6,925,328	1943	1,276,725	11,243,017

Graphite in 1943

Production and sales of domestic natural and artificial graphite increased in 1943. The combined total of crystalline and amorphous graphite produced by domestic mines in 1943, as reported to the Bureau of Mines, was 9,939 short tons, and shipment reached 9,597 tons valued at 903,102 compared with a production of 7,120 short tons and sales of 7,253 tons valued at $401,690 in 1942. Artificial or more properly manufactured graphite was produced by the Acheson Graphite Division of the National Carbon Company, Inc., 30 East Forty-second Street, New York, N. Y., from a plant operated at Niagara Falls, N. Y. The Bureau of Mines has recently published Information Circular 7266, Graphite-Natural and Manufacture by G. Richards Gwinn, which contains a description of domestic deposits, their origin and possible market value. The uncertainty of foreign shipments prompted the production and stockpiling of domestic natural graphite for use as insurance against the possibility of complete stoppage of imports from Madagascar and Ceylon. However, by the end of 1943 the supply and stocks of strategic

graphite in the United States had improved to the extent that domestic plants built with the aid of Reconstruction Finance Corporation funds were shut down. This improvement is reflected in the supplements and amendments to War Production Board Order M-61 relative to the conservation and use of strategic graphite. At the beginning of 1943 all graphite in flake lump or chip form of plus 50 mesh U. S. Sieve Series was considered as strategic, and in July the production of graphite crucibles was restricted to those designed as "standard" by the industry. However, by January 1, 1944, only Madagascar flake graphite of plus 50 mesh screen size was considered as strategic, restrictions on the acquisition of graphite crucibles were relaxed to the point that only inventory control was exercised, and Ceylon lump and chip and domestic flake graphite were removed from the strategic list by the War Production Board.

Although the quantity of domestic graphite is adequate the quality is not satisfactory for crucible use, and production costs are greater than for crucible grade Madagascar and Ceylon material. Therefore with the availability of the imported material assured, there is little prospect of post-war market demands for domestic graphite exceeding those of pre-war years.

Metals Reserve Company prices for domestic flake graphite in 1943 were as follows: in cents per pound No. 1A, 14; No. 1, 13; No. 1B, 12; No. 2, 11; No. 3, 7; No. 4, 5.

Synthetic Organics in April

Item	April 1944 Production	Consumption	Stocks
Acetanilide technical and (U.S.P.)	643,396	289,051	917,388
Acetic acid (synthetic)[1]	24,471,598	17,156,759	9,263,196
Acetic acid (natural and from calcium acetate)[2]	3,448,145	[4]	1,060,371
Acetic anhydride[3]	(Published quarterly)		
Acetylsalicylic acid (Aspirin)	676,095	[4]	596,025
n-Butyl acetate	6,235,207	[4]	3,145,099
Creosote oil, tar distillers (gallons)[5]	10,869,901	828,796	26,522,738
Creosote oil, byproduct (gallons)[6]	3,562,500	65,254	1,955,584
Cresols, meta-para[7]	640,698	[4]	294,448
Cresols, ortho-meta-para[7]	655,213	.....	[4]
Cresylic acid, crude	2,141,226	[4]	1,438,474
Cresylic acid, refined[7]	3,342,989	[4]	2,154,511
Diethyl ether (all grades)	5,484,234	[4]	2,741,646
Ethyl acetate (85 per cent)	7,675,579	1,201,397	5,323,248
Lactic acid (edible)	381,579	[4]	307,900
Lactic acid (technical)	322,810	21,863	240,820
Methyl chloride (all grades)	2,136,340	[4]	718,323
Naphthalene, byproduct (less than 79° C.)[8]	8,288,927	.....	3,227,748
Naphthalene, tar distillers (less than 79° C.)[9]	17,013,390	[4]	9,371,842
Naphthalene, refined (79° C. and over)	7,578,823	4,423,257	2,604,018
Nicacinamide	[4]	.....	10,329
Oxalic acid (technical)	1,367,874	[4]	452,486
Phenobarbital and sodium salts	21,283	[4]	52,325
Phthalic anhydride	10,607,574	2,537,067	1,780,311
Riboflavin (for human use)	8,982	[4]	35,759
Sulfa drugs (total)[10]	520,867	91,671	1,606,434

[1] Statistics of production of recovered acetic acid are confidential and therefore are not included in these data.

[2] Statistics reported here for acetic acid produced by direct process from wood and from calcium acetate are collected and compiled by the Bureau of the Census.

[3] Includes acetic anhydride produced from acetic acid by the vapor-phase process.

[4] CONFIDENTIAL because publication would reveal operations of individual companies.

[5] Includes statistics reported by distillers of purchased tar only.

[6] Statistics reported here for creosote oil represent oil produced by byproduct coke-oven operators and are collected and compiled by the Coal Economics Division of the Bureau of Mines.

[7] Includes statistics reported to the Bureau of Mines by byproduct coke-oven operators and compiled by the Coal Economics Division, Bureau of Mines, in addition to those reported to the United States Tariff Commission by tar distillers.

[8] Statistics reported here for crude naphthalene represent napthalene produced for sale by byproduct coke-oven operators and are collected and compiled by the Coal Economics Division of the Bureau of Mines. The grades, melting at less than 74° C., 74° to 76° C., and 76° to less than 79° C., represent production for sale.

[9] These statistics are for three grades of crude naphthalene: The grade solidifying at less than 74° C., produced for sale only; the grade solidifying between 74° C. and 76° C.; and the grade solidifying at more than 76° C., but less than 79° C. As there is some conversion between grades, the data include some duplication.

[10] Statistics of production, consumption, and stocks of acetylsulfathiazole are included with those of sulfa drugs.

Source: Statistics collected and compiled by the U. S. Tariff Commission and issued jointly by the U. S. Tariff Commission and the War Production Board.

Alcohol Production In First Four Months

Production of 190 proof alcohol in the first four months of the year was at a record rate of 192,200,000 gallons, as compared with a production of 137,400,000 gallons during the first four months of 1943, members of the War Production Board's Industrial Alcohol Producers Industry Advisory Committee were informed recently, WPB reported.

The total 1944 alcohol supply is now estimated at 612,400,000 gallons of 190 proof alcohol, against an estimated requirement of 633,900,000 gallons, according to WPB's Chemicals Bureau.

Dr. Walter G. Whitman, assistant director of the Chemicals Bureau, informed the committee that preliminary estimates of supply and requirements for 1945 indicated requirements would be 634,000,000 gallons against an estimated supply of 639,800,000 gallons. The revised estimates of requirements in terms of millions of gallons of 190 proof alcohol are as follows:

	1942	1943	1944	1945
Synthetic rubber	...	126.0	365.0	365.0
Direct military and Lend-Lease	71.2	102.9	78.6	89.0
Indirect military and civilian	128.0	147.9	160.3	160.0
Anti-freeze	30.0	50.8	30.0	20.0
	229.2	427.6	633.9	634.0

Members of the committee were informed by Chemicals Bureau officials that the alcohol-from-potato program, which was established to provide an outlet for surplus potatoes from the 1943 crop, was about completed. They said that 300,000 gallons of alcohol had been distilled from 3,200 tons of dehydrated potatoes, which had been obtained from 19,200 tons of raw potatoes.

Asked to advise on the use of additional quantities of rye in their production (some distilleries have been using rye flour on an experimental basis) members of the committee reported that additional quantities of rye could not be used without reducing production. The rye flour, they said, is difficult to handle, gums up their facilities and increases manpower costs.

Members of the committee told Government officials that they felt the minimum safe stockpile figure, estimated earlier at 100,000,000 gallons, could now be revised downward. The present stockpile is 86,-100,000 gallons.

Carbon Black Production And Sales Increase in 1943

The carbon-black industry in 1943 recovered from the reverses experienced in 1942, and almost reached the peaks attained in 1941 in both production and sales, according to data reported to the Bureau of Mines, United States Department of the Interior. Total production was 3 per cent, and sales were 40 per cent above 1942. All the producing States registered substantial gains except Texas, where a 9-per cent decrease in the Panhandle district overbalanced a 14- per cent increase in the rest of the State, causing a decline of 6 per cent in the State's output.

Expansion in synthetic rubber manufacture, which calls for large amounts of the soften blacks, was reflected in the production of the furnace blacks, which increased 47 per cent over the 1942 record. They comprised 36 per cent of the total production of carbon black in 1943 compared with 25 in 1942 and 17 in 1941. Contact blacks which are principally of the channel type, declined 11 per cent.

Stocks held by producers totaled 205,-215,000 pounds at the end of the year, a 15-per cent decline from the amount on hand at the close of 1942. Stocks were heavily drawn upon in the latter part of the year, when sales were far above production.

The amount of natural gas burned in the manufacture of carbon black in 1943 was 6 per cent below the volume used in 1942. This decrease in the face of increased production was made possible by

the increased output of plants manufacturing furnace blacks which obtain relatively high yields. The average yields of carbon blacks of all grades in 1943 was 1.88 pounds per thousand cubic feet of gas burned compared with 1.71 pounds in 1942. Carbon black manufacturers paid an average of 1.47 cents per thousand cubic feet of gas in 1943, an advance of 0.18 cent over the 1942 average.

Total sales including exports equaled 629,300,000 pounds in 1943 compared with 449,931,000 in 1942. All the major classes of domestic sales increased. Shipments to rubber manufacturers reached a new high of 473,473,000 pounds compared with the peak of 439,502,000 attained in 1941. The publication of export figures has been suspended, and they are therefore combined with miscellaneous sales.

The average value of carbon black at the plants remained the same as in 1942, at 3.41 cents a pound.

Seven new furnace-type plants were put into operation during 1943, and three channel plants were shut down or dismantled.

Salient statistics of carbon black produced from natural gas in the U. S., 1942-43

		1942	1943
Number of producers reporting		21	21
Number of plants		50	54
Quality produced:			
By States and districts:			
Louisiana	pounds	90,353,000	109,609,000
Texas:			
Panhandle district	do.	380,536,000	345,447,000
Rest of State	do.	54,353,000	61,898,000
Total Texas	do.	434,889,000	407,345,000
Other States (Calif., Kans., N. Mex., Okla.)	do.	48,764,000	76,467,000
Total United States	do.	574,006,000	593,421,000
By processes:			
Contact processes	do.	428,665,000	379,923,000
Furnace processes	do.	145,341,000	213,498,000
Quantity sold:			
Domestic:			
To rubber companies	do.	295,947,000	473,473,000
To ink companies	do.	19,233,000	23,530,000
To paint companies	do.	3,616,000	3,945,000
For miscellaneous purposes	do.	[1]131,135,000	[1]128,352,000
Total	do.	[1]449,931,000	[1]629,300,000
Exports:	do.	[1]	[1]
Total sales	do.	449,931,000	629,300,000
Losses	do.	167,000	1,661,000
Stocks held by producers Dec. 31	do.	242,755,000	205,215,000
Value at plants of carbon black produced:			
Total		$19,547,000	$20,248,000
Average per pound	cents	3.41	3.41
Estimated quantity of natural gas used, M. cu. ft.		335,533,000	315,562,000
Average yield per M. cu. ft.	pounds	1.71	1.88
Average value per M. cu. ft.	cents	1.29	1.47

[1] Exports included with "Miscellaneous purposes" to avoid disclosing figures.

Synthetic Organics in First Quarter

In the table, production includes material produced whether consumed in producing plants or sold; consumption represents consumption at producing plants only. It includes material produced in such plants, or material purchased or transferred from other plants; stocks are company stocks, as of the last day of the year or month, located at plant, in transit, or in warehouse, and include purchase as well as produced material.

Neoprene Production

Rubber Director Dewey recently announced that production of neoprene is now fairly constant at about 13,000 tons per quarter and that as requirements of the armed forces have been met a small amount was released for other use in June.

Synthetic Organic Chemicals: United States Production, Consumption, and Stocks, January, February, and March 1944

(In pounds)

Item	January 1944			February 1944			March 1944		
	Production	Consumption	Stocks	Production	Consumption	Stocks	Production	Consumption	Stocks
Acetanilide (Technical and U.S.P.)	439,148	270,368	757,572	599,572	262,304	796,064	699,295	368,643	737,310
Acetic acid (Synthetic)[1]	25,251,912	19,569,465	9,517,218	23,835,226	17,210,363	8,004,120	27,719,588	17,990,378	9,192,322
Acetic acid (Natural and from calcium acetate)[2]	3,512,324	16,580	1,529,208	3,338,767	18,230	1,509,517	3,289,140	.....	1,279,686
Acetic anhydride[3]	39,966,091	29,550,413	9,645,759	38,720,059	29,373,446	9,922,038	41,686,408	32,184,310	10,244,794
Acetylsalicylic acid (Aspirin)	753,887	[4]	749,336	764,005	[4]	814,695	829,951	[4]	881,272
n-Butyl acetate	5,699,444	149,275	2,298,399	6,231,619	[4]	2,808,377	7,913,081	[4]	2,596,717
Creosote oil, tar distillers' (Gallons)[5]	11,305,961	810,998	19,155,075	11,233,805	1,013,396	23,969,329	11,633,703	1,013,209	25,724,682
Creosote oil, byproduct (Gallons)[6]	2,965,392	160,186	1,380,822	3,236,392	36,021	1,711,595	2,983,970	93,488	1,516,362
Cresols, meta-para[7]	562,320	[4]	151,606	648,718	[4]	301,729	537,482	147,562	167,351
Cresols, ortho-meta-para[7]	584,661	.....	304,561	758,389	.....	325,759	971,533	[4]	211,190
Cresylic acid, crude	1,965,334	[4]	1,306,714	2,237,695	[4]	1,600,825	2,014,785	[4]	1,265,794
Cresylic acid, refined[7]	2,723,855	[4]	1,982,414	3,747,714	[4]	2,107,819	3,737,173	[4]	2,365,739
Diethyl ether (All grades)	4,967,093	[4]	2,463,017	4,217,884	[4]	2,394,500	5,547,268	[4]	3,463,471
Ethyl acetate (85%)	9,914,309	1,513,656	5,105,921	9,016,264	1,304,683	4,728,572	10,176,203	1,585,029	6,029,911
Lactic acid (Edible)	427,944	[4]	345,584	288,343	[4]	369,851	304,732	[4]	334,257
Lactic acid (Technical)	246,138	10,009	172,358	315,674	15,655	219,212	256,698	18,788	155,841
Methyl chloride (All grades)	1,291,121	[4]	1,078,377	1,317,988	[4]	934,583	1,990,710	[4]	700,022
Naphthalene, byproduct (Less than 79° C)[8]	9,368,375	.....	2,447,785	9,121,505	.....	2,990,248	8,682,110	.....	2,892,682
Naphthalene, tar distillers (Less than 79° C)[9]	15,072,813	[4]	9,827,554	15,744,644	[4]	8,270,015	17,616,262	[4]	8,474,152
Naphthalene, refined (79° C and over)	7,268,318	4,061,657	3,042,885	7,768,540	4,163,541	2,783,416	8,180,156	4,543,373	2,910,302
Niacinamide	23,287	3,856	42,378	[4]	3,954	48,705	[4]	[4]	51,227
Oxalic acid (Technical)	1,490,234	[4]	681,722	1,447,985	[4]	764,709	1,517,309	[4]	443,151
Phenobarbital and sodium salts	22,484	[4]	66,415	25,361	[4]	72,870	20,797	[4]	46,380
Phthalic anhydride	9,205,342	2,570,729	1,564,253	9,675,900	2,621,906	1,735,855	10,345,136	2,546,644	1,982,944
Riboflavin (For human use)	9,783	[4]	24,179	8,856	[4]	26,170	12,351	[4]	31,528
Sulfa drugs (Total)	653,798	198,104	1,392,334	663,816	237,139	1,346,134	630,775	1,242,205	1,469,082

[1] Statistics of production of recovered acetic acid are confidential and therefore are not included in these data.

[2] Statistics reported here for acetic acid produced by direct process from wood and from calcium acetate are collected and compiled by the Bureau of the Census.

[3] Includes acetic anhydride produced from acetic acid by the vapor phase process.

[4] CONFIDENTIAL because publication would reveal operations of individual companies.

[5] Includes statistics reported by distillers of purchased tar only.

[6] Statistics reported here for creosote oil represent oil produced by byproduct coke-oven operators and are collected and compiled by the Coal Economics Division of the Bureau of Mines.

[7] Includes statistics reported to the Bureau of Mines by byproduct coke-oven operators and compiled by the Coal Economics Division, Bureau of Mines, in addition to those reported to the United States Tariff Commission by tar distillers.

[8] Statistics reported here for crude naphthalene represents naphthalene produced for sale by byproduct coke-oven operators and are collected and compiled by the Coal Economics Division of the Bureau of Mines. The grades, melting at less than 74° C, 74 an 76° C and 76 to less than 79° C represent production for sale. Statistics of production given for January and February include corrections of figures shown previously.

[9] Includes the grade solidifying at less than 74° C produced for sale only. Other grades included are the grade solidifying between 74° C and 76° C and the grade solidifying at more than 76° C but less than 79° C. The statistics therefore contain some duplication.

Source: Statistics collected and compiled by the U. S. Tariff Commission and issued jointly by the U. S. Tariff Commission and the War Production Board.

MARKETS IN REVIEW

Second quarter chemical production near record level.

New supply controls offset those removed by WPB.

More plant capacity for phthalic anhydride.

Important trend in insecticides favors synthetic organics.

Acetone and butyl supplies improved.

Raw material difficulties in vitamins and pharmaceuticals showing up.

Heavy Chemicals, Fine Chemicals, Coal Tar Products, Paint Materials reviewed

THERE has been a distinct trend in recent weeks toward increasing controls in the chemical industry, also the formulation of more plans to expand productive capacity for some strategic items which were thought to be in sufficient supply after we had entered the war. Phthalic anhydride and insecticides might be mentioned in this connection.

The War Production Board at the same time is not slow to ease some chemical controls when the supply situation has been shown to be better, although at this writing the markets have not benefited greatly from such action. There is still an extreme shortage, for example, in carbon tetrachloride even though the control order for this solvent has been modified so as to accord larger supplies to the dry cleaning industry. Riboflavin, or Vitamin B-2, has been removed from allocation, yet is far from plentiful.

Measured by the Industrial Chemicals index of the Federal Reserve Board, the industry entered the second quarter of the year with production holding close to the record point attained in the first quarter. The index was 402 in April (1935-1939=100), same as in March, and which compares with 406 in February and 405 in January. The April figure was more than 60 points above that for April, 1943.

Loaded or inflated with wartime explosives and other Ordnance production, the tendency of the barometers was to sag for the final 1943 and first 1944 quarters owing to curtailment and revision in the overall explosives program. At this time, owing to full-scale resumption of powder and explosives output at such plants, the series is probably advancing again.

Textile consumers working on civilian business do not appear to be facing an encouraging outlook as far as dye and chemical supplies are concerned over the remainder of 1944, barring, of course, swift termination of hostilities in the European theatre. In addition to the carbon "tet" supply stringency, synthetic solvents such as trichlorethylene and perchlorethylene are greatly restricted. Alkalies and chlorine remain difficult for consumers in textiles and other fields, and it is expected that chlorine allocations will have to be tightened further, possibly around July 1. The greater part of Army-Navy dye requirements probably have been met by now, yet relaxation of vat dye restrictions for civilian use would appear to be some time off in view of the equally urgent need for the coal tar intermediates entering dyes in other war industries.

Insecticide manufacturers have been shipping out a fairly large tonnage of materials to the agricultural consuming trades, report continued difficulty in supplying rotenone and pyrethrum types which were largely consumed before the war. Meanwhile, interesting developments underway point to a greater use of the newer organic chemical insecticides recently developed of the DDT and xanthone derivation. DDT production evidently has been far below even military requirements, and the output will be doubled under an expanded program. At present very few chemical manufacturers have been able to achieve commercial production of the dichlor-diphenyl-trichlorethane compound which has proved so effective against typhus-carrying lice, and which holds great promise against flies, mosquitoes, other disease-carrying insects and caterpillars. It is said to be 10 times more effective than lead arsenate in exterminating the Japanese beetle.

Calcium arsenate and lead arsenate are still required in heavy volume against the boll weevil, cotton aphid, and the scourge of the Northwest apple-growing industry, the coddling moth worm. One of the outstanding postwar promises for the insecticide trade are the newer non-toxic compounds for both of these purposes manufactured from the coal tar derivative xanthone. Leading insecticide manufacturers in the chemical industry expect they will partly, and possibly wholly some day replace the arsenic compounds in this field. Manufacturers meanwhile have been able to effect a price slash of some 50 per cent for DDT, bringing its cost down to around $1 lb.

have been highlighted by new supply difficulties in some much needed raw materials. Insufficient supplies of quinoline evidently has led to curtailment of nicotinic acid production, and WPB has been forced to deny requests for this vitamin for civilian medicinal and animal feed enrichment purposes. The difficulties in quinoline might be traced in a measure to shortages in aniline and nitrobenzene. The adoption of isopropyl alcohol for antifreeze compounds has tightened the supply situation in that material for the drug and proprietary fields, even though there would appear to be lessened pressure on isopropyl for conversion to acetone.

Solvents consumers are finding the acetone situation easier, a development which stems partly from the tight phthalic anhydride supply. This has been accompanied by relaxation in the supply position of butyl solvents and which may become more plentiful for nitrocellulose lacquers. The granting of a liquor-making "holiday" to the beverage alcohol industry brought out a statistical picture for alcohol generally which is far less pessimistic than the figures supplied earlier this year by WPB. Production from all sources is placed at 612,000,000 gallons and total requirements at 614,000,000 gallons. A few months ago the indicated deficit was placed at 25,000,000 gallons.

Scaling down of the synthetic rubber program's requirements from 365,000,000 to 345,000,000 gallons figured in this revision, and it is interesting to note that the difference in these two totals, 20,000,000 gallons, is equivalent to the monthly alcohol output of the beverage plants. It explains the liquor holiday scheduled for August. In addition to the 345,000,000 gallons for rubber, Lend-Lease and direct military requirements will be 78,600,000; indirect military and civilian, 160,300,000, and anti-freeze, 30,000,000 gallons.

Butylenes sufficient to provide the butadiene for 25,000 long tons of GR-S rubber are being diverted to the manufacture of approximately 1,000,000 barrels of 100-octane aviation fuel, and as it is planned to provide alcohol in place of the petroleum gases for rubber, it is likely that the alcohol stockpile will be drawn upon more heavily. This reserve already has been reduced from its peak of 140,000,000 to 86,100,000 gallons as of June 8.

Heavy Chemicals.—Additional strength has been shown by caustic soda, copper carbonate and oxide, bichromates, chromic acid, chlorine, bleaching powder and other industrial chemicals consumed in heavy tonnage. Copper sulphate is entering agricultural sections in large volume as a fungicide, and tonnages for export may not be released until the peak of domestic demand has passed, probably in August. A slightly better supply position is indicated for sulphuric acid. The slack may be taken up in the fall months

when superphosphate operations expand. June prices for sodium nitrate were continued through July, and a tightening supply outlook is in prospect for chemical nitrogen as the result of enlarged military needs for ammonia and nitric acid. Ammonium nitrate made from surplus Ordnance and TVA ammonia which has filled agricultural nitrogen requirements, will not be available after Nov. 1, trade learns. Anhydrous ammonia also will move in considerable volume during the summer months to refrigeration plants.

Fine Chemicals.—Quicksilver dropped below the $100 per flask level on what some sellers in the New York market considered an unfavorable consumption and supply situation. Synthetic camphor has been in almost uninterrupted demand from the pharmaceutical trade which uses both refined powder and tablets. Technical camphor also is moving steadily to the cellulose nitrate plastics and film producers who use it as a plasticizer, and this situation has adversely affected the output of tablets. Medicinal codliver oil is priced lower at $2.40 to $2.50 per gallon against $2.70-$2.80 previously. The bulk of current supplies is imported from Iceland. While controls have been taken off Riboflavin, those for Vitamin B-1 (thiamin hydrochloride) are expected to stay around for a while. Production of Vitamin C (ascorbic acid) has been affected by insufficient raw materials while Government requirements have increased. Penicillin prices have been cut again but the situation will merit some explanation. The new price, $1.90 per 100,000 units against $2.20 previously, is to the Government. Prices quoted by distributors to hospitals at this writing are $4.50 to $6. The release of even larger supplies for civilian use is imminent.

Coal Tar Products.—Supply developments have not been encouraging in coal tar bases or coke-oven chemicals. Toluene is officially described as critical, and the aromatic is required in constantly growing volume for Ordnance production. Benzol for ethylbenzene-styrene and for high-test gasoline blending evidently is not sufficient, and considerable quantities have had to be allocated from the stockpile. Intermediates all remain in strong position despite lessened demands from dye makers. Only small amounts of H Acid are available, and the fur dyeing trade has had its allocations of aniline salt reduced in favor of more essential uses. Napththalene supplies have been cut into by more urgent demands for phthalic anhydride. Output of the latter this year may reach 144,000,000 to 145,000,000 lbs., yet it has been necessary to erect new capacity which will raise production by an estimated 21,000,000 lbs. Phthalic, vitally needed for new insectifuges, a wide variety of plasticizers, and alkyd resin coatings, was only produced to the extent of 58,000,000 lbs. in 1940.

Paint Materials. A somewhat easier position is noted in the supplies of aluminum pigments, phenolic resins, casein, and zinc sulphide. A gradually improving situation is also looked for in the drying oils which afforded the paint industry much difficulty earlier in the war. Oiticica oil and castor oil had their controls removed some time ago. Tung oil controls have been eased on the prospect of a peak domestic tung nut crop next fall. A new plant for the production of dehydrated castor oil is to be established in Brazil.

Still among the industry's severe shortages are titanium dioxide, lithopone, bleached shellac and a number of natural varnish gums. Another adverse development is the indication that the new rosin crop ending with March, 1945, will show a deficit of 600,000 bbls.

Ansco Develops New Color Film

A new photographic color film for amateur still and motion picture use, which can be processed in ninety minutes by the photographer, obviating the necessity of professional development, was shown to the press June 22 by the Ansco Co. at the Waldorf-Astoria. The new film, based on the original Fischer patents, also is being made available to the camera-using public.

CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

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
June, '42, $0.940 June, '43, $0.900 June, '44, $0.890

	Current Market		1944 Low	1944 High	1943 Low	1943 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	.15¼	.15	.15¼
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 acid 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	.24	.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.	...	.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, bgs,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.	.2110	.2330	.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.	...	.0891	...	.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, kgs, wks (*FP, PC*) lb.	.0550	.06	.0550	.06	.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, Cryst,c.l.,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

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.
½s higher than NYC prices; *y* Price given is per gal.

Current Prices

Gums
Salt Cake

	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
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
Basic sulfate, bbls, lcl lb.	.07½	.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

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.	...	.10	...	.10	...	.09½
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.	.09⅜	.10	.09⅜	.10	.09⅜	.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, dom, 60-62-63% K_2O bulk unit-ton...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 l.c.l. lb.	.07½	.07¾	.07½	.07¾	...	.07¾
Bisl fite 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 tech. 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 tech 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

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	.13	.1208	.1307	.1305	.1307
Oiticica, liquid, tks .....lb.	...	.19	.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

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case.

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2—Colloid Mills requiring 40 hp. each.
2—Blue Streak Hammer Mills—15K and 20J.

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10—Pebble Mills, 30 to 200 gal.
2—Marcy 6′ x 4½′ Ball Mills
3—650 gal. Steel Jacketed, Agitated Kettles
2—Solvent Stills, 300 and 500 gal. with columns and condensers
1—Buflovak 5′ x 10′ Rotary Vacuum Dryer
1—Buflovak 24″ x 20″ Vacuum Drum Dryer
7—Rotary Dryers, 4′ x 30′, 6′ x 17′, 6′ x 28′, 6′ x 42′, 7′ x 120′
2—1750 gal. Lead Lined Pressure Tanks
3—Jeffrey Hammer Mills, 36″ x 24″, 24″ x 18″
2—6′ x 5′ Jacketed Steel Stills
2—Oliver Rotary Filters, 5′ x 8′, 8′ x 3½′
1—Kent 4 Roll H. S. Water Cooled Mill

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1—Consolidated Automatic Rotary Powder Filler Stainless Steel Hopper and Feeder
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2—Howe Weightograph Scales, 2 oz. to 150 lbs.
1—Falling Film Condenser Stainless Steel, 24″ dia. x 10′ long, 140 sq. ft. heating surface
1—Chrome Iron Absorption Column 45″ I.D. x 40′ high—25 Buble Cap. Plates
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1—Battery 6—40″ and 1 battery 4—40″ American Tool bronze basket, 1200 RPM., belt driven Centrifugals, plain bearings, mixer, supporting framework, syrup troughs, unloaders.

1—12,000 sq. ft., quadruple effect, all steel, vertical tube Evaporator, complete with all piping, pumps, etc.

1—19,000 sq. ft., quadruple effect, horizontal, brass tube Evaporator, with all piping, pumps, etc.

4—8′ x 12′ All Steel Oliver Filters, complete with all pumps and receivers.

3—8 x 10 Wood Stave Oliver Filters, complete with all pumps and accessories.

3—#12 Sweetland Filters, iron leaves on 4″ centers.

8—Juice Heaters 500 to 750 sq. ft. H. S.

1—Hersey double unit Rotary Dryer or Granulator.

2—Burman Rotary Double Shell Direct Heat Pulp Dryers.

Miscellaneous: Crystallizers, Pumps, Package Machinery, Dryers, Coil and Calandria Pans.

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1—24″ dia. x 40″ PENNSYLVANIA SINGLE ROLL CRUSHER.

1—18″ x 18″ LANCASTER TWO-ROLL CRUSHER.

1—HARDINGE CONICAL PEBBLE-MILL, 6′ x 36″, silex lined, silent chain drive, motor and starter.

3—DORR BOWL CLASSIFIERS—
10′ dia. bowl with 2′3″ x 19′8″ rake,
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Trays and Superstructures for 20′ dia. x 10′; 30′ dia. x 12′; 40′ dia. x 12′.

4—DORRCO DIAPHRAGM PUMPS, single and duplex.

1—8′ x 8′ OLIVER ROTARY CONTINUOUS VACUUM FILTER.

3—RAYMOND BROS. "IMP" PULVERIZERS, 1—No. 30, 2—No. 40. Each with direct connected motor starting equipment, cyclone collector, tubular dust collector and all interconnecting piping.

1—OLIVER DRY VACUUM PUMP, 14″ x 8″.

1—HARDINGE CONSTANT WEIGHT FEEDER, with motor.

1—HORIZONTAL STEEL STORAGE TANK, 8′ x 28′ 10,000 gal.

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PATENTS

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Du Pont Promotions Made

Appointment of Dr. William W. Watkins as research manager to head the organic chemistry activities in the Pioneering Research Laboratory of the Du Pont Rayon Department, at Buffalo, New York, has been announced. Dr. Watkins, who has been a research supervisor, joined the Pioneering Research staff in 1936 following graduate study at Harvard University, where he obtained his Ph.D. degree in chemistry.

Dr. Albert Hershberger, for a number of years attached to the Pioneering Research section of the Du Pont Rayon Department, has been appointed supervisor of new films research in the Cellophane Research section, at Buffalo, New York, it has been announced.

Midgley Honored at Ohio State

Dr. Thomas Midgley, Jr., president of the American Chemical Society and discoverer of tetraethyl lead, to which the developments of high-octane gasoline are largely due, received the honorary degree of Doctor of Science from Ohio State University on June 3. Dr. Midgley, who is vice-president of Ethyl Corporation, was cited for his achievements in fuel research, which have made possible unusual advances in automotive and aircraft engines, for his development of non-toxic, non-inflammable refrigerants, for pioneer studies in rubber, for his contributions to the extraction of bromine from the ocean, and for his fostering of the spirit of research. The citation was read by Dr. William Lloyd Evans, past president of the American Chemical Society and emeritus professor of chemistry at Ohio State.

Carbon Black Sought Abroad

American manufacturers of carbon black, one of the materials the scarcity of which threatens the synthetic rubber program, have been asked to consider the building of plants in Russia and Iran, the War Production Board has reported. H. LeRoy Whitney, technical advisor to the WPB, at a recent meeting of industry representatives, said that large untapped supplies of natural gas, from which carbon black is made, were to be found in Russia and at the head of the Persian Gulf. Transportation facilities are available.

Personnel Notes

EDMUND D. WINGFIELD has been elected assistant secretary of Freeport Sulphur Company by the board of directors, Langbourne M. Williams, Jr., president of the company, has announced.

E. B. HOBBS has resigned from Victor Chemical Works as of May 1.

LLOYD A. HALL, chief chemist for the Griffith Laboratories, Chicago, Illinois, received the honorary degree of Doctor of Science from Virginia State College at Petersburg, Virginia, on May 29, for his many years of outstanding work in and his contribution to food chemistry.

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"WE"-EDITORIALLY SPEAKING

THE AMAZING SUCCESS of "DDT" as a military insecticide was recently related by Lt. Col. A. L. Ahnfeldt, Director, Sanitation and Hygiene Division, office of the Surgeon General, at a press meeting sponsored by Geigy Company.

After relating some of the experiences of the armed forces in controlling disease-spreading insects by the use of "DDT", he said:

"It is a kind Providence that permits revolutionary discoveries of benefit to all mankind to come from the wanton destruction of war. To millions of the people of the earth, there could be no greater boon than freedom from the disease-bearing and pest insects which have plagued man since time immemorial.

"I firmly believe that the discovery of DDT now being applied to the use of the armed forces offers the hope of a new era in insect control and will rank with the really great discoveries in medicine of the past century. DDT will be to preventive medicine what Lister's discovery of antiseptics was to surgery, and should close the door forever on those diseases which are companions of death-dealing insects."

As an interesting side light, the method of delousing with DDT powder became tremendously popular with the native Arab population in North Africa, and became known among them as a sleeping powder, because for the first time in years they were able to have relief from louse infestation and were thus able to get a good night's sleep.

On the humorous side the delousing schedule occasionally interrupted wedding ceremonies. The bride with her entourage would leave the chapel and appear at the dusting station, cheerfully submitting to the dusting procedure. Great hilarity ensued. Here was a new vogue: sprinkling the bride with louse powder instead of the traditional rice.

As experimental work advances, new uses are being found for DDT. The impregnation of underwear with a DDT emulsion has proved in tests to be a practical procedure. Ordinarily, inpregnation of garments will not withstand washing, but the research scientists have found an emulsion that retains its effectiveness against lice after the clothing has been laundered eight times extending over two months. An insecticide which has such residual qualities, even after repeated washing, is truly phenomenal.

Fifteen Years Ago

From Our Files of July, 1929

Chemical and Wood Industries (Ltd.) is formed in London, England, for the purpose of acquiring a controlling interest in the Destilacija Drva D. D. (Wood Distillation Co.) of Yugoslavia, which is understood to own the largest single installation for wood distillation in Europe.

Ernest Twitchell, recipient of the Berlin Medal in 1917 for his invention of the saponification of fats, dies at his home in Cincinnati, June 6, aged 66. Prior to his resignation due to ill health, he was chairman, board of directors, Twitchell Process Co. and chemist, Emery Industries, since 1886.

General Electric Co. offers new line of nitrocellulose lacquers in a wide range of colors to be marketed under the trade name of "Glyptal."

Solvents Institute, Inc., is organized in New York with the following membership: American Solvents & Chemical Corp.; E. I. du Pont de Nemours & Co.; Franco-American Chemical Co.; Kessler Chemical Co.; Merrimac Chemical Co.; U. S. Industrial Chemical Co.; and the Van Schaack Bros. Chemical Works.

United Chemicals Corp., New York, acquires control of the Curtin-Howe Corp. and subsidiaries, specializing in timber preservation.

United Feldspar Corp. is formed from the Tennessee Mineral Products Corp., Oxford Mining & Milling Co., Perham Crystal Feldspar Mines, and the U. S. Feldspar Corp.

German, British, and Chilean nitrate interests arrive at an international nitrate agreement thus linking the natural with the synthetic production and marketing of this material.

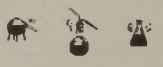
The outstanding feature of the past month in the chemical industry has been the great number of mergers. There was American-Cyanamid-Kalbfleisch, Newport-Rhodia, U. S. Industrial Alcohol-Kentucky Alcohol, Monsanto-Rubber Service Laboratories, and Calco-King.

OUR CONGRATULATIONS and best wishes for success go to the Chemical Institute of Canada, newly formed organization of 6000 members of the chemical profession. The institute was formed at the recent 27th annual Canadian Chemical Conference and Exhibition in Toronto by the amalgamation of the Canadian Chemical Association, the Canadian Institute of Chemistry, and the Canadian section of the Society of Chemical Industry.

In accepting office as the first president of the new group, Mr. L. E. Westman complimented Canadian chemists on their almost unanimous vote for the merger and said, "This means that we are growing up, and that we intend to do things more in future from a Canadian design."

DID YOU KNOW that nitrocellulose, the base of smokeless powder, when first manufactured was put in sacks in cold mountain streams to wash out acid impurities because it was thought hot water might cause it to explode—*Monsanto Magazine.*

STARS AND STRIPES, the army overseas newspaper, ran a story from a Middle East port that native laborers went on a cold cream diet and devoured the small, precious stocks intended for the skins of army nurses.



THE MACHINE TOOL of the future will be an entirely different animal than the machine tool we have dreamed about in the past says James Y. Scott, president of the National Machine Tool Builders. He believes the trend is away from "operational tools" to "process" machines which can move a material through 20 or 30 operations and turn out a finished product.

An example of this type of tool is a new machine called the "shapemaster" which will perform such tricks as boring a square hole and making the square plug to fit. One of the jobs this machine can do is make molds for soft drink bottles, which formerly had to be chiseled out of high grade gray iron by hand. Cost reduction is about 75 percent. For even more intricate molds, such as for plastics, the saving is even higher.

Improvements like this with similar higher technological efficiency in other industrial methods and processes will probably affect high post war wage rates and make possible low-price, mass-produced consumer goods.

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. 562, Nos. 3, 4, 5—Vol. 563, No. 1—May 16—June 6, '44—p. 510

**Photographic Chemicals*

Producing subtractive multicolor pictures composed of a plurality of registering dye images produced within the inseparably united silver halide emulsion layers on the support of a multi-layer light-sensitive material and formed of dyes having overlapping absorption characteristics. No. 2,347,119. Walter Michaelis to Chromogen, Inc.

**Resins, Plastics*

Acid-curing, thermosetting resin carrying a curing agent, a diamino triazinyl substituted alkyl sulphide. No. 2,347,032. Gaetano D'Alelio and James Underwood to General Electric Co.

Molding composition comprising a mixture of polystyrene and decachlordiphenyl, and characterized by having a heat distortion temperature above that of polystyrene. No. 2,347,103. Ralph Hayes to Monsanto Chemical Co.

**Rubber*

Preparing a latex suspension adaptable for use in a continuous process of preparing sheet rubber. No. 2,347,370. Ben Rowland and Douglas Fronmuller to The Institute of Paper Chemistry.

Obtaining crude rubber from the serum portion resulting from the creaming of an alkali-preserved latex. No. 2,347,576. Stewart Ogilby to United States Rubber Co.

**Textiles*

Improved cord for tyres comprising a cabled assembly including high tenacity staple fibre yarns having a basis of cellulose ester filaments which have been stretched and saponified. No. 2,346,759. Thomas Jackson, Donald Finlayson, and Thomas Frearson to Celanese Corp. of America.

Saturating felted fibrous material. No. 2,346,947. Raymond Schlaanstine to Hercules Powder Co.

**Water, Sewage and Sanitation*

Clarifying paper mill waste waters and recovering the filler and fiber content which comprises subjecting said waste waters to a froth flotation in presence of a promoter selected from higher fatty acids, rosin acids, talloel. No. 2,347,147. Robert Ben Booth to American Cyanamid Co.

Agricultural Chemicals

Protecting potatoes against decay which comprises treating surfaces of potatoes with a chlorine-containing solvent and a dilute solution of ammonium hydroxide. No. 2,348,946. Margaret Wilson.

Insecticide comprising an extract of sabadilla seed and solvent which has been rendered toxic to a higher level than normal toxicity by application of heat, and "Lethane." No. 2,348,949. Thomas Allen and Robert Dicke to Wisconsin Alumni Research Foundation.

Insecticidal composition containing as active ingredient 2,6-dimethyl-1,4-naphthoquinone dissolved in a solvent. No. 2,348,976. Julius Hyman to Velsicol Corp.

Preparation of pectic acid from a pectin-metal composition. No. 2,349,138. Edwin Bryant to California Fruit Growers Exchange.

Manufacturing cyclohexene. No. 2,349,173. Lloyd Joshel to United States of America (Claude Wickard, Secretary of Agriculture).

Preparing a deodorized edible substance of improved stability which comprises adding to edible substance, scum. No. 2,349,277. Kenneth Hickman to Distillation Products, Inc.

Insecticidal composition containing as an essential active ingredient 4-phenyl-morpholine. No. 2,349,344. Samuel Gertler and Herbert Haller to United States of America as represented by Claude R. Wickard, Secretary of Agriculture.

Stabilizing soy bean oil against flavor reversion. No. 2,349,381. Harvey Royce to The Southern Cotton Oil Co.

Insect repellent composition comprising a fixative solvent having dissolved therein a poly-methyl naphthalene selected from 2,6-dimethyl naphthalene, 2,3,6-trimethyl naphthalene and 2,3,6,7-tetramethyl naphthalene. No. 2,349,434. Julius Hyman to Velsicol Corp.

Insecticidal composition comprising a carrier and as active toxicant a compound selected from the alkyl and alkenyl ethers of 3.5.x-trichloro-2-hydroxy-diphenyl. No. 2,349,572. Gerald Coleman, Fred Fletcher and Wesle Schroeder to The Dow Chemical Co.

Antioxidant, an N-aryl N'-alkyl N'-aryl sulfonyl arylene diamine. No. 2,349,749. Philip Paul to United States Rubber Co.

Seed, plant and soil fungicidal composition comprising tetrachlor-para-benzoquinone as active ingredient. No. 2,349,771. William ter Horst to United States Rubber Co.

Fungicidal composition comprising a carrier and 2,3-dichlor-1,4-naphthoquinone as active ingredient. No. 2,349,772. William ter Horst to United States Rubber Co.

Insecticidal composition comprising a solid solution of 2,2-bis-(p-chlorophenyl)-1,1,1-tricholoroethane in a waxy solid. No. 2,349,814. Christian Deonier and Howard Jones to free use of the people of the United States.

Gluten feed comprising bran, gluten and fermented steep water, and free of yeast fermentable sugars. No. 2,349,818. Walter Fetzer to Union Starch & Refining Co.

Producing sugar of low ash content. No. 2,350,143. Charles Barber and Paul Barber.

Active glucosides of senna and a process for their preparation. No. 2,350,295. Arthur Stoll, Walter Kussmaul and Balthasar Becker to Sandoz Ltd.

Insecticidal composition comprising a product from the extracts of pyrethrin and rotenone bearing plants and an added toxicant. No. 2,350,324. Gerald Coleman, Fred Fletcher and George Lynn to The Dow Chemical Co.

Lactic acid purification. No. 2,350,370. Herman Schopmeyer and Charles Arnold to American Maize-Products Co.

Monoesters of compounds of ascorbic acid series with saturated aliphatic monocarboxylic acids, said esters containing an unsubstituted ene-diol group. No. 2,350,435. Percy Wells and Daniel Swern to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Retarding abscission of part of a growing plant comprising treating plant with solution containing water-soluble alkyl phenol sulfonate and material of group consisting of naphthalene acetic acid, the ethyl and methyl esters thereof, and naphthalenacetamide. No. 2,350,709. James Adams to General Chemical Co.

Increasing effectiveness of insecticides which consist of hexachlorethane, which comprises adding a chlorinated aromatic compound, of parahlorbrombenzene, chloronaphthalene or paradichlorbenzene. No. 2,350,814. Hans von Philipp.

Cellulose

Manufacturing flexible cellulosic products. No. 2,348,868. Gaston Vulliet-Durand.

Derivative of cellulose and, as plasticizer, a compound selected from butyl acetonyl phthalate and methoxy ethyl acetonyl phthalates. No. 2,349,331. Bjorn Andersen, Ernst Grenquist and Ralph Ball to Celanese Corp. of America.

Production of mixed esters of cellulose. No. 2,350,391. Henry Dreyfus to Celanese Corp. of America.

Ceramics

Forming non-reflecting films upon a surface of a glass body comprising silica and base components for the silica. No. 2,348,704. Frederick Adams to Pittsburgh Plate Glass Co.

Apparatus for preheating and densifying a fusible powdered material. No. 2,350,632. Francis Murphy and Ray Bebout to Libbey-Owens-Ford Glass Co.

Preparing moist but not pourable ceramic masses to prevent formation of gases from contaminations contained therein. No. 2,350,749. Fritz Gareis.

Chemical Specialties

Dry-cleaning and disinfecting composition comprising a mixture of carbon tetrachloride, methyl alcohol, and a bactericide selected from corrosive sublimate and 2-benzyl-4-chlorophenol. No. 2,348,795. Gunther Endres.

Antioxidant. No. 2,348,842. Philip Paul to United States Rubber Co.

In manufacture of soap by a continuous process aqueous saponifying reagent by the step comprising artificially extracting heat from mixture after beginning of the saponification reaction. No. 2,348,855. Ashton Scott to The Sharples Corp.

Manufacture of molded heat insulation material. No. 2,348,898. Harold Greider and Roger MacArthur to The Philip Carey Manufacturing Co.

Salt water drilling mud. No. 2,349,049. Eldon Means to Lubri-Gel Products Co.

Lubricant containing a complex soap of lead and a metal selected from alkali metals and alkaline earth metals, a glyceroxide of a metal and mineral oil. No. 2,349,058. Reuben Swenson to Standard Oil Co.

Molding lubricant for use with ethyl cellulose plastics consisting of paraffin wax and a blending agent comprising a paraffin soluble resin and 12-hydroxy stearin. No. 2,349,134. Russell Bradshaw to The Dow Chemical Co.

Flocking sheet material with fibers to produce a suede-like finish, by applying a base coating of Hevea rubber cement to one face, subjecting base coating to drying heat; then applying thin coating of plasticized "Neoprene" cement to base coating. No. 2,349,153. John Ferrante to Kenlea Mfg. Corp.

Method of making bituminous paving compositions and pavements. No. 2,349,445. Frank McGrane to Colprovia Roads, Inc.

Manufacture of bituminous pavements and paving compositions. 2,349,446. Frank McGrane to Colprovia Roads, Inc.

Drawing wire, which consists in applying to wire a wire-drawing lubricant consisting of dry mixture of sulphur and wire-drawing soap. No. 2,349,708. Flint Elder to The American Steel and Wire Co.

Manufacturing a solid lubricating composition which comprises reacting petroleum asphalt and petroleum lubricating oil with sulfur. No. 2,349,861. Arlan Hale to Gulf Oil Corp.

Making a batt containing intersecting smooth surfaced non-cellular fibers

* Continued from last month (*Vol.* 561, *Nos.* 3, 4—*Vol.* 562, *Nos.* 1, 2)

of glass wool. No. 2,349,909. Virgil Meharg to Bakelite Corp.

Coating an hydraulic cement product which comprises applying aqueous composition that contains soluble silicate consisting of sodium silicate and that contains acidic kaolinitic type clay. No. 2,350,030. Harold Greider and William Young to The Philip Carey Manufacturing Co.

Perspiration retarding or inhibiting composition obtained by combining a soluble stringent salt of a polyvalent metal with a water-insoluble metallic base. No. 2,350,047. Emil Klarmann and Louis Gates to Lehn & Fink Products Corp.

Composition useful as a gum solvent for deposits in internal combustion engines. No. 2,350,145. William Backoff and Norman Williams, John O'Loughlin, Harry Moir, and John Yule to The Pure Oil Co.

Curling hair which consists in treating rolled-up hair with a solution containing hydroxylamine sulfate, and an alkaline substance. No. 2,350,178. Harry Martin to Martin Laboratories, Inc.

Method for drying kelp. No. 2,350,209. Donald Clark, Leland Pratt and Spencer Coleman and Harland Green to Kelco Company.

Making shoe filler compositions, comprising as reducing an unrun fossil gum to finely divided condition, dispersing same, swelling dispersed particles in an organic liquid swelling agent to form elastic flocs, and mixing with a granular resilient body material. No. 2,350,252. Ernest Sackett, one-half to North American Holding Corp., and one-half to Parshad Holding Corp.

Preparation of a parasite control material comprising molten sulphur and a fish poison. No. 2,350,328. William Hellings and Forrest McLane to Stauffer Chemical Co.

Lubricating oil compound comprising a petroleum lubricating oil, a metal soap of an aromatic fatty acid and a compound of alizarin and fatty acid esters thereof to inhibit corrosiveness. No. 2,350,489. Leonard Beare to Sinclair Refining Co.

Dry, free-flowing powdery soap mass consisting of water-insoluble metallic soap of "rosinic acid" and water-insoluble metallic soap of a "fatty type acid." No. 2,350,521. Grady O'Neal to The Sherwin-Williams Co.

Water-insoluble soap of soap-forming acids in powdered, free-flowing form. No. 2,350,526. Grady O'Neal to The Sherwin-Williams Co.

Grease composition comprising a mineral lubricating oil, a mercaptide and a polyvalent metal. No. 2,350,544. John Zimmer and Arnold Morway to Standard Oil Development Co.

Emulsifier for producing intermediate breaking aqueous asphaltic emulsions comprising an alkali metal soap of petroleum hydrocarbon-insoluble pine wood resin, and an alkali metal soap. No. 2,350,548. William DeLaney to Hercules Powder Co.

Lubricating oil agent having stable viscosity improving effectiveness. No. 2,350,562. Eugene Lieber and Caleb Hodges to Standard Oil Development Co.

Solid lubricant comprising mixture of solid fatty alcohols, and microcrystalline petrolatum wax to inhibit running of said lubricant. No. 2,350,570. Albert Schilling and Thomas Curran to Remington Arms Co., Inc.

Solid lubricant comprising petrolatum and ozokerite; and a microcrystalline petrolatum wax to inhibit running of said lubricant. No. 2,350,571. Albert Schilling and Thomas Curran to Remington Arms Co., Inc.

Avoiding excessive foaming in saturation of moisture-containing fibrous material with asphalt. No. 2,350,649. Wallace Spelshouse and Arthur Boenau to Socony-Vacuum Oil Co., Inc.

Laundry starch composition. No. 2,350,653. James Walsh and Frank Miller to American Maize-Products Co.

Metallic soap composition comprising solution of a polyvalent metal soap of 12-hydroxy stearic acid in a high boiling lacquer solvent of polar type. No. 2,350,687. Francis Licata and Joseph Nothum to National Oil Products Co.

Adhesive comprising an aqueous adhesive composition and a water-insoluble, unsaponifiable, readily volatile, organic liquid emulsified with aqueous adhesive. No. 2,350,732. Richard Drew to Minnesota Mining & Manufacturing Co.

Greasing agent for spinning fibers comprising a compound selected from bivalent and polyvalent aliphatic alcohols and ether alcohols, water-soluble high boiling hydroaromatic and heterocyclic alcohols, salts of cellulose hydroxyparaffin monocarboxylic acids, and salts of ligninsulfonic acid. No. 2,350,782. Gustav Lietz.

Lubricant for metal surfaces comprising oil of lubricating viscosity and metal salt of a partial ester of an inorganic oxygen bearing acid of an element selected from sulfur, selenium, and tellurium. No. 2,350,783. Bert Lincoln, Gordon Byrkit and Waldo Steiner to Socony-Vacuum Oil Co., Inc.

Method of making crackle finish. No. 2,350,818. George Rees to Trojan Powder Co.

Conditioning partially air-seasoned wood for preservative treatment. No. 2,350,845. Joseph Vaughan to Southern Wood Preserving Co.

Abrasive belt jointed with an adhesive, of a water-soluble urea aldehyde condensation product and an alkyd modifier. No. 2,350,861. Richard Argy and Carl Foss to The Carborundum Co.

Lubricant grease. No. 2,350,906. Vaman Kokatnur and Andrew van Hook to Frank S. Busser and Frederic Warfield, trustees for Autoxygen, Inc., and Sun Oil Co.

Exothermic composition and method for waving hair, said composition comprising a hexahydric alcohol and an oxidizing agent. No. 2,350,926. Raymond Reed to Raymond E. Lee, doing business as The Leed Co.

Lubricating oil composition containing a lubricating oil and the product obtained upon heating an oil-soluble petroleum sulfonate was P_2S_5 until the evolution of H_2S has ceased. No. 2,350,959. Elmer Cook and William Thomas, Jr., to American Cyanamid Co.

Coal Tar Chemicals

Producing from cyclopentadiene, and like, present in gases and vapors evolved from such solid fuels as coal, a material having at ordinary temperatures a vapor pressure lower than cyclopentadiene and into which said material is susceptible of re-conversion by simple heating. No. 2,349,418. William Glowacki and Elliott Preston to Koppers Company.

Process of producing a gas suitable for synthesis of hydrocarbons and containing therefor CO and H_2 in ratio of from 1:1 up to 1:2. No. 2,349,438. Heinrich Koppers to Koppers Company.

Production of valuable liquids from refined pitch produced by stripping high temperature coal tar to produce residual selected from pitch, semi-coke and coke, and fractionating overhead material to recover a liquid useful as wood preservative, and a higher boiling fraction. No. 2,349,720. Jacquelin Harvey, Jr.

Converting mixture of high temperature coal tar fractions into lower boiling valuable liquids. No. 2,349,721. Jacquelin Harvey, Jr., one-half to Southern Wood Preserving Co.

Coatings

Package-stable bronzing lacquer. No. 2,349,571. Corliss Cummins to The Dow Chemical Co.

Aqueous coating composition comprising a water solution of a water-soluble cellulose ether and an alkali metal silicate. No. 2,350,161. Walter Gloor to Hercules Powder Co.

Thin, flexible sheet material comprising a film moistureproof composition, said composition comprising wax and cementing material therefor, said cementing material being cyclized rubber in which is incorporated phenol formaldehyde piperazine resin. No. 2,350,366. James Mitchell to E. I. du Pont de Nemours & Co.

Making a coating composition which comprises dispersing azo pigment dyestuff, water-insoluble metallic soap, and a small amount of salt electrolyte into a non-aqueous liquid vehicle. No. 2,350,524. Grady O'Neal to The Sherwin-Williams Co.

Forming an adherent, resilient, flexible insulating coating for surface of a crankcase, comprising stirring powdered vermiculite into suspension of pre-vulcanized latex. No. 2,350,559. Sidney Kienitz to Pentrathane Products, Inc.

Gelation process of coating an article. No. 2,350,742. Charles Fordyce and Gerard Clarke to Eastman Kodak Co.

Gelation coating process. No. 2,350,743. Charles Fordyce and Gerard Clarke to Eastman Kodak Co.

Gelation coating process. No. 2,350,744. Charles Fordyce and Gerard Clarke to Eastman Kodak Co.

Preparing protein compositions for coating paper. No. 2,350,953. Walter Bain and Arthur Neubauer to The Glidden Co.

Pigmented resin and method of making. No. 2,350,955. Folsom Drummond and William Waldie.

Dyes, Stains

Alcohol-soluble azo dyestuffs and their manufacture. No. 2,348,788. Achille Conzetti and Ernst Lehmann to J. R. Geigy A.G.

Printing a fabric with an ingrain azo color. No. 2,349,561. William Reynolds and Sylvester Scully to Interchemical Corp.

Production of azo dyestuffs. No. 2,349,899. Bernd Bock to General Aniline & Film Corp.

Anti-halation film layer containing as light-absorbing material a dye salt formed by combination of carbinol form of a phenylmethane dye with an alkali-soluble synthetic resin. No. 2,350,090. Bernard Beilenson to Eastman Kodak Co.

Textile dyeing which comprises dyeing, with an acid dye, a "Fiber D" regenerated cellulose textile material which has been reacted with phenyl isocyanate to impart to said cellulose material an affinity for said acid dye. No. 2,350,188. Paul Pinkney to E. I. du Pont de Nemours & Co.

Basic water-soluble dyestuffs. No. 2,350,393. Bernd Eistert and Gerd Kochendoerfer to General Aniline & Film Corp.

Manufacture of azo pigment dyestuffs, which comprises associating with an azo pigment dyestuff water-insoluble "rosinic-fatty type acid" metallic soap to effect new physical characteristics. No. 2,350,520. Grady O'Neal to The Sherwin-Williams Co.

Manufacture of azo pigment dyestuffs and coating compositions. No. 2,350,522. Grady O'Neal to The Sherwin-Williams Co.

Salt-form azo pigment dyestuff and coating composition made therefrom. No. 2,350,523. Grady O'Neal to The Sherwin-Williams Co.

Making an azo pigment dyestuff composition, which comprises preparing azo pigment dyestuff powder, preparing a water-insoluble "rosinic-fatty type acid" metallic soap as free-flowing powder, and physically mixing the two powders. No. 2,350,525. Grady O'Neal to The Sherwin-Williams Co.

Manufacture of antimony trioxide pigments. No. 2,350,638. Ernst Podschus and Georg Meder.

Equipment

Method and means for indicating the viscosity of flowing fluids. No. 2,348,732. Kermit Fischer to Fischer & Porter Co.

Method and means for indicating the specific gravity of flowing fluids. No. 2,348,733. Kermit Fischer to Fischer & Porter Co.

Planographic printing plate having a unified cellulosic printing face capable of retaining image forming material impressed thereon, when the plate is substantially dry, against displacement by dampening solutions. No. 2,348,771. William Wescott to Addressograph-Multigraph Corp.

Parchmentized cellulose planographic printing plate. No. 2,348,943. William Wescott to Addressograph-Multigraph Corp.

Evaporating liquids and apparatus for carrying out same. No. 2,349,002. Adolph Placek.

Removing desired constituents from a mixture of gases and vapors containing same. No. 2,349,098. Siegfried Kiesskalt, Erich Kruta, Herbert Quednau and Franz Patat.

Heat exchanger. No. 2,349,143. Stanley Chute and Herman Buschow to The M. W. Kellogg Co.

Flexible abrasive disc comprising a backing consisting of sheet of heat-hardened phenolic resin containing a non-metallic reinforcement embedded within it. No. 2,349,365. Harry Martin and Joseph Aust to The Carborundum Co.

Apparatus for treating fatty material. No. 2,349,378. Herbert Renner to J. R. Short Milling Co.

Electrical conductor carrying insulating composition comprising a resinous monovinyl polymer derived from monomeric vinyl chloride and a plasticizer comprising di (2-ethylhexyl) phthalate. No. 2,349,413. William Hemperly to Union Carbide and Carbon Corp.

High vacuum distillation apparatus. No. 2,349,431. Kenneth Hickman to Distillation Products, Inc.

Apparatus for carrying out endothermic gas reactions. No. 2,349,439. Heinrich Koppers to Koppers Company.

Method of and apparatus for controlling the mixing of combustible gases.

No. 2,349,521. Edwin Schmidt to Cutler-Hammer, Inc.
Separating solid materials of different specific gravities according to sink-and-float method. No. 2,349,528. Fredrick Trostler and Thomas Andrews.
Electric salt bath furnace. No. 2,349,678. Harry Rolnick to Rolnick Testing & Manufacturing Co.
Apparatus for cooling gas. No. 2,349,841. Hollis Bacon to Northern Blower Co.
Catalyst carrier comprising a cord-type carrier selected from glass and quartz. No. 2,349,844. Johann Bertsch, deceased, by Manufacturers Bank & Trust Co. of St. Louis, executor.
Apparatus for obtaining persalts by electrolysis. No. 2,349,998. Werner Trinius.
Controlling the boiling point range of the product of a fractionation column having a reflux. No. 2,350,006. Alfred Wolfner.
Water softening apparatus. No. 2,350,045. Edmund Kathe to The Rainflo Manufacturing Co.
Vulcanizing apparatus. No. 2,350,175. Eugene Luxenberger to Mishawaka Rubber and Woolen Manufacturing Co.
Dyeing apparatus. No. 2,350,191. Horace Raymond to Atlantic Rayon Corp.
Sediment testing device. No. 2,350,239. Milton Kohn.
Method of making catalysts. No. 2,350,282. William LaLande, Jr. to Attapulgus Clay Co.
Fluid sampling device. Charles Cochran and Frank Lake to Continental Oil Co.
Flowmeter. No. 2,350,343. Kermit Fischer to Fischer & Porter Co.
Transferring heat from one point to another by means of a closed system wherein a volatile liquid is successively evaporated and condensed at substantially same pressure. No. 2,350,348. Richard Gaugler to General Motors Corp.
Magnetic stirrer for chemical laboratories to be used for a liquid medium. No. 2,350,534. Arthur Rosinger.
Method for contacting gases and liquids. No. 2,350,590. Stewart Coey to Research Corp.
Evaporative cooling and apparatus for contacting gases and liquids. No. 2,350,591. Stewart Coey to Research Corp.
Thermally responsive device for indicating when wall of a container has attained a predetermined temperature. No. 2,350,637. Ralph Pittman.
Apparatus for catalytic conversion. No. 2,350,644. Thomas Simpson and Charles Leehthaler to Socony-Vacuum Oil Co., Inc.
Electrolyzer cell for gas separation by water decomposition. No. 2,350,669. Wilhelm Boller to Maschinenfabrik Oerlikon.
Method and furnace for electrically melting glass. No. 2,350,734. Francois Dumarest.
Apparatus for treating cement. No. 2,350,737. Michael Eiben.
Surface type heat exchanger. No. 2,350,936. Arthur Smith to General Electric Co.
Countercurrent froth flow flotation system. No. 2,350,943. John Thompson and Lionel Booth to The Galigher Company.
Continuous separator for separating precipitated wax from a chilled oil-wax slurry and forming a wax cake with some occluded oil. No. 2,350,944. James Thornton to The Lummus Co.
Heat-exchanger tube bundle. No. 2,350,976. George Worn.

Explosives

Apparatus for treatment of smokeless powder. No. 2,349,249. Gild Desetti and Walter Dew, Bill Mackey and Richard Woodbridge, Jr., to E. I. du Pont de Nemours & Co.
In manufacture of explosives, the process of drying wet granular organic nitro explosive material. No. 2,349,300. Fredrich Olsen to Western Cartridge Co.
Priming mixture for ammunition containing 1% to 15% of acid lead salt of di-nitrosoresorcinol. No. 2,350,670. Willi Brun and Philip Burdett to Remington Arms Co., Inc.

Food Chemicals

Preparing cocoa and chocolate products. No. 2,348,837. Johan Nyrop.
Purification of sugar juices by liming and carbonation. No. 2,348,846. Clarence Peterson to The Eimco Corp.
Latex composition containing milk, and material from ammonium and alkali-metal fluoride. No. 2,348,865. Robert Sterrett to United States Rubber Co.
Preparing condensed low lactose skim milk for storage and recovery of lactose therefrom. No. 2,349,227. Keith Thorneloe; Ava Thorneloe executrix of said Keith Thorneloe, deceased.
Acylated derivative of vitamin B_6 and process of preparing the same. No. 2,349,267. Stanton Harris and Eric Stiller to Merck & Co., Inc.
Production of tocopherol or vitamin E having improved color and stability. No. 2,349,271. James Baxter to Distillation Products, Inc.
Producing thrombokinase. No. 2,349,316. Norbert Volle to The Kroger Food Foundation.
Process of treating refined edible oils, fatty oils and fatty acids, by peroxidation for use as bleaching agents in bread dough. No. 2,349,377. Herbert Renner to J. R. Short Milling Co.
Deodorizing and decolorizing levulinic acid. No. 2,349,514. Wendell Moyer to A. E. Staley Manufacturing Co.
Cooking an oil comprised of sardine oil in presence of ⅛ of 1% to 2½% of castor oil. No. 2,349,546. Wells Ginn to Vejin, Inc.
Curing and preserving animal and fish products, which comprises subjecting them to action of an alkyl ester of para-aminobenzoic acid and one member from monohalide derivatives of aliphatic acids other than fluorine derivatives and alkali salts of said monohalide derivatives. No. 2,349,836. Leander Stuart to Claude R. Wickard as Secretary of Agriculture of the United States of America.
Separating albuminous products from whey. No. 2,349,969. Karl Kremers.
Fat containing food composition having one substance selected from unhardened jojoba nut alcohol, elaidinated jojoba nut alcohol, and hydrogenated jojoba nut alcohol. No. 2,350,082. Ilona Taussky.
Producing vitamin concentrates comprising hydrogenating a fish oil. No. 2,350,768. Henry Kellog and Harris Hineline.

Artificial digestion of albuminoid and fatty substances. No. 2,350,811. Maurice Percheron.
Coffee extract containing added natural coffee oil and a hydrogenated vegetable oil. No. 2,350,903. John Kellog to John L. Kellog & Co.

Industrial Chemicals—Inorganic

Preparing finely-divided sulphur, the particles of which do not tend to reassociate on storage. No. 2,348,736. Sheldon Heath to The Dow Chemical Co.
Recovery of aluminum bromide from light tarry complexes of the aluminum bromide with hydrocarbons formed in low temperature hydrocarbon conversion processes in which aluminum bromide is used as catalytic agent. No. 2,348,770. Irving Welinsky and Manuel Gorin to Socony-Vacuum Oil Co., Inc.
Making dense dead burned magnesia from moist precipitated magnesium hydrate. No. 2,348,847. Robert Pike to Harbison-Walker Refractories Co.
Refining carbon and silicon in cast-iron which comprises pouring molten blast-furnace iron into ladle containing low carbon iron scrap and hammer-scale. No. 2,348,849. Lence Reygagne.
Treatment of finely-divided zinc oxide containing a sulphur compound and having an acidity in excess of about 0.2%. No. 2,348,883. Howard Cyr to The New Jersey Zinc Co.
In flotation of lime-bearing minerals, process of controlling frothing action of collecting reagents which in water give surface active ions. No. 2,349,094. Thorbjorn Heilmann to Separation Process Co.
Concentration of sylvinite ores. No. 2,349,393. Arthur Weinig to Potash Co. of America.
Treating impure anhydrous sodium hydroxide containing sodium chloride. No. 2,349,596. Irving Muskat to Pittsburgh Plate Glass Co.
Fabricating a selenium rectifier which comprises subjecting surface of selenium component to hydrogen peroxide. No. 2,349,622. Clarence Hewlett to General Electric Co.
Separating a copper sulphide from a lead sulphide by selective froth flotation. No. 2,349,637. Kurt Ruckwardt to Anaconda Copper Mining Co.
Chlorination of chromium bearing materials. No. 2,349,747. Irving Muskat to Pittsburgh Plate Glass Co.
Preparing a corrosion inhibitor for compounding with a lubricating oil normally corrosive to cadmium-silver and copper-lead bearings, which comprises reacting a mahogany petroleum sulphonate with phosphorus penta sulphine. No. 2,349,785. Jacob Faust to L. Sonneborn Sons, Inc.
Continuous countercurrent process for chlorination in a vertical column of a chromite ore containing silica and magnesia. No. 2,349,801. Charles Maier to The Dow Chemical Co.
Reducing acidity factor of a crystalloidal titanium sulphate solution by acid extraction therefrom and without disturbing the crystalloidal properties thereof. No. 2,349,936. L'Roche Bousquet, David Young, and Allan Low, to General Chemical Co.
Purifying disodium phosphate liquor contaminated with soluble phosphate rock impurities by reacting the liquor with barium hydrate. No. 2,349,943. Arthur Ditzel to E. I. du Pont de Nemours & Co.
Obtaining detergent, wetting, foaming, metallic salt dispersing and emulsifying agents in finely divided pulverulent form and which will not agglomerate. No. 2,350,000. Jean Vallernaud.
Producing low loss electrical insulation which comprises firing a body of green steatitic material containing iron in a carbon containing crucible. No. 2,350,088. Ernest Dinning, Jr.
Clarification of liquids by coagulation. No. 2,350,111. John Hood to Acco, Inc.
Diammonium monoalkali ferricyanide. No. 2,350,443. Robert Barnes and Leonard Moore to American Cyanamid Co.
Manufacture of aluminum sulphate products. No. 2,350,575. Ritner Tomlinson and Henry Meyer to The Pennsylvania Salt Manufacturing Co.
Production of nitrogen-phosphoric acid compounds. No. 2,350,850. Rudolf Watzel.

Industrial Chemicals—Organic

An ester of ethylenesulphonic acid. No. 2,348,705. Van Vernon Alderman and William Hanford to E. I. du Pont de Nemours & Co.
Improving drying characteristics of crude esters of higher unsaturated fatty acid esters of pentaerythritol and higher unsaturated fatty acid esters of dipentaerythritol. No. 2,348,708. Theodore Bradley to American Cyanamid Co.
Alicyclic esters of alpha-hydroxy-isobutyric acids. No. 2,348,710. Coleman Carl, Jack Thurston, and Donald Kaiser to American Cyanamid Co.
Separation of xylene from other hydrocarbons of group consisting of paraffinic, olefinic and naphthenic hydrocarbons contained therein which distill from the xylene fraction in the same temperature range as xylene distills. No. 2,348,726. Charles Clark to Allied Chemical & Dye Corp.
Refining hydrocarbon distillate which comprises contacting said distillate with marl at a temperature in excess of about 500° F. No. 2,348,745. Francis Moriarty to Universal Oil Products Co.
Depolymerizing a solid synthetic linear polyamide to a fluid mass by heating same in presence of water, removing water, and polymerizing the residue. No. 2,348,751. Wesley Peterson to E. I. du Pont de Nemours & Co.
Reducing the temperature susceptibility of an unoxidized bituminous substance. No. 2,348,832. Karl Mauch and Othmar Pauer.
Manufacture of mercaptothiazolines. No. 2,348,917. Roger Mathes to The B. F. Goodrich Co.
Separation and recovery of the tall oil resin acids and fatty acids. No. 2,348,970. Frederick Gayer and Charles Fawkes to Continental Research Corp.
Separation and recovery of tall oil resin acids and fatty acids. No. 2,348,971. Frederick Gayer and Charles Fawkes to Continental Research Corp.
Sodium bismuth triglycollamate. No. 2,348,984. Robert Lehman and Reavis Sproull.
Manufacture of acetylene. No. 2,349,007. Jan Ruys and Leonard Goldstein to Shell Development Co.
Dewaxing mineral oils including mixing the waxy oil with dewaxing solvent comprising amyl mercaptan and a wax antisolvent in which the antisolvent is methyl ethyl ketone. No. 2,349,038. Luke Goodson, James Montgomery, and Robert Henry, to Phillips Petroleum Co.
Dewaxing mineral oils including mixing the waxy oil with dewaxing solvent comprising diamyl sulfide and wax antisolvent, in which the antisolvent is acetone. No. 2,349,039. Luke Goodson, James Montgomery, and Robert Henry to Phillips Petroleum Co.
Producing increased yields of toluene from a naphtha charging stock. No. 2,349,045. Edwin Layng and Vanderveer Voorhees, one-half to Standard Oil Co., and one-half to The M. W. Kellogg Co.
Preparing cyclopentadiene from dicyclopentadiene. No. 2,349,047. William Lycan and Howard Gerhart to Pittsburgh Plate Glass Co.
Progressive-burning smokeless powder grain in which organic material of high molecular weight is butyl methacrylate. No. 2,349,048. Bill Mackey and Paul Milus to E. I. du Pont de Nemours & Co.
Preparation of 4-pyridine sulphonamides and related compounds. No. 2,349,060. Adolph Tiesler to Lederle Laboratories, Inc.
Preparing surface-active aliphatic monocarboxylic acid-monoalkylol cyanamide condensation products. No. 2,349,061. Robert Uncles and Kerwin Kurtz to American Cyanamid Co.
Tetra-diazonium derivative of phthalocyanine series, stabilized in solid form by salt formation with an aromatic sulfonic acid. No. 2,349,089. Norman Haddock to Imperial Chemical Industries Limited.
Stabilized polydiazo-phthalocyanines. No. 2,349,090. Norman Haddock to Imperial Chemical Industries Limited.
Stabilized polydiazo-phthalocyanines. No. 2,349,091. Norman Haddock to Imperial Chemical Industries Limited.
Polymerization of vinyl aromatic compounds in presence of mesityl oxide. No. 2,349,136. Edgar Britton and Walter LeFevre to The Dow Chemical Co.
Composition containing non-gaseous hydrocarbonaceous component and an exothermic heat reaction product of resinus character of glyceride oils and the acids derived therefrom and an oxide selected from alkaline earth metal and magnesium oxides. No. 2,349,165. Rudolph Grant, one-fourth to Max Isaacson and Sol Shappirio.
Production of nitrogenous heterocyclic compounds. No. 2,349,179. Karl Kumetat, Kreis Bitterfeld and Oskar Riester.
Plugging and sealing space between well bore and casing in a well which comprises introducing a liquid resin forming material, mixture of furfural and thiourea. No. 2,349,181. William Lerch, Clyde Mathis and Eugene Gatchell to Phillips Petroleum Co.
Manufacture of polysulphide compounds of formula RSSR, wherein R represents an aralkyl radical. No. 2,349,191. John Olin and Thomas Deger to Sharples Chemicals, Inc.
Refining a terpene resinous copolymer of a pinene and styrene which comprises mixing with sodium acid sulfate and zinc. No. 2,349,210. William Traylor to Hercules Powder Co.
Alkylating an organic compound by reaction with an olefin polymer in presence of a liquid alkylation catalyst. No. 2,349,211. Anton Tulleners to Shell Development Co.
In manufacture of amines, the process favoring production of monoalkyl amines. No. 2,349,222. Roland Goshorn to Sharples Chemicals, Inc.
Manufacture of alicyclic compounds by heating ethylene and a 1,3-diene. No. 2,349,232. Lloyd Joshel to United States of America, represented by Claude R. Wickard, Secretary of Agriculture.
Cracking a hydrocarbon material by contacting it under cracking conditions with a catalyst which comprises a zirconium phosphate. No. 2,349,243. John Bates to Houdry Process Corp.
Praparing a tocopherol concentrate. No. 2,349,269. Kenneth Hickman to Distillation Products, Inc.
Separating tocopherol from refinery scum, which scum is condensed from inert gas employed during vacuum deodorization of an animal or vegetable oil, which contains tocopherol. No. 2,349,270. Kenneth Hickman to Distillation Products, Inc.
Purifying tocopherol contained in deodorizer scum. No. 2,349,272. Kenneth Hickman and Noel Kuhrt to Distillation Products, Inc.
Preparing tocopherols and new tocopherol derivatives. No. 2,349,273. James Baxter and Charles Robeson to Distillation Products, Inc.
Protecting a substance which is subject to oxidation which comprises adding a small amount of lighter-than-water tocopherol containing vapor condensate. No. 2,349,274. Kenneth Hickman to Distillation Products, Inc.
Concentrating the tocopherol contained in lighter-than-water scum derived from the steam utilized for the vacuum-steam deodorization of vegetable or animal oils. No. 2,349,275. Kenneth Hickman to Distillation Products, Inc.
Preparation of tocopherol products. No. 2,349,276. Kenneth Hickman to Distillation Products, Inc.
Preparing a stabilized fat containing tocopherol. No. 2,349,278. Kenneth Hickman to Distillation Products, Inc.
Derivatives of 2,4-oxazolidinedione. No. 2,349,313. Roger Stoughton to Mallinckrodt Chemical Works.
Pyridine compound and process for manufacture thereof. No. 2,349,318. Kurt Westphal to Winthrop Chemical Co., Inc.
Emulsions comprising a continuous phase and a discontinuous phase dispersed therein by means of reaction product of acid-reacting fatty substance with morpholine. No. 2,349,326. Alexander Wilson to Carbide and Carbon Chemicals Corp.
Noncorrosive heat-transfer liquid. No. 2,349,338. Leo Clapsadle and Gordon Graham to Carbide and Carbon Chemicals Corp.
Making solid fuel briquettes. No. 2,349,342. John Erickson.
Dihydroxy-acetone diether and its manufacture. No. 2,349,348. Adolf Grun to J. R. Geigy A. G.
Manufacture of phenyl o-phenoxybenzoate from crude diphenyl carbonate containing iron impurities by catalytic rearrangement of the diphenyl carbonate. No. 2,349,459. John Pearson and Berndt Hammaren to General Chemical Co.
Manufacture of lower aliphatic amines having at least two carbon atoms attached to the nitrogen atom. No. 2,349,461. Henry Pratt and George Morris to Imperial Chemical Industries Limited.
Producing an addition agent for hydrocarbon oils, which comprises electrolyte into a non-aqueous liquid vehicle. No. 2,350,524. Grady the plate is substantially dry, against displacement by dampening so-reacting an ester of phosphorous acid with an alkyl aroxy alkanol. No. 2,349,462. Raymond Reuter to The Atlantic Refining Co.
Isomerizing paraffins. No. 2,349,516. Herman Pines and Herman Bloch to Universal Oil Products Co.
Calorimetry of low quality combustible gases. No. 2,349,517. Clarence Pinkerton to Cutler-Hammer, Inc.
Purifying phthalic anhydride obtained by vapor phase oxidation of organic substances and containing impurities which are not sulfur compounds. No. 2,349,518. Frank Porter to The Solvay Process Co.
Stabilized diazo dicyandiamide compound. No. 2,349,557. Paul McClellan and Walter Ericks to American Cyanamid Co.
Solvent recovery from colloided material. No. 2,349,562. Henry Rosenthal.
Purifying a 2-mercaptoarylenethiazole. No. 2,349,598. Harold Roberts to Wingfoot Corp.
Producing dibenzothiazyl disulphide from a crude mercaptobenzothiazole.

containing tarry matter which is less soluble in lime water than in caustic soda. No. 2,349,599. Robert Moorhouse to Wingfoot Corp.

Combination thermal and catalytic cracking of hydrocarbon oils. No. 2,349,603. Joseph Barron to The Texas Company.

Preparing solutions of phenols and of their halogenated derivatives. No. 2,349,654. Hans Goebel to Sherka Chemical Co., Inc.

Plastic polymeric derivatives of chloroprene and process of producing the same. No. 2,349,733. Louis Howland to United States Rubber Co.

Restoration of original clear color of lacquers that have been discolored in dipping operations involving copper and copper containing materials by addition of maleic acid. No. 2,349,737. Joseph Krieger.

Separating an alkenyl halide having halogen attached to a saturated carbon atom which is immediately adjacent an unsaturated carbon atom, from a liquid mixture containing said alkenyl halide and another halide having the halogen attached to an unsaturated carbon atom. No. 2,349,752. Maxwell Pollack to Pittsburgh Plate Glass Co.

Preparation of benzotetronic acid. No. 2,349,765. Robert Shelton and Marcus Van Campen, Jr. to The Wm. S. Merrell Co.

Preparing a polymer of a polyhydric alcohol polyester of methacrylic acid. No. 2,349,768. Franklin Strain to Pittsburgh Plate Glass Co.

Synthesis of aryl-alkyl-halogeno-ethanes. No. 2,349,779. Gerrit Van Zoeren to The Wm. S. Merrell Co.

New Product, 1.2-(2'.1'-naphtho)-7.8-benzo-phenanthrene. No. 2,349,781. Charles Weizmann.

Concentration and preservation of tocopherol. No. 2,349,789. Kenneth Hickman to Distillation Products, Inc.

Preparing a water-insoluble, alkali-soluble carboxy-ethyl cellulose ether. No. 2,349,797. Louis Bock and Alva Houk to Rohm & Haas Co.

Recovering vinyl acetate from aqueous mixture containing such ester together with a water-soluble ketone. No. 2,349,807. Donald Benedict to Carbide and Carbon Chemicals Corp.

Hydrocarbon oil having innccorporated an oil-soluble copper mercaptide, derived from a terpene. No. 2,349,820. Arthur Fox to E. I. du Pont de Nemours & Co.

Isomerization process for conversion of straight-chain hydrocarbons to branched-chain hydrocarbons employing an aluminum halide-paraffinic hydrocarbon complex as a catalyst wherein said complex increases in viscosity with use. No. 2,349,821. Nathan Fragen to Standard Oil Co.

Producing aromatic hydrocarbons and hydrogen by contacting aliphatic hydrocarbons of six or more carbon atoms in a straight chain with a dehydrogenating-cyclizing catalyst. No. 2,349,826. Edwin Layng to The M. W. Kellogg Co.

Producing substantial yield of a mono-alkyl aromatic hydrocarbon from a poly-alkyl aromatic hydrocarbon. No. 2,349,834. Louis Schmerling and Vladimir Ipatieff to Universal Oil Products Co.

Polymethylene di-(cyanamides). No. 2,349,851. Henry Dreyfus to Celanese Corp. of America.

Producing 3-methyl pyridine for conversion into nicotine derivatives. No. 2,349,896. Philip Wilson, Jr. and Joseph Wells to Carnegie-Illinois Steel Corp.

Halogen methyl compounds of sulphonamides and sulphonhydrazides and a process of preparing them. No. 2,349,912. Ludwig Orthner and Heinz Schild to General Aniline & Film Corp.

Synthesizing hydrocarbons, alcohols, and mixtures thereof, which includes step of passing a mixture of hydrogen and carbon monoxide through an alternating electric field. No. 2,349,915. Paul Spillane to Keith Williams and Thomas Lawrie.

Aqueous solution of lactoflavin containing a water-soluble salt of 2,4-dihydroxy-benzoic acid or its mono-alkyl ethers. No. 2,349,986. Ernst Preiswerk to Hoffmann-La Roche Inc.

Rendering workable copolymers of butadiene and styrene which consists in mixing said polymers with an unsaturated neutral distillation residue from mineral oil treated with sulphuric acid. No. 2,350,007. Carl Zerbe.

Delustering cellulose acetate fabric which comprises impregnating said fabric with dispersion of a copolymer formed from mixture of acrylonitrile and ethyl acrylate. No. 2,350,032. Onslow Hager to Rohm & Haas Co.

Recovering vinl acetate from an aqueous mixture containing same together with a water-soluble aliphatic ketone. No. 2,350,087. Donald Benedict to Carbide and Carbon Chemicals Corp.

Plasticizing with heat a water-soaked wood veneer and then impregnating with solution. No. 2,350,135. Alfred Stamm to Claude R. Wickard as Secretary of Agriculture of the United States of America.

Producing an additive terpene ether which comprises reacting an alcohol with an unsaturated terpene compound in presence of sulfamic acid as catalyst. No. 2,350,147. Joseph Borglin to Hercules Powder Co.

Composition comprising the product of conjoint polymerization of a mixture comprising vinyl chloride and an acrylic ester, and a heat and light stabilizer. No. 2,350,199. Ronald Staley to General Electric Co.

Producing a liquid organic condensation product having a fraction whose boiling point is above 175° C. comprising heating a mixture of pinene, formaldehyde and an acid catalyst. No. 2,350,230. Mortier Harvey to Harvel Research Corp.

Pyrimidine compounds. No. 2,350,263. Robert Williams and Joseph Cline to Research Corp.

Pyrimidine compounds. No. 2,350,264. Robert Williams and Joseph Cline to Research Corp.

Pyrimidine compounds. No. 2,350,265. Robert Williams and Joseph Cline to Research Corp.

Cellulose triacetate composition and a solvent mixture comprising a lower monochloromononitroalkane and a lower aliphatic monohydric alcohol. No. 2,350,300. Charles Bogin to Commercial Solvents Corp.

Producing carbon bisulphide. No. 2,350,320. James Amos, Ray Boundy, and Kenneth Stober to The Dow Chemical Co.

Making a phlegmatized and shockproof ammonium salt of an aromatic nitro compound. No. 2,350,322. Ernst Berl and Walter Berl.

Fester of an alkoxy-aryloxy-substituted ethyl alcohol and an unsaturated aliphatic monocarboxylic acid. No. 2,350,325. Gerald Coleman and Bartholdt Hadler to The Dow Chemical Co.

Treatment of a hydrocarbon mixture rich in olefins and aromatics with a finely divided radioactive material as sole effective catalyst to effect polymerization and condensation. No. 2,350,330. Theron Remy.

Preparation of products having structural formula

$$(HOCH_2CH_2)(OCH_2OCH_2CH_2)_x(OCH_2OCH_2CH_2OH)$$

(x is positive integer from 1 to 2) which comprises reacting ethylene glycol with formaldehyde. No. 2,350,350. William Gresham to E. I. du Pont de Nemours & Co.

Alcoholysis of esters of substituted acetic acids. No. 2,350,360. Donald Loder and Wilber Teeters to E. I. du Pont de Nemours & Co.

Hydrogenation of diethylstilboestrol. No. 2,350,361. Randolph Major, Clarence Christman and Karl Folkers to Merck & Co., Inc.

Preparation of alloxazines and isoalloxazines. No. 2,350,376. Max Tishler and Gustaf Carlson to Merck & Co., Inc.

Detecting changes in composition of a liquid containing material adapted to have depolarizing action upon an electrode polarized in said liquid. No. 2,350,378. Charles Wallace to Wallace & Tiernan Products, Inc.

Polymerized rosin alcohol. No. 2,350,384. Joseph Borglin to Hercules Powder Co.

Preparing esters of acetyllactyllactic acid comprising causing esters of lactyllactic acid to react with an acetylating agent. No. 2,350,388. Houston Claborn, dedicated to the free use of the people of the United States.

Producing styrene polymer. No. 2,350,400. Wilbert King to Allied Chemical & Dye Corp.

Amines containing at least one 2,6-dimethyl tetrahydropyranomethyl group in the molecule. No. 2,350,446. Thomas Carruthers and Robert Kiefer to Carbide and Carbon Chemicals Corp.

Separating pyrrole from a mixture with pyridine homologs not readily separable therefrom by distillation. No. 2,350,447. Percy Cole and Charles Clark and John Waldron to Allied Chemical & Dye Corp.

Producing substituted guanidine and biguanide salts. No. 2,350,453. Walter Ericks to American Cyanamid Co.

Production of conjugated diolefins which comprises reacting olefin of at least 3 carbon atoms with formaldehyde in presence of sulfuric acid. No. 2,350,485. Erving Arundale and Louis Mikeska to Jasco, Inc.

Converting a cyclic acetal to a conjugated polyolefin. No. 2,350,517. Louis Mikeska and Erving Arundale to Jasco, Inc.

Producing saturated acid extracts which comprises absorbing an olefin in mixture of sulfuric acid with paraffinic oil, and completely saturating the sulfuric acid with olefin. No. 2,350,558. William Kerns and Helmuth Schneider to Standard Alcohol Co.

Producing fatty acids capable of forming polyhydric alcohol esters of improved drying properties from a mixture of fatty aids. No. 2,350,583. Theodore Bradley to American Cyanamid Co.

Preparing 1:3-dimethyl-2-chlor-5-hydroxybenzene. No. 2,350,677. George Gladden to William Cocker.

Resolving a mixture of alpha and one other tocopherol into its components. No. 2,350,713. James Baxter and Julius Taylor to Distillation Products, Inc.

Preparing alpha, beta-dialkyl-alpha, beta-diarylethanes. No. 2,350,718. Hermann Bretschneider, Gabor Fodor, and Zoltan Foldi.

Separating a feed mixture comprised of ethylene chloride, propylene chloride, and butyl alcohol. No. 2,350,719. Albert Bright and Webster Fisher to Eastman Kodak Co.

Transportation of finely divided solids, the catalyst in catalytic conversion of hydrocarbons. No. 2,350,759. Frederick Hilmer and Norman Peery to Shell Development Co.

Producing an aqueous emulsion which is stable, which consists in mixing a perchlorethylene solution of a wax with solution of a water soluble basic organic salt of aluminum. No. 2,350,800. Adalbert Muller.

An -ester of p-di-alkylaminoalkoxymethylbenzoic acid. No. 2,350,826. Victor Salvin and Arthur Hill to American Cyanamid Co.

Producing polyamide articles. No. 2,350,851. Wilhelm Wehr.

Making alcohol-modified urea-formaldehyde resins. No. 2,350,894. Herbert Honel.

Preparing amino diphenyl sulphides which comprises rearranging a phenyl-sulphen-anilide by heating it. No. 2,350,900. Treat Johnson to Sharp & Dohme, Inc.

Separating occluded liquid from an annular hollow cake of porous meltable solid material accumulated in a liquid-solid separating operation. No. 2,350,934. August Henry Schutte.

Preparation of 1,3-dioxolane. No. 2,350,940. Lombard Squires to E. I. du Pont de Nemours & Co.

Production and acid treatment of hydrous chromic oxide. No. 2,350,960. Marc Darrin to Mutual Chemical Co. of America.

Alcoholysis of a lower (alkyl) ester of acetic acid having empirical formula, $ROCH_2COOH$. No. 2,350,964. Donald Loder and Wilber Teeters to E. I. du Pont de Nemours & Co.

Leather

Treatment of chrome tanned leather for production of glue and gelatine, which comprises treating chrome tanned leather with an aqueous lime suspension containing a soluble calcium salt to depress the solubility of the lime. No. 2,349,542. Zoltan Erdeley to Gypsum Lime and Alabastine Canada, Limited.

Medicinals

Impregnating gauze with dispersed sulfadiazine and a greasy substance selected from petroleum jelly and lanolin. No. 2,349,152. Wolffe Feinstone to American Cyanamid Co.

Bacteria antigen for the treatment of diphtheria. No. 2,349,293. Orry Charles Morrison.

Bacteria antigen for the treatment of scarlet fever. No. 2,349,294. Orry Charles Morrison.

Medical capsule consisting of a container of a lower fatty acid ester of cellulose having an acyl content of 13-20%. No. 2,349,430. Gordon Hiatt and John Emerson to Eastman Kodak Co.

Tocopherol concentrate for medicinal or dietary purposes. No. 2,349,590. Kenneth Hickman to Distillation Products, Inc.

Spirocheticidal preparation comprising an arsenical of 3-amino-4-hydroxy phenyl arsine oxide hydrohalide or 3-amino-4-hydroxy phenyl dihalo arsine hydrohalide associated with an alkali metal salt of citric, succinic, malonic, tartaric phthalic acids. No. 2,349,729. Russell Hopkinson and Alexander Tolstoouhov to Parke, Davis & Co.

Preparation of a di-hydroxyaryl di-alkyl substituted ethylene. No. 2,349,770. Frank Tendick to Parke, Davis & Co.

O-acetoxyamino acids in which the amino groups are not acetylated, having general formula: $ROCOCH_3$. No. 2,349,774. Gerrit Toennies to The Lankenau Hospital.

Therapeutic compound selected from 5-methyl-5-n-butyl-2,4-oxazolidinedione, 5-methyl-5-n-amyl-2,4-oxazolidinedione, 5-ethyl-5-isoamyl-2,4-oxazolidinedione, and 5-ethyl-5-n-amyl-2,4-oxazolidinedione. No. 2,349,795. Roger Stoughton to Mallinckrodt Chemical Works.

Therapeutic compound selected from 5-methyl-5-n-hexyl-2,4-oxazolidinedione, 5-methyl-5-n-heptyl-2,4-oxazolidione, and other derivatives. No. 2,349,796. Roger Stoughton to Mallinckrodt Chemical Works.

Additional patents on medicinals, metals, alloys, paints, paper, petroleum chemicals, refining, 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 September 7, 1943.

Apparatus for removal of particles from gases. No. 414,971. Walter Harold Thompson, Herbert John Racey.
Means for stacking goods containers. No. 414,988. Harry Paulin.
Process to de-air wooden blocks and impregnate with wax-lanoline composition. No. 414,989. Jean Proulx.
Process for manufacture of rennet. No. 415,003. Berger's Ltd. (Basil D. Thornley, Stanley Hilton).
Manufacture of methyl silicon halides. No. 412,012. Canadian General Electric Co. (Eugene G. Rochow).
Improving dyeing of cellulosic textiles by use of cyanamide and aliphatic hydroxy aldehydes or ketones. No. 415,021. Courtaulds Ltd. (W. G. Cameron, Thos. Henry Morton).
Resin treatment for stiffening woven fabrics. No. 415,022. Courtaulds Ltd. (Robt. A. McFarlane).
Rot and fungus proofing textiles by means of copper naphthenate precipitation. No. 415,024. Cuprinol Ltd (Herman Waldemar Liehr).
Manufacture of esters of 3-keto cyclopentano-10:13 dimethyl-polyhydro phenanthrenes. No. 415,070. Society of Chemical Industry in Basle. (K. Miescher, A. Wettstein, Caesar Scholz).
Production and purification of compounds of suprarenal cortical hormone series. No. 415,071. Society of Chemical Industry in Basle. (Tadeus Reichstein, Emil Schlittler).
Manufacture of lactones. No. 415,073. S. C. I. in Basle (Tadeus Reichstein, Leo. Ruzicka).
Preparation of oxygen compound of terpene hydrocarbons. No. 415,094. Universal Eucozone Ltd. (A. S. Ramage).
Carboxyl group degradation product manufacture of oestrane series. No. 415,116. Walter Hohlweg, Hans Herloff Inhoffen.

Granted and Published September 14, 1943.

Milk soap. No. 415,133. John E. McCormick.
Paper base wrapping sheet coated with ester gum, rubber, paraffin wax. No. 415,146. Appleford Paper Products Ltd. (Randolph Spencer Soanes).
Bordeaux mixtures of improved adherent properties. No. 415,186. J. R. Geigy A. G. (Fritz Wille).
Liquid olefine polymer catalytic hydrogenation. No. 415,205. International Hydrogenation Patents Co. (P. Herold, H. Kauffman, W. Kroenig, Ernst Donath).
Electrode and welding rod coated with tungsten, molybdenum, vanadium carbides. No. 415,246. Richard Dumpelmann, Paul Ehlers.

Granted and Published September 21, 1943.

New ferrous metal die casting process. No. 415,247. C. A. Parlante, Ernest Windsor-Bowen.
Method of making vegetable fibre fabrics. No. 415,256. John Hannan.
Polymerization of styrene and a dioxane derivative. No. 415,300. Dow Chemical Co. (E. C. Britton, W. J. Le Fevre, H. B. Marshall).
Color photography and kinematography process. No. 415,330. Latta Syndicate Ltd. (Albert Gilbert Tull).
Process to manufacture waterproof and acidproof mortars. No. 415,380. I. G. F. Aktiengesellschaft (Karl Dietz, Karl Frank).
Catalytic conversion of gaseous olefines to liquid hydrocarbons. No. 415,381. Walter Fleming, Wilhelm Baumeister.
Device for separating solid substances from a suspension. No. 415,382. Frederick Juell.

Granted and Published September 28, 1943.

Method for manufacture of resin bonded laminates. No. 415,383. Friedrich Bender, Karl Schnetzler.
Internal micrometer gauge. No. 415,402. Max Maag.
Liquid distilling apparatus. No. 415,412. Aiton & Co. Ltd. (J. A. Aiton).
Plasticization of synthetic linear polyamide. No. 415,440. Canadian Industries Ltd. (Cole Coolidge).
Higher hydroxyketone production. No. 415,535. N. V. Organon. (Rupert Oppenauer).

Granted and Published October 5, 1943.

Waterproofing starch bonded fuel briquettes. No. 415,548. John A. Erickson.
Composition building board composed of abestos waste, lime, rosin, gum, adhesive. No. 415,554. Reginald A. Jacobs.
Heat stable plasticized amino-aldehyde resin. No. 415,577. American Cyanamid Co. (Herb. J. West, H. M. Enterline).
Decalcification of gelatin. No. 415,595. Canadian Kodak Co. Ltd. (E. E. Jelley, W. J. Weyerts).
Radiogoniometer. No. 415,599. Canadian Marconi Co. (Sydney Cockerell).
Vinyl acetate-isophorone or dihydroisophorone composition. No. 415,600. Carbide and Carbon Chemicals. (Arthur K. Doolittle).
Reducing brittleness of vinyl aromatics by means of aliphatic ester of organic acid. No. 415,609. The Distillers Co. Ltd. (H. P. Standinger, H. M. Hutchinson).
Rust preventing paper container for metallic objects. No. 415,620. Globe Envelopes Ltd. (Jas. Edwin Myers).
Calcium sulphate-urea formaldehyde plaster composition. No. 415,628. Imperial Chemical Ind[illegible]
Cyclic process for ex[illegible]68,567. Keystone Varnish Co., Brooklyn, No. 415,650. Perosa [illegible]ed Mar. 23, 1944; for paint; since
Manufacture of deriva[illegible]
series. No. 415,660. [illegible]eichstein, Albert Wettstein).
Ester of the dihydro-ostrine se[illegible]
(Karl Miescher, Caesar, Schol[illegible]
Compounds of bis-nor-cholanic ac[illegible]
415,662. S. C. I. in Basle (T[illegible]
Waterproofing textiles by rubber,
415,683. Henry Dreyfus. (G.[illegible]
Cyclopentano-polyhydro henanthr[illegible]
Logemann, Hans Herloff-Inhoff[illegible]

Granted and Published Octo[illegible]

Production of insoluble resin by treatment [illegible] with sulfuric and formaldehyde. No. 415,695.
Rotary steam engine. No. 415,704. Felix [illegible]
Sprayable, blush resistant cellulose nitrate [illegible]composition. No. 415,742. Canadian Industries Ltd. (J. [illegible]
Alkyd resin coating composition. No. [illegible]5,74[illegible] nadian Industries Ltd. (D. M. Gowing, P. F. Sanders)
Plastic polymer of formaldehyde. No. 41[illegible],744 [illegible]adian Industries Ltd. (P. R. Austin, C. E. Frank).
Reduction process for the production of volatiable metals such as magnesium. No. 415,764. Dominion Magnesium Ltd. (Lloyd M. Pidgeon).
Magnesium producing apparatus. No. 415,765. Dominion Magnesium Ltd. (Lloyd M. Pidgeon).
Formaldehyde—urea, acid catalyed, synthetic resin. No. 415,779. Imperial Chemical Industries. (A. Hill, E. E. Walker).
Screen gyrating machine. No. 415,807. Niagara Screens and Machines Ltd. (Robt. Stroud).
Partitioned carton design. No. 415,836. Jos. Leopold Coyle.
Process for manufacture of rutile titanium pigment. No. 415,838. (Elbert Lederle, Rudolf Brill).
Magnesium orthosilicate refractory. No. 415,840. Victor Moritz Goldschmidt.

Granted and Published October 19, 1943.

Cellulosic pulp producing apparatus. No. 415,843. James Brooke Beveridge, Richard D. Kehoe.
Metal storage tank design. No. 415,844. Chas. Wm. Lawman, Alex. Ronald Miller.
Glycol and alginate cooling and anti-leak fluid. No. 415,889. Carbide and Carbon Chemicals. (Headless Lamprey).
Sintered hard metal alloy and production thereof. No. 415,924. Philips Lamps Ltd. (Johan Romp).
Manufacture of light weight concrete articles. No. 415,959. Horace Keeble (Geo. H. Cheeseman).
Mono-azo dyestuff. No. 415,964. Herbert Krackee, Willy Schumacher.
Low molecular olefin polymerization. No. 415,965. Paul Herold.

Granted and Published October 26, 1943.

Plaster cast cutting device. No. 415,968. Gottfried Christen, Albert H. Smith.
Aminotriazine-formaldehyde condensation product. No. 416,030. Society of Chemical Industry in Basle. (Gustav Widmer).

Granted and Published November 2, 1943.

Preparation of calcium and magnesium carbonates. No. 416,065. Walter McGeorge, Francis Highland Milner.
Paraffin wax, resin, rubber, naphtha coating composition. No. 416,075. Chas. Rapelje Hill.
Anaesthetic or gas administering apparatus. No. 416,087. Henry Alfred Ernest Talley.
Allyl esters of acrylic acid and homologues. No. 416,106. Canadian Industries Ltd. (C. E. Barnes).
Copolymers containing ethylidene diacrylate or dimethylacrylate. No.

416,108. Canadian Industries Ltd. (Loring Coes Jr.).
Catalytic preparation of methoxy acetaldehyde. No. 416,112. Canadian Industries Ltd. (Wm. F. Gresham).
Unsaturated alcohol esters of silicic and boric acid. No. 416,114. Canadian Industries Ltd. (H. S. Rothrock).
Manufacture of water insoluble sulphonium derivatives of phthalocyanines. No. 416,117. Canadian Industries Ltd. (Samuel Coffey, N. H. Haddock, Jas. R. F. Jackson).
Halogenated olefine manufacture. No. 416,129. Canadian Industries Ltd. (O. W. Cass).
Permanently tacky adhesive composition. No. 416,148. Dunlop Tire and Rubber Goods Co. Ltd. (D. F. Twiss, A. E. T. Neale).
Polymerized aliphatic mono-olefine incorporation in polymerized styrene. No. 416,165. International Standard Electric Corp. (Thos. R. Scott, Malcolm C. Field).
Grain refined zirconium-magnesium alloy. No. 416,168. Magnesium Elektron Ltd. (Franz Sauewald, Ludwig Holub, Hans Eisenreich).
Azo dyestuff. No. 416,187. S. C. I. in Basle. (F. Straub, W. Anderau).
Yellow azo dyestuff. No. 416,188. S. C. I. in Basle. (F. Felix, W. Muller).
Glucoside-like compound manufacture. No. 416,219. Hans Herloff Inhoffen, Max Gehrke, Walt. Schoeller.

Granted and Published January 11, 1944.

Fire extinguisher comprising a glass container blown with sectional weakened spots. No. 417,621. H. Borden Clarke.
Process of making solid fuel briquettes employing caustic treated starch as binder. No. 417,628. The Empire-Hanna Coal Co. Ltd. (John A. Erickson).
A filter apparatus for filtering gaseous media. No. 417,631. Erik Torvald Linderoth.
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Dominion Oxygen Co.
[redacted] istillation of acidified solutions of a persulphate. No. 417,696. Imperial Chemical Industries Ltd. (P. Harrower, R. C. Cooper, O. H. Walters).
Blowpipe head for heating uniformly a relatively wide surface. No. 417,704. Linde Air Products Co. (A. E. Shorter).
Method or printing fabric webs subject to distortion. No. 417,708. Montreal Cottons Ltd. (G. H. Tillett).
Process for extracting and concentrating sulfur dioxide from gaseous mixtures, comprising the use, as a solvent for the dioxide, of aqueous solutions of basic glucinium salts, specifically glucinium sulphate. No. 417,759. Societe Anonyme des Manufactures des Glaces et Produits Chimiques de Saint-Gobain. (L. J. B. Guyard).
Basic ester manufacture by inter reaction of aryl nitrile and alkyl halide. No. 417,760. Max Bockmuhl, Gustav Ehrhart.

Granted and Published January 18, 1944.

Electrostatically controlled device to atomatically indicate moisture content of moving paper web in paper making machine. No. 417,763. George Service, Roger La Plante.
Process for the manufacture of high tenacity cellulose acetate fibres. No. 417,768. Henry Dreyfus.
Vaporizing burner for petroleum or liquid fuels. No. 417,773. John Gunnar Lindmark.
Method of waterproofing mineral materials by treating with activating and wetting agents dissolved or suspended in bituminous material. No. 417,776. Norman W. McLeod.
Self locking nut. No. 417,780. Oliver Edwin Simmonds.
Separation of red mud from solutions in the Bayer process by the use of gelatinized starch. No. 417,786. Aluminum Laboratories Ltd. (Robt. F. Stewart).
Gas compressor having a cylinder reciprocatable between end covers. No. 417,826. Commercial Steels and Forge Co. (Australia) Pty. Ltd. (J. W. Newton, M. J. Duff-Fyfe).
Manganese alloy having high vibration damping capacity, ductile in quenched and annealed state. No. 417,827. Consolidated Mining and Smelting Co. of Canada Ltd. (Reginald Scott Dean).
Treatment of cellulosic textile with wax, fatty acid, cyanamide-formaldehyde composition. No. 417,828. Courtaulds Ltd. (C. C. Wilcock, C. P. Tattersfield).
Treatment of polyvinyl alcohol threads with thionyl chloride and acid binding agent. No. 417,829. Courtaulds Ltd. (D. L. Wilson).
Imparting warm handle and wool-like appearance to viscose-wool fabric by ammonium salt, sulphonated fatty alcohol composition. No. 417,830. Courtaulds Ltd. (J. H. McKeown, Wm. Penn).
Method of producing resin-metal laminate. No. 417,871. The Resinous Products and Chemical Co. (Norman Adrian de Bruyne).
Method of lining a textile hose with rubber latex or equivalent sealing agent. No. 417,876. The Sillick Holding Co. Ltd. (D. E. F. Canney, Mark Balkin).
Process for the manufacture of shoe stiffeners by impregnation of fibrous sheets with resins. No. 417,882. Society of Chemical Industry in Basle. (Henri Gruenberg).
Diamond drill bit. No. 417,887. John D. MacFarlane.

Granted and Published January 25, 1944.

Means for use in indicating the position of an object within a body scanned by X-rays. No. 417,907. Boreas Henry Cook.
Bag closure and sealing means. No. 417,913. John Thomas Greenslade.
Method of manufacturing porous fibrous plates employing foam-forming waste sulphite liquor. No. 417,924. Ernst Aron Isidor Orrmell.
Fabrication of sponge rubber goods from acqueous dispersions thereof by employment of rubber gelling agent and a substance capable of giving off a gas, for example, sodium silicofluoride and ammonium carbonate. No. 418,004. Dunlop Rubber Co. Ltd. (S. D. Taylor, D. W. Pounder)
Sizing and rot-proofing textiles by treatment with aqueous dispersion of water-insoluble naphthenic salt and rosin-wax composition. No. 418,023. National Processes Ltd. (Wm. Jas Carter).

Granted and Published February 1, 1944.

Manufacture of artificial leather by impregnation of fabric with aqueous dispersion of rubber, oilseed flour, and casein, and drying, pressing, and vulcanizing product. No. 418,102. Geza Ganz.
Method of manufacture of flame or explosion traps. No. 418,103. Wm. Helmore.
Wax applicator particularly adaptable to skis. No. 418,114. Wm. Melville Macdonald.
Electrostatic means of separating fabric fragments from rubber fragments. No. 418,117. Thos. Jerome Masse.
Centrifugal clutch. No. 418,126. Norman Bruce Wilson.
Heat exchanger design. No. 418,158. Heat Pumps Ltd. (C. K. Newcombe).
Manufacture of ceramic insulator from 99 per cent titanium dioxide, and neutralizing quantity of alumina, by compacting, sintering, and rapid cooling. No. 418,174. Philips Lamps Ltd (Roelof Dirk Bugel).
Process for production of zinc hydrosulphite from zinc particles of comparatively large size by agitation of zinc-sulphurous acid composition. No. 418,175. Powell River Co. Ltd. (Richard Clifford Bedsoe).
Portable percussive tool. No. 418,180. Small Electric Motors (Canada) Ltd. (Clement E. Gossling).
Water insoluble resin having anion exchange properties resulting from reaction of polyalkylene polyamine, aldehyde, and a ketone. No. 418,210. Dominion Rubber Co. Ltd. (J. R. Little).
Glazing putty composed essentially of whiting, mineral oil, cobalt linoleate, and linseed oil fatty acids. No. 418,211. Dussek Brothers & Co. Ltd. (Jas. Henry Howe).
Cathode ray tube design. No. 418,214. Electric and Musical Industries Ltd. (Hans Gerhard Lubszynski).
Thermionic valve voltmeter and potentiometer circuit. No. 418,218. Electric and Musical Industries Ltd. (C. S. Bull, A. D. Blumlein).
High frequency oscillation generating apparatus. No. 418,219. Electric and Musical Industries Ltd. (Wm. Spencer Percival).
Electric image transmission apparatus and method. No. 418,222. Electronic Television Co. (F. C. P. Henroteau).
Laminated textile composition. No. 418,233. Henry Dreyfus (Donald Finlayson).

Granted and Published February 8, 1944.

Enamelled metal masonry simulating building material. No. 418,283. Building Products Ltd. (Leslie S. Odell).
Manufacture of alkali resistant alginic textiles by treatment with chromium salts. No. 418,295. Cefoil Ltd. (J. B. Speakman).
High frequency conductor insulation consisting of esterified cellulose of at least the diacyl stage. No. 418,305. International Standard Electric Corporation (A. A. New).
Brushless shaving preparation in stick form adapted to direct application to the face consisting substantially of sesame oil, spermaceti, stearin, soap, monoglyceride, titanium oxide, and perfume. No. 418,310. Lever Brothers and Unilever Ltd. (May Whitham, Richard Thomas).
Manufacture of titanium oxide ceramic insulator by sintering and controlled temperature treatment. No. 418,319. Philips Lamps Ltd. (P. Goede, L. S. Scheerman, M. G. van Bruggen, E. J. W. Verwey, R. D. Bugel).
Process of rendering a cellulose ether more suitable for manufacture of shaped articles by heat treating cellulose above 40 degrees Centigrade, so that the ether when dissolved in alkali solution will extrude more smoothly into setting bath. No. 418,357. Leon Lillienfeld.
Employment of cellulose ether for ceramic materials, and production of ceramic bodies therefrom by compacting and sintering. No. 418,358. Willem Leendert Carolus van Zwet.

Granted and Published February 15, 1944.

Improved plasticizer for paper consisting of urea in combination with glycerine. No. 418,367. Chester E. Beecher.
Frame for processing photographic negatives. No. 418,371. Arnold C. Burke.
Hypodermic needle joint. No. 418,373. Samuel James Everett.
Waterproofing agent for bricks or stones composed of aqueous emulsion of saponifiable wax, alkali carbonate, and fish glue. No. 418,381. Jas. Carruthers Blair McGuffie.
Cooled paper machine sweat roll design. No. 418,384. Floyd Prame.
Plaster board comprising gypsum plaster, lignified fibres and parenchymatous cellulose tissues. No. 418,387. Jos. Francis Strable.
Process comprising admixing and agitating mass of fibres with slimy aqueous soap solution to promote individualiation of fibres and producing spreadable, plastic composition, or uniformly textured artificial leather sheet. No. 418,413. D. C. R. Ltd. (A. L. Clapp).

Granted and Published February 22, 1944.

Process of producing three-coloured photographic image. No. 418,470. Jack Howard Coote.
Malted solidified fat wherein the fermentation of the malt is inhibited by encasing in the edible fat. No. 418,474. Leo Gurwitsch.
Pulp digester improved design. No. 418,475. Gustaf L. M. Hellstrom.
Labelling machine device. No. 418,487. Frederick Shurley.
Chromium recovery from chromite ore by fusion with lime and decomposing product with alkali metal compound. No. 418,491. Marvin J. Udy.
Process for vertically casting metal ingots of predetermined length by forming separating members on the molten surface of the ingot by the use of film like membrance, such as metallic oxide or whitewash. No. 418,499. Aluminum Laboratories Ltd. (Andre Hone).
Employment of reducing agent to destroy any autoxidation products in process for the manufacture of alpha-chloroacrylic acid polymers. No. 418,515. Canadian Industries Ltd. (J. W. C. Crawford, N. McLeish).
Reversible gel composition of polyvinyl alcohol etc. No. 418,524. Canadian Kodak Co. Ltd. (W. H. McDowell, W. O. Kenyon).
Thermionic valve circuit. No. 418,570. Electric and Musical Industries Ltd. (Wm. Spencer Percival).
Oil well pressure control-system. No. 418,585. The James Morrison Brass Mfg. Co. Ltd. (J. C. Sandilands).
Resin coated electrical stress grading device and method of manufacture thereof. No. 418,586. Northern Electric Co. Ltd. (T. R. Scott, J. K. Webb).
Electrical insulator particularly suitable as condenser dielectric consisting of compacted, sintered, ceric oxide. No. 418,626. Everet Johannes Willem Verwey, Marinus Gerard van Bruggen.
Blocking layer cell. No. 418,627. Ludovicus Augustinus Lambertus Esseling, Willem Christian van Geel.

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

407,552. The Cleveland Electro Metals Co., Cleveland, Ohio; filed Sept. 9, 1943; serial No. 463,295; for aluminum castings; since May 16, 1939.

407,560. The Commercial Chemical Co., Los Angeles, Calif.; filed Jan. 29, 1944; serial No. 466,982; for insecticides; since Jan. 1, 1940.

407,562. Burrell Technical Supply Co., Pittsburgh, Pa.; filed Feb. 23, 1944; serial No. 467,685; for gas analysis apparatus; since April 1935.

442,823. The Atlantic Refining Co., Philadelphia, Pa.; filed Apr. 22, 1941; for oils; since Mar. 5, 1941.

462,436. Abbott Labs., North Chicago, Ill.; filed Aug. 2, 1943; for isopropyl alcohol compound; since Apr. 30, 1943.

463,202. Imperial Chemical (Pharmaceuticals) Ltd., Slough, England; filed Sept. 3, 1943; for cetyltrimethylammonium bromide; since Feb. 28, 1943.

463,313. Cleveland Tungsten, Inc., Cleveland, Ohio; filed Sept. 10, 1943; for tungsten materials; since May 13, 1943.

463,353. I. F. Laucks, Inc., Seattle, Wash.; filed Sept. 11, 1943; for glue; since Aug. 24, 1943.

463,794. Nyanza Color & Chemical Co., Inc., N. Y.; filed Sept. 30, 1943; for dyestuffs; since Jan. 1, 1920.

464,548. The Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed Oct. 30, 1943; for industrial chemicals; since 1933.

464,836. Weber Bros. Metal Works, Chicago, Ill.; filed Nov. 8, 1943; for Laroatory apparatus; since June 8, 1943.

464,852. Engineering Labs., Inc., Tulsa, Okla.; filed Nov. 9, 1943; for chemical apparatus; since January 1935.

465,519. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Dec. 4, 1943; for detergent; since September 1933.

465,995. The Sullivan Co., Memphis, Tenn.; filed Dec. 22, 1943; for bituminous compound; since May 18, 1934.

466,101. Phillips Petroleum Co., Bartlesville, Okla.; filed Dec. 27, 1943; for carbon material, principally as a filler in rubber; since Aug. 5, 1943.

466,102. Phillips Petroleum Co., Bartlesville, Okla.; filed Dec. 27, 1943; for carbon black; since Nov. 17, 1943.

466,165. J N T Mfg. Co., Inc., N. Y.; filed Dec. 29, 1943; for fabric spot remover; since Sept. 3, 1937.

466,182. The Tremco Mfg. Co., Cleveland, Ohio; filed Dec. 29, 1943; for paint enamels; since Apr. 11, 1928.

466,709. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed Jan. 19, 1944; for electroplating solution; since Sept. 23, 1943.

467,160. MacDermid Inc., Waterbury, Conn.; filed Feb. 4, 1944; for alkaline cleaners; since September 1939.

467,412. The Fred Stein Labs., Atchison, Kans.; filed Feb. 14, 1944; for moisture testing apparatus; since Sept. 23, 1937.

467,417. The Varniton Co., Los Angeles, Calif.; filed Feb. 14, 1944; for chemical catalyst; since April 1941.

467,461. William B. Ogush, Inc., N. Y.; filed Feb. 16, 1944; for precious metals; since Feb. 1, 1944.

467,511. Bloomingdale Bros., Inc., N. Y.; filed Feb. 18, 1944; for ready-mixed paints; since Jan. 18, 1944.

467,534. Old Dutch Industrial Products Co., Inc., Kearny, N. J.; filed Feb. 18, 1944; for leather dyes; since October 1937.

467,781. E. I. du Pont de Nemours & Co., Wilmington, Del.; filed Feb. 26, 1944; for fungicide; since Apr. 17, 1942.

467,838. Joseph Baebi, as The Hilton Paint and Varnish Works, Hilton, N. J.; filed Feb. 29, 1944; for paints; since July 20, 1930.

467,862. Quaker Chemical Products Corp., Conshohocken, Pa.; filed Feb. 29, 1944; for oils for knitting machines; since February 1937.

467,898. S. & S. Chemical Co., Newark, N. J.; filed Mar. 1, 1944; for water-repellent, since Feb. 26, 1944.

468,019. Filtrol Corp., Los Angeles, Calif.; filed Mar. 7, 1944; for treated colloidal clay; since Feb. 1, 1944.

468,020-1-2. Filtrol Corp., Los Angeles, Calif.; filed Mar. 7, 1944; for treated colloidal clay; since Feb. 5, 1944; since Feb. 4, 1944; since Feb. 29, 1944.

468,032. J. M. Huber, Inc., N. Y.; filed Mar. 7, 1944; for carbon black; since Feb. 18, 1944.

468,073. Fisher Scientific Co., Pittsburgh, Pa.; filed Mar. 8, 1944; for boiling of liquids; since Mar. 1, 1944.

468,162. Rubber and Plastics Compound Co., Inc., N. Y.; filed Mar. 10, 1944; for use in manufacture of rubber cement; since Dec. 10, 1943.

468,213. Virginia Chemical Corp., Piney River, Va.; filed Mar. 11, 1944; for defluorinated phosphate; since Nov. 16, 1943.

468,358. U. S. Industrial Chemicals, Inc., N. Y.; filed Mar. 16, 1944; for anti-corrosion compound; since Jan. 12, 1944.

468,378. The Firestone Tire & Rubber Co., Akron, Ohio; filed Mar. 17, 1944; for treating rubber; since Feb. 26, 1940.

468,411-3. Freedom Oil Co., Freedom, Pa.; filed Mar. 18, 1944; for oils; since August 1943; since July, 1943.

468,412. Freedom Oil Co., Freedom, Pa.; filed Mar. 18, 1944; for paint thinner; since February 1943.

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N. Y.; fi[redacted]e July 1, 1938.

468,820. Socony-Vacuum Oil Co., Inc., N. Y.; filed Mar. 29, 1944; for hydraulic oils; since Jan. 1, 1916.

468,956. Fairchild Bros. and Foster, N. Y.; filed Apr. 3, 1944; for detergent; since Mar. 3, 1944.

469,105. H. A. Astlett & Co., N. Y.; filed Apr. 7, 1944; for oils; since December 1943.

469,173. The Tremco Mfg. Co., Cleveland, Ohio; filed Apr. 8, 1944; for paint; since Feb. 6, 1936.

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