YOU CAN NOW BUY DRY SODIUM METHYLATE*

A NEW AND USEFUL REAGENT

PREPARATION BY CONSUMER NO LONGER ESSENTIAL

Until the recent development of *dry* Sodium Methylate by Mathieson, this useful reagent had to be prepared by the consumer from metallic sodium and methanol—a slow and hazardous operation.

Moreover, the "home-made" product — a dilute solution of sodium methylate in methanol—did not permit the close control so necessary to efficient operation and high yields in organic syntheses.

Mathieson Sodium Methylate . . . a white crystalline powder over 95% pure . . . has made possible some spectacular developments in the manufacture of sulfa drugs, vitamins, dyes, perfumes and other important products.

According to the conditions to be met, the consumer may either use dry sodium methylate to supply his *entire* requirements or employ the new dry reagent to build up the concentration of the dilute methylate solutions prepared in his own plant.

Just how this versatile new reagent might fit into *your* processing picture we don't know, but we do believe it may pay you to consider its possibilities.

Our technical staff is at your service without obligation. Write for full information.

***PROPERTIES OF MATHIESON DRY SODIUM METHYLATE**

APPEARANCE — A fine, white, very hygroscopic powder.

PURITY — Contains a minimum of 95% sodium methylate, CH_3ONa, not over 2% of inorganic alkalies (sodium hydroxide and sodium carbonate) and not over 3% of methanol.

STABILITY — Stable when stored in airtight containers.

MELTING POINT — None, decomposes and chars.

APPARENT DENSITY — About 0.4.

SOLUBILITY — Dissolves in approx. twice its weight of methanol.

Mathieson CHEMICALS

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42nd STREET, NEW YORK 17, N. Y.

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

Chemical Industries
THE BUSINESS MAGAZINE for MAKERS and USERS of CHEMICALS
Management • Research • Production • Marketing

VOL. 55—NO. 3

September, 1944 *Contents*

DEPARTMENTS

NEWS OF THE MONTH

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ABP ABC

THE READER WRITES

Why Sussman Claims Were Not Allowed

To the Editor of Chemical Industries:

In an article in the August issue of "Chemical Industries" on recent court decisions by Mr. Leo T. Parker, there are itemized "things" which the author states "are not patentable:". Referred to in this light is In re Sussman 141 Fed. (2d) 267, quoted claims from the application reviewed by the Court of Customs and Patent Appeals in the decision, and an introductory statement that the Patent Office refused to allow a patent on an application containing the claims. As a matter of fact, although exactly these claims were not allowed, the application originally containing them was allowed with a claim which covers the reaction set forth in more limited phraseology.

In order that the chemical fraternity may not infer erroneously that the form of claim, the product of the claim, or such claims, broadly speaking, are under the patent statutes not allowable, something more should be said on why these claims were not allowed by the Patent Office.

Incidentally, as the claims cover a process (that is, an act), it can hardly be called a "thing" and moreover, the "thing" made by the process of these claims, namely, (methoxy-methoxy) ethanol was considered allowable by the Patent Office as this product has been patented by one of Sussman's collaborators in another patent (U. S. Patent 2,321,608).

The issue raised by the Patent Office Examiner, sustained by the Board of Appeals of the Patent Office and reviewed by the Court, against the quoted claims was whether or not they differed sufficiently from the prior art to justify their allowance. The Court sustained the rulings of the lower tribunals that they did not. The form of presenting (or claiming) the process was consequently not in issue. No generalities should, therefore, be drawn that such "things" are unpatentable for they are patentable in the absence of anticipatory prior art and providing the "thing" is useful and is beyond the normal skill of the chemist.

Actually, the claims were refused because the process described was broadly old for, on the one hand, 1,4-glycols have been reacted with acetals to form linear polymers and, on the other hand, formaldehyde, closely related to methylal, had been reacted with ethylene glycol to form cyclic compounds. In view of this art the Patent Office held there was no critical difference recited in the process claims (in spite of the differences in specific reactants named) over the processes shown in the art, except that the claims designated a different product than was produced by the processes of the art, and this exception was not sufficient to justify the allowance. The court, however, directed the Patent Office to allow a claim limited by details of operation which it felt showed the critical differences over the art. The Patent Office has allowed that claim.

With no prior art upon which to base a refusal of a claim, the Patent Office does allow claims similar to those quoted providing the other conditions of patentability are satisfied; and when there is no prior art, no critical differentiating characteristics are required to limit the scope of the claim. Such a claim was recently allowed by the Patent Office (Ex Parte Loder et al—Appeal No. 48,038—Board of Appeals of the Patent Office):

"A process for the preparation of a formal of an alkyl hydroxy carboxylic acid which comprises heating formaldehyde and an aliphatic alcohol with an ester of a hydroxy substituted organic acid in the presence of an acidic catalyst."

F. T. FLAHERTY, *Attorney for Sussman*
E. I. du Pont de Nemours & Co.
Wilmington, Del.

"Required Reading"

To the Editor of Chemical Industries:

The tear sheets of the article "The Over-All Outlook" by Francis J. Curtis in your July issue were received this morning.

Thanks for your prompt action in placing these in our hands. Articles of this nature are significant and timely. We are impressed sufficiently by the treatment of this text to place it in the hands of our New York sales force as required reading.

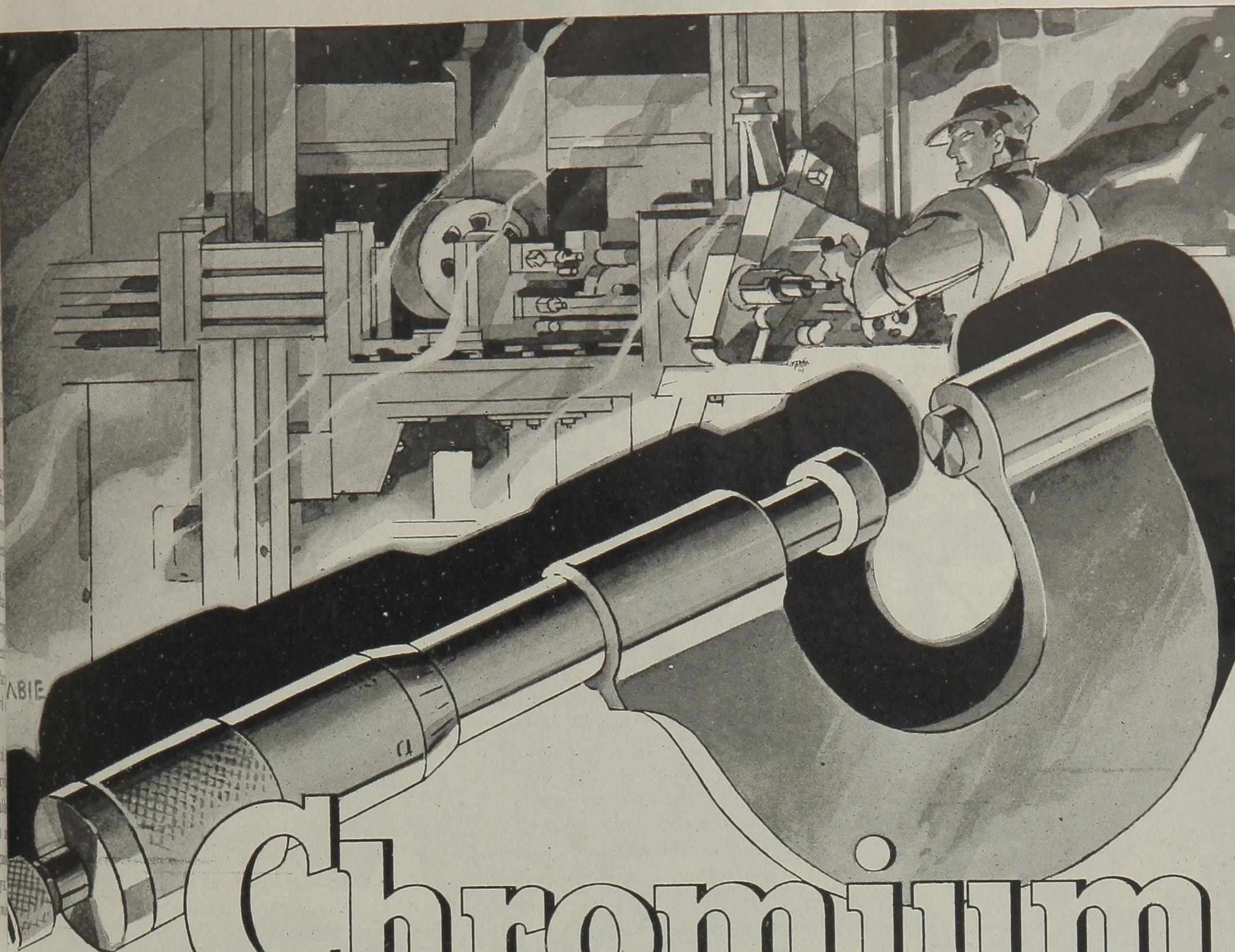
HAROLD W. FEUCHTER,
J. T. Baker Chemical Co.,
New York, N. Y.

Most Interesting

To the Editor of Chemical Industries:

In the August, 1944, issue CHEMICAL INDUSTRIES was one of the most interesting articles I have read in many months on the textile industry. This type of material should be of great interest to many purchasing agents and therefore I am writing to ask permission to reprint it in the October issue of *Pacific Purchaser*.

E. G. CHAMBERS, Exec. Secy.,
Purchasing Agents Association of
Northern California, Inc.,
San Francisco, Calif.



Chromium gives life to *War Tools*

War tools get a lot of punishment these days. Worked three times the peacetime average by untrained men, the tendency toward excessive wear is many times greater.

One of the bottlenecks in war production is the scarcity of these tools and gauges. Increasing the life of these instruments is, in effect, increasing their supply. The extraordinary wear resistance of chrome plate makes it especially suitable for this application. Worn tools and gauges are saved from the scrap pile and actually made better than new by replacing the worn metal with chromium.

Mutual Chromic Acid meets all specifications and is widely used by our government and throughout industry. Shipments are made from either of our complete plants or dealers' warehouses.

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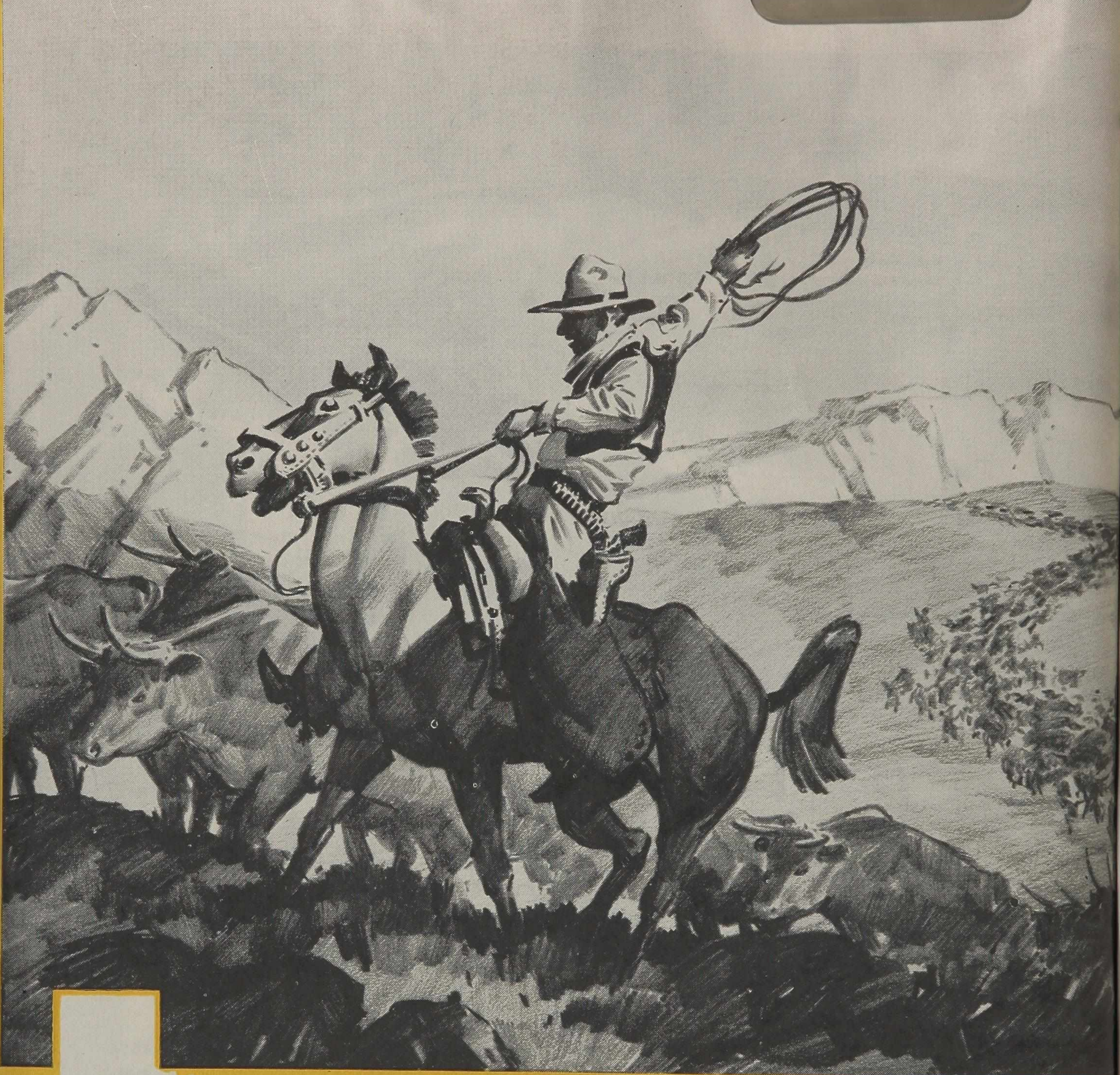


WASHINGTON

T. N. SANDIFER *reporting*

Industry Committees • Chemical Supplies • Coke Outlook Missouri Valley Authority • Alcohol Commission

Anti-Trust Status of Industry Committees

One aspect of the current reconversion steps being taken by the War Production Board is that Industry Advisory Committee activities in connection with reconversion will come under an entirely new interpretation of their legal scope, so far as the Anti-Trust Division of the Department of Justice is concerned. This development escaped general notice in the public preoccupation with broader phases of the return to peacetime production now getting under way on a limited scale.

Earlier in the summer, John Lord O'Brian, general counsel of War Production Board, advised the Attorney General that "in accomplishing the return to civilian production without disruption to the war program, and with minimum dislocation of the national economy, it may be necessary for the War Production Board to request cooperative action on the part of industry." He pointed out that the Government should not be in the position of requesting action of its citizens which, if they complied, might subject them to civil or even criminal prosecution.

Mr. O'Brian pointed out a number of possible joint action plans that might raise questions under the anti-trust laws; plans for subcontracting the civilian production of a plant engaged in war work or a plant unable promptly to reconvert, or plans which might place reasonable and temporary restrictions upon distribution practices both here and abroad where war needs have substantially dislocated normal distribution channels.

Without claiming that all of these proposals should be approved by the Government, he said "some of them, or others of the same general nature, may be desirable, if not essential."

The WPB counsel sought to learn if the earlier agreement with the Anti-Trust Division would cover such possible actions.

In substance the Attorney General now takes the position that "the carrying out of consultations should not be considered as implying that members of such committees are authorized to get together and reach an agreed position in anticipation of such consultations" such as WPB indicated might be held.

"Conditions during industrial demobilization will, of course, differ considerably from those under which the war production program was initiated and is now being carried on," the Attorney General said. "But consultation such as you describe by members of industry advisory committees with the War Production Board while hostilities continue does not constitute violation of the anti-trust laws.

"Consultation, of course, does not involve the determination by the industry advisory committee itself of policies, administration of programs, or the formulation of problems, which should be the responsibility of the War Production Board."

Laying down the stricture that no advance agreements regarding such consultations could be taken by the members, he said, "If the members of the committees should themselves privately agree on any plan or program or take part in any such private plan or program involving directly or indirectly, the production or distribution of commodities, such a plan or program would be subject to the antitrust laws."

The chemical industry is not as deeply involved in this problem as certain heavier industries, for obvious reasons, but an industrial spokesman expressed the view that the anti-trust exemption provided in this exchange is "extremely limited."

Some Chemicals Eased by WPB

A recent survey of WPB actions discloses that orders governing chemicals and related materials have been modified in a number of cases in recent weeks, beginning in July. Among these have been acrylic acid resins, urea and melamine aldehyde resin, monobutyl ether of ethylene glycol, monomethyl amine and dimethyl amine, chrome pigments thiamine hydrochloride, aromatic solvents, and aluminum.

Missouri Valley Authority

What started as a regional dispute between so-called irrigationists versus navigationists, over disposal of Missouri river water apparently is shaping up for Congressional determination as to whether to establish a TVA on the Missouri—in other words a Missouri River Authority.

Under terms of a bill just proposed in Congress, with powerful backing, such an Authority would be launched, designed to furnish the Missouri Valley with power, potash and phosphate manufactures, and all the other features of the present TVA.

Advocates of the MVA point out that one of the most important outgrowths of TVA has been development of phosphate deposits in the area, and they suggest for illustration, that MVA would have such phosphate deposits as those in Montana, and elsewhere in the area, as a basis for similar operations. In fact, supporters see greater possibility in this and other activities than in the power aspects of MVA, in view of the lesser water supply in the Missouri Valley, compared to TVA. It may be recalled in connection with the proposed phosphate exploitation, that TVA now has a tremendous cooperative program, in which test demonstrations of TVA fertilizers are being conducted on 30,000 farms in 28 states, by selected farmers, who receive this TVA product for test purposes and keep records for the agency. MVA sponsors point to the development of new chemical and light metal industries that followed the advent of TVA in its particular area.

Coke Production Seen as Promising

Carbonization of coal in byproduct ovens shows an encouraging outlook in the national economy after hostilities cease, the Bureau of Mines reports.

Recalling that the beehive coke industry has made a noteworthy contribution to the war program in metallurgical fuel, the Bureau points out that nevertheless, the economy of byproduct ovens will doubtless entirely displace the beehive ovens as a source of metallurgical fuel in future, except for emergencies.

"It is generally agreed that civilian requirements of steel products will not equal the present war-time demands," the Bureau said, "and this will doubtless lower the requirements of furnace coke. However, the displacement of beehive coke, the reestablishment of domestic coke markets to prewar levels, and the increasing demands for light oil and coal-tar products point toward active markets for the byproduct industry.

"The potential scope of application of the light-oil and coal-tar chemicals is virtually limitless, and present-day uses will increase. The rapidly expanding plastic, synthetic rubber, aviation gasoline, pharmaceutical and dyestuffs industries are some of the more important outlets for increasing quantities of benzol, cresols, cresylic acid, phenol, pyridine, and other products derived mainly from byproduct coking."

Alcohol Production Commission Urged

Appointment of an interdepartmental commission to study locations and prepare plans for construction of 50,000,000 gallons of new alcohol production capacity, using grains, is advocated by Senator Gillette, chairman of a sub-committee which for more than a year has interested itself in alcohol production.

The new plant would obviously be intended to absorb the slack in post-war demand for grains, and the Senator specifically suggested the new locations should tap Northwestern and Canadian surpluses. Meanwhile, the Senator's sub-committee will shortly attack what it termed action at WPB to drive out of production certain grain plants already operating.

American Foreign Interests

Figures as to American holdings abroad which have been tabulated during the year will come into use upon termination of the war. Meanwhile the information has been utilized by the government for its own purposes, Government officials having commented that "the Government's need for detailed knowledge of American interests abroad and their relationships in other countries has increased constantly since the war began."

Ostensibly, however, the data which was gathered in a canvass inaugurated last year, will have its uses in postwar negotiations, and at the peace table. The figures show that American holdings of various kinds in foreign countries total more than $13,300,000,000. This financial stake abroad is comparable only with that of Britain, it is pointed out. The total includes $1,775,000,000 in six enemy countries, of which $1,290,000,000 represents investments in Germany. Those in Italy total $265,000,000, and Japan, $90,000,000.

An interesting feature of such holdings is that they are three times the total of known Axis holdings in the United States, of $450,000,000. All such Axis property has been seized by the Alien Property Custodian, so far as reported, and, it is believed here, American holdings in Axis countries have been expropriated, in addition to some $2,000,000,000 of American-owned property in areas occupied at one time or another by Axis forces.

Presumably these figures will come into play whenever Germany falls and the interested opposing nations begin to balance their books against that Axis power and whatever assets may be found.

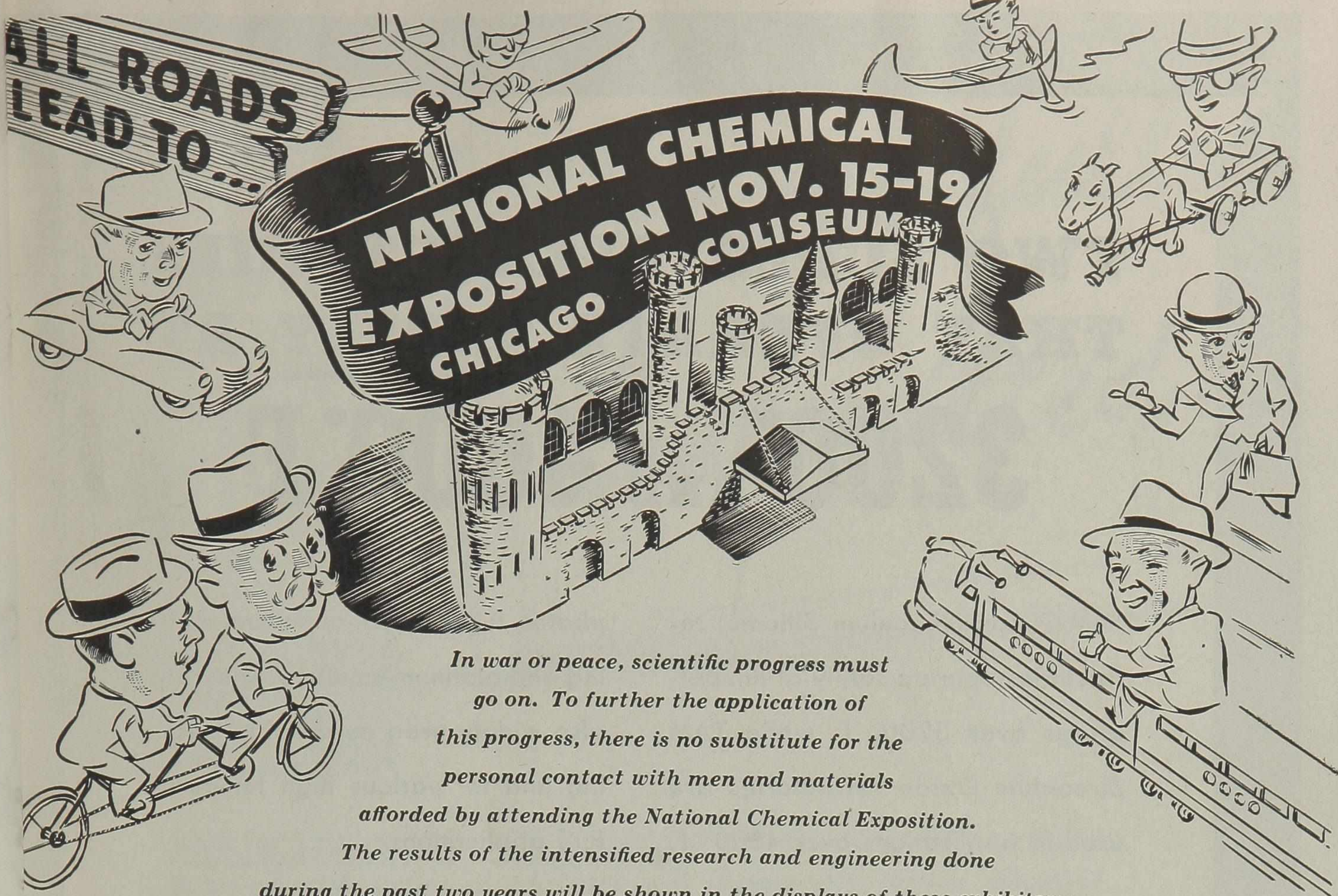
In another category are the investments and financial interests of Americans in friendly countries, dominated by some $5,800,000,000 in the British Empire, of which in turn, the largest part represents holdings in Canada. Three and a quarter billion dollars represents American ownership and investments in Latin American countries. They will have their part in postwar negotiations obviously.

Anti-Trust Agitation

Preoccupation with monopolies has been a fetish in the past with the Administration, as evidenced by the TNEC hearings. Of late the Department of Justice has seemed to be reviving this emphasis through its interest in certain aspects of postwar preparations.

Thus, if some moves are consummated, the Department might be found later to be passing on the ultimate disposal of Government plants, as well as other surplus property on the basis of whether it tends to bolster an existing monopoly, or foster a new one. Some reflection of this idea is evident in some of the suggestions before the Small Business Committee.

Niagara Alkali Company's plant at Niagara Falls, N. Y. is modern, efficient and adaptable to the changing demands of both war and peacetime production



In war or peace, scientific progress must go on. To further the application of this progress, there is no substitute for the personal contact with men and materials afforded by attending the National Chemical Exposition. The results of the intensified research and engineering done during the past two years will be shown in the displays of these exhibitors:

:adia Synthetic Products Div.,
Western Felt Works
:e Glass, Inc.
ox Corporation
nerican Air Filter Co., Inc.
nerican Chemical Society
nerican Foundry Equipment Co.
nerican Instrument Co.
nerican Photocopy Equipment Co.
nerican Resinous Chemicals Corp.
Reeve Angel & Co., Inc.
mour and Company
as Powder Company
rnstead Still & Sterilizer Co., Inc.
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telle Memorial Institute
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lders-Providence, Inc.
mp Pump Company
anese Chemical Corp.
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cago Apparatus Co.
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The De Laval Separator Co.
Denver Equipment Co.
The Dicalite Co.
Harry W. Dietert Co.
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The Dorr Company
The Dow Chemical Company
Durametallic Corporation
The Duriron Company, Inc.
Emery-Carpenter Container Co.
The Emulsol Corporation
Ertel Engineering Corp.
Eutectic Welding Alloys Co.
Fansteel Metallurgical Corp.
The Filter Paper Co.
Fisher Scientific Co.
The W. J. Fitzpatrick Co.
General American Process Equip. Div.,
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General Ceramics Company
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Glycerine Producers' Association
Glyco Products Co., Inc.
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Hamilton Manufacturing Co.
W. A. Hammond Drierite Co.
Hasco Valve & Machine Co.
Haveg Corporation
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Hills-McCanna Co.

Illinois Electric Porcelain Co.
Illinois Testing Laboratories, Inc.
Illinois Water Treatment Co.
Industrial & Engineering Chemistry
Industrial Instruments, Inc.
Ingersoll Steel & Disc., Div. of
Borg-Warner Corp.
Interscience Publishers, Inc.
Johns-Manville Corporation
Kewaunee Mfg. Co.
Kimble Glass Company
Maurice A. Knight
Kold-Hold Mfg. Co.
Laboratory Equipment Corp.
Laboratory Furniture Co., Inc.
Lapp Insulator Co.
Leader Iron Works, Inc.
Link-Belt Company
Loeb Equipment Supply Co.
Lukens Steel Company
Mallinckrodt Chemical Works
Marathon Paper Mills Co.
Marsh Stencil Machine Co.
Mayer & Oswald, Inc.
Merco Nordstrom Valve Co.
Metal-Glass Products Co.
National Carbon Company, Inc.
National Engineering Co.
National Starch Products, Inc.
National Technical Laboratories
The Neville Company
Ohio Chemical & Mfg. Co.
The Ohio Steel Foundry Co.
Omega Machine Co.

Paper & Industrial Appliances, Inc.
The Patterson-Kelley Co., Inc.
The Permutit Company
Leonard Peterson & Co., Inc.
The Pfaudler Co.
Podbielniak, Inc.
Productive Equipment Corp.
Proportioneers, Inc.
Pulverizing Machinery Co.
Putman Publishing Co.
Reichhold Chemicals, Inc.
Reinhold Publishing Corp.
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St. Regis Paper Co.
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E. H. Sheldon Co.
Simplicity Engineering Co.
Sivyer Steel Casting Co.
Sparkler Manufacturing Co.
Triangle Package Machinery Co.
Trimount Instrument Co.
Union Bag & Paper Corp.
The United States Stoneware Co.
Victor Chemical Works
Waukesha Foundry Company
W. M. Welch Manufacturing Co.
Wheelco Instruments Co.
Wilson Chemical Feeders, Inc.
Worthington Pump and Machinery Corp.

Cooperating Hotels

Make Reservations Before Nov. 1

The Stevens
Edgewater Beach Hotel
La Salle Hotel
Medinah Club of Chicago
Bismarck Hotel
Hotel Atlantic
Hotel Maryland
The St. Clair
Allerton Hotel
The New Hamilton Hotel
Eastgate Hotel
Hotel Sheridan Plaza
The Seneca

NATIONAL INDUSTRIAL CHEMICAL CONFERENCE—Dr. H. E. Robinson and his Conference Committee have provided an outstanding program, to open with a joint luncheon with the Chicago Association of Commerce. Conference programs will feature such subjects as:

Metals—New Developments in Aluminum, Magnesium, Steel and Steel Alloys—The Chemist and Chemical Engineer in Pharmaceuticals—Vitamin Synthesis and Production—Production of Penicillin—Research and Production Contributions of Chemical Engineers in Petroleum and Synthetic Rubber—Current Contributions of the Chemist and Chemical Engineer to Human Progress.

by such internationally famous speakers as:

T. V. Faragher, Aluminum Co. of America; Dr. L. B. Grant, Dow Chemical Co.; J. Mitchell, Carnegie Illinois Steel Co.; C. R. Addinall, Merck and Co.; Dr. G. Granger Brown, U. of Michigan; C. F. Kettering, General Motors Corp.

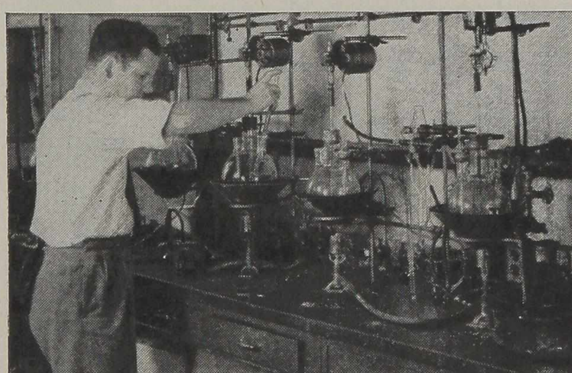
INDUSTRIAL MOVIES—Mr. Edward Bicek and his movie Committee have selected 22 of the latest and finest industrial movies for a continuous showing.

FEATURE EXHIBITS—Latest physical and electronic methods applied to chemical and chemical engineering problems, including: high frequency heating, electron microscopes.

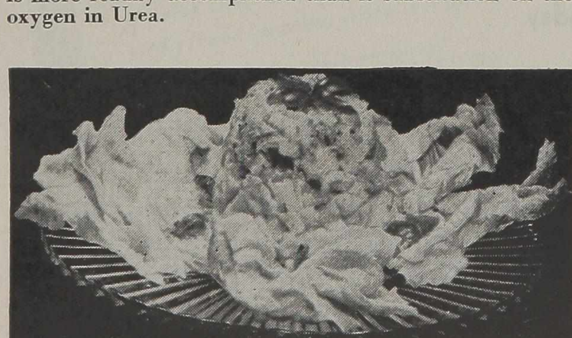
VERY MANUFACTURING PROCESS IN SOME WAY INVOLVES CHEMISTRY

LIFE On The

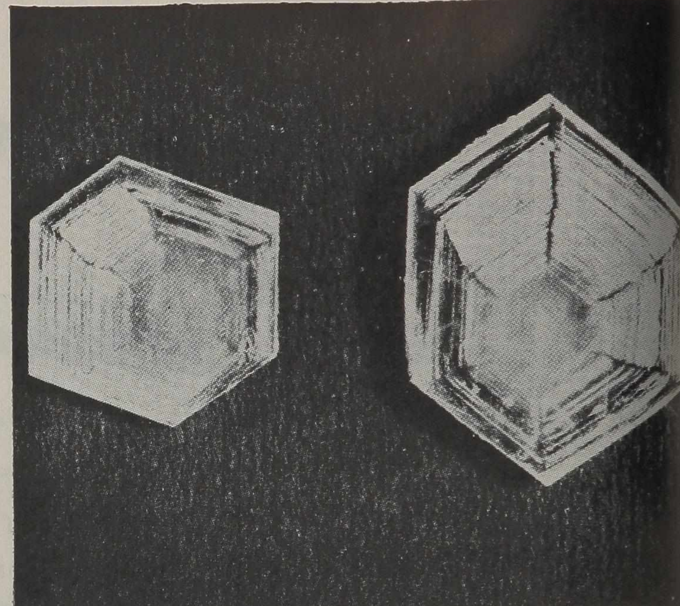
(*Above*) **IN PHOTOGRAPHIC PROCESSING** Thiourea is used as a reagent and as a sensitizer for coatings of blueprint and photostat papers.



(*Above*) **AS A CHEMICAL INTERMEDIATE** Thiourea lends itself to many chemical reactions which might give products of interest to many industries. It is a highly reactive chemical raw material. Substitution on the sulphur atom in Thiourea is more readily accomplished than is substitution on the oxygen in Urea.



(*Above*) **APPLES AND PEACHES** may be prepared in large quantities many hours in advance of the time they are to be served or placed in a quick freezer when treated with Thiourea to prevent discoloration of the cut sections.



Actual formula of Thiourea is: $(NH_2)_2C=S$

This tautomerism occurs in water solution: $(NH_2)_2C=S \rightleftharpoons (NH=)(NH_2)C-SH$

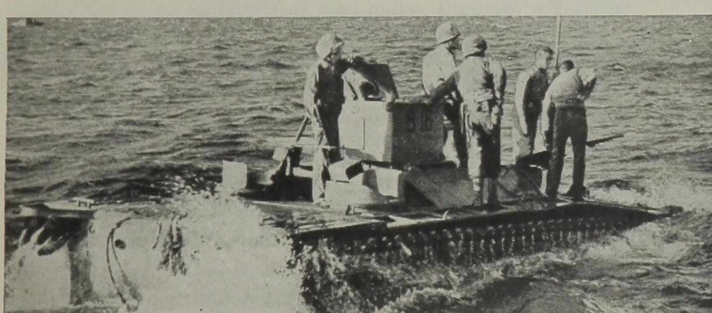
(*Above*) **CRYSTALS OF THIOUREA,** shown in this photomicrograph, are whit and lustrous, soluble in cold water, ammonium sulphocyanide solutio and ether. Cyanamid's Thiourea contains 99.32% Thiourea, .36 moisture, no ash, and .1% water insoluble material. Chemical formul are shown above.

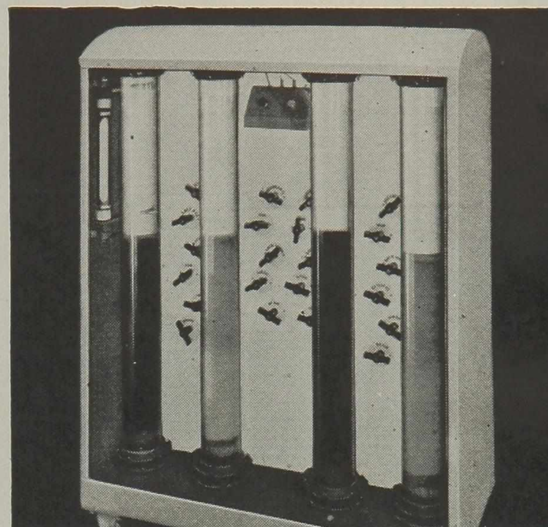
AVAILABILITY OF THIOUREA SUGGESTS NEW INDUSTRIAL APPLICATIONS

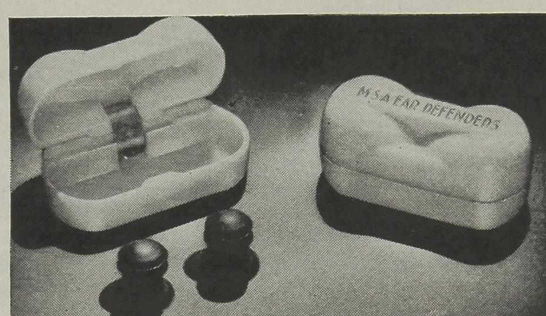
Thiourea was commercially produced for the first time in the Unit States in 1940 by Cyanamid. Since that time, through Cyanam research and development, it has become more and more important as chemical raw material, and is finding new and widely diversified use

Among the larger commercial uses of Thiourea are the production a number of drugs, one an important member of the sulfa family, a of certain types of synthetic resins. Other indicated uses, besides tho illustrated, some covered by patents, include its use as a starting poi in making various synthetic dyestuffs, as an ingredient of insecticid compositions, as a mothproofing agent in treating furs, feathers, a skins. Thiourea is also used in photographic processing as a develop for plates and films, as a fixing agent in photographic works, and as ingredient of compositions used for the removal of stains from negativ and compositions for toning sulphide-toned images on developing a printing papers.

Sample quantities of Thiourea for exploration into its adaptabili to new products and new uses are available from Cyanamid. Suppli are also available for immediate production in either carload, or le than carload, quantities. Additional information, prices, and sampl will be sent on request.

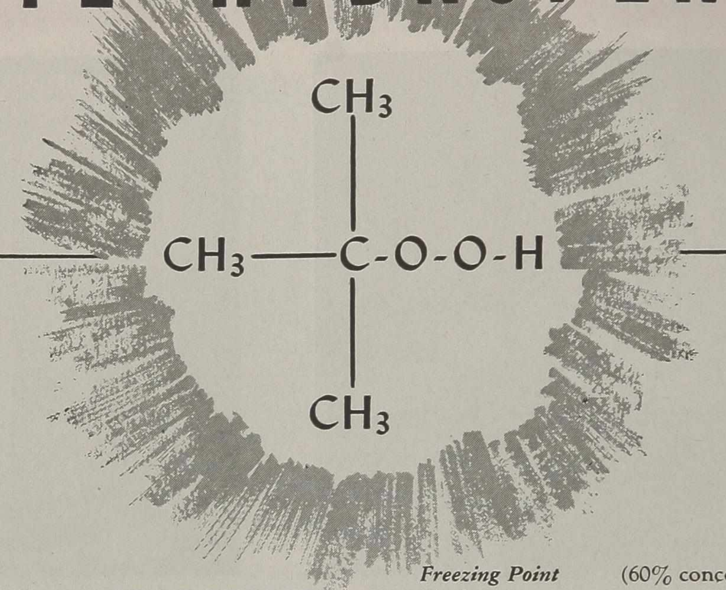





M.S.A. EAR DEFENDERS

Commercial

t-BUTYL HYDROPEROXIDE*



GENERAL DESCRIPTION

t-Butyl Hydroperoxide is a new, organic, alkyl peroxide which offers extremely interesting possibilities. It is standardized at a concentration of 60% (10.66% available oxygen). Use of the proper activators increases the rate of release of the oxygen.

SUGGESTED USES

1. As a catalytic agent in one or two phase polymerizations. **(*t*-Butyl Hydroperoxide has proved to be an excellent catalyst for polymerizing Styrene, as well as certain Elastomers such as Buna S.)**
2. As a drying accelerator in oils, paints, varnishes, etc.
3. As a combustion accelerator for heavy fuel oils used in Diesel engines.
4. As an accelerator in the curing of synthetic resins.
5. As an accelerator in the vulcanization of certain synthetic rubbers.
6. As an oxidation agent for laboratory purposes.

PROPERTIES

Molecular Weight		90
Specific Gravity	@ 25° C. (60% concentration)	0.859
Boiling Point	"	82–83° C.
Freezing Point	(60% concentration)	−30° C.
Flash Point	"	18.3° C.
Refractive Index @ 25° C.	"	1.3960
Available Oxygen	"	10.66%
Color	"	Water White
pH of 1 part 60% Conc. in 10 parts water		4
Stability	Completely stable up to	76.6° C.
Solubility:	60% concentration in water	11%
	Water in 60% concentration	5%
	In short chain aliphatics	Excellent
	In aromatics	Excellent

ACTIVATORS

Hydroquinone and other similar organic reducing agents have proved to be efficient secondary catalysts in polymerization reactions (when used in quantities up to 0.1% of *t*-Butyl Hydroperoxide), greatly increasing the efficiency of polymerization. When use requires quick release of oxygen, the same proportions of Hydroquinone mentioned above have proved efficient.

• • •

For experimental samples of this interesting new peroxide, write the Union Bay State Chemical Company, Peroxide Division, 50 Harvard St., Cambridge 42, Massachusetts.

*U.S. PATS. 2176407 & 2223807

UBS

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Chemical Company

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PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

DU PONT CHEMICALS YOU SHOULD INVESTIGATE

SODIUM CYANIDE
NaCN

PROPERTIES

Molecular weight	49.01
Color	White
Melting Point	560°C. 1040°F.
Density (15.5°C.)	1.51
Heat of fusion	75 cal. /g.
Solubility	
In water	High
In liquid ammonia (—33°C.)	3.7 g./100 g. NH_3
In absolute alcohol and ether	Very slight
Stability	
Extremely stable when dry	

Already widely used in such diverse applications as metal cleaning, flotation, electroplating, carburizing and tanning, this versatile chemical is finding increasing use in the field of organic synthesis. Du Pont Sodium Cyanide is available in molded egg-shaped pieces ("Cyanegg") and granular form ("Cyanogran"). Both contain a minimum of 96% NaCN and are shipped in standard drums of 100 and 200 pounds, net.

APPLICATIONS

METAL CLEANING—NaCN solution exerts a cleaning action on metals by dissolving oxide film to form soluble metal complexes. It can be applied as a separate dip or as an ingredient in alkaline cleaning solutions. In the textile field, NaCN solutions are used to remove certain metallic impurities.

ORE TREATMENT—The extraction of metals, principally gold, from finely ground ores is another well established use of NaCN. In the flotation of metal ores, NaCN solution acts as a "depressor" for iron sulfide.

CASE HARDENING AND CARBURIZING—Molten Sodium Cyanide baths impart a wear-resistant surface to ferrous metals.

ELECTROPLATING—NaCN is a primary component of solutions from which copper, zinc, cadmium, brass, silver, gold and other metals are deposited electrolytically.

INORGANIC AND ORGANIC THIOCYANATES—Dissolved NaCN readily reacts with sulfur to form sodium thiocyanate. On this reaction is based the use of cyanide as a "sharpening" agent in the unhairing of hides. Sodium thiocyanate, in turn, reacts with organic chlorides to form thiocyanate esters, widely used as the active ingredients in fly sprays.

AS A SOURCE OF HCN—Treatment of NaCN with acid is a quick, simple way to obtain HCN. When proper safety precautions are exercised, the gas so evolved is used in fumigation and in a large number of chemical reactions.

AS A CHEMICAL REACTANT

Alkyl halides and esters react with NaCN to form nitriles—a synthesis widely used in the plastics field. The nitriles, in turn, are the starting point for varied reactions leading to amides, acids, imino ethers, orthoesters, and amines.

The cyanohydrin synthesis

RHC:O + HCN → R.CHOH.CN is based on the reaction of aldehydes and ketones (or their bisulfite addition products) with NaCN. The cyanohydrins can be converted to corresponding organic acids or esters. For example, acetaldehyde cyanohydrin yields α–hydroxy propionic acid (lactic acid), while the cyanohydrin of methyl ethyl ketone gives α–hydroxy α–methyl butyric acid.

The Strecker amino acid synthesis is based on the reaction of ammonia with cyanohydrins. By this method, alanine can be prepared from acetaldehyde, glycine from formaldehyde, and α–amino isobutyric acid from acetone.

Cyanoacetic ester, readily synthesized by reaction of chloracetic acid with NaCN, followed by esterification, behaves similarly to the malonic acid esters. It condenses with aldehydes to give unsaturated compounds; and will add to unsaturated esters in the presence of sodium ethoxide, according to the Michael reaction. Alcoholysis of cyanoacetic ester and subsequent reaction with sodium, gives sodio malonic ester, an intermediate in the synthesis of soporifics, such as the barbiturates.

★ ★ ★

At present, supplies of Sodium Cyanide are under WPB allocation. But this need not postpone your investigation of its many possible future uses. Limited quantities are available for experimental purposes. For further information, write: E. I. du Pont de Nemours & Co. (Inc.). Electrochemicals Department, Wilmington 98, Delaware.

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Where can you use these reactive emulsifying agents and chemicals?

Many emulsion problems are solved with these Aminohydroxy compounds — each possesses individual characteristics ideal for specific applications.

Tris(hydroxymethyl)aminomethane

PROPERTIES	
Molecular Weight	121.14
Melting Point, °C	171 to 172
Boiling Point, °C	219 to 220 10mm
Specific Gravity 20°/20°C	. . .
pH of 0.1M Aqueous solution at 20°C	10.4
Solubility in Water—g/100 ml at 20°C	80

(Available in experimental quantities)

. . . forms soaps of higher water solubility . . . exceptionally stable paraffin wax emulsions. Its three hydroxyls and an amino group enable synthesis of many useful chemicals such as cation active textile softeners and plasticizing esters.

TEXTILES

2-Amino-2-ethyl-1, 3-propanediol

PROPERTIES	
Molecular Weight	119.16
Melting Point, °C	37.5 to 38.5
Boiling Point, °C	152 to 153 10mm
Specific Gravity 20°/20°C	1.099
pH of 0.1M Aqueous solution at 20° C	10.8
Solubility in Water—g/100 ml at 20°C	Completely Miscible

(Available in limited quantities)

. . . for fast dispersion . . . for easily preparing oil-in-water emulsions such as insecticidal sprays, cutting oils, and textile lubricants. It is advantageous for use in a variety of products where an efficient, convenient emulsifier is needed.

CUTTING OILS

2-Amino-2-methyl-1, 3-propanediol

PROPERTIES	
Molecular Weight	105.14
Melting Point, °C	109 to 111
Boiling Point, °C	151 to 152 10mm
Specific Gravity 20°/20°C	. . .
pH of 0.1M Aqueous solution at 20°C	10.8
Solubility in Water—g/100 ml at 20°C	250

(Available in limited quantities)

. . . useful in preparing cosmetic creams and lotions outstanding in stability and freedom from yellowing. It is used to make liquid cleansing cream bases, textile lubricants, and other transparent or milky mineral oil emulsions with good color, odor, and aging stability.

COSMETICS

2-Amino-2-methyl-1-propanol

PROPERTIES	
Molecular Weight	89.14
Melting Point, °C	30 to 31
Boiling Point, °C	165 760mm
Specific Gravity 20°/20°C	0.934
pH of 0.1M Aqueous solution at 20°C	11.3
Solubility in Water—g/100 ml at 20°C	Completely Miscible

(Available in commercial quantities)

. . . a versatile material for making bright drying floor polishes and other emulsions where high water resistance of the dried film is essential. It is also useful in the synthesis of dyestuffs, wetting agents, photographic developers, and pharmaceuticals.

EMULSION PAINTS

2-Amino-1-butanol

PROPERTIES	
Molecular Weight	89.14
Melting Point, °C	-2
Boiling Point, °C	178 760mm
Specific Gravity 20°/20°C	0.944
pH of 0.1M Aqueous solution at 20°C	11.1
Solubility in Water—g/100 ml at 20°C	Completely Miscible

(Available in experimental quantities)

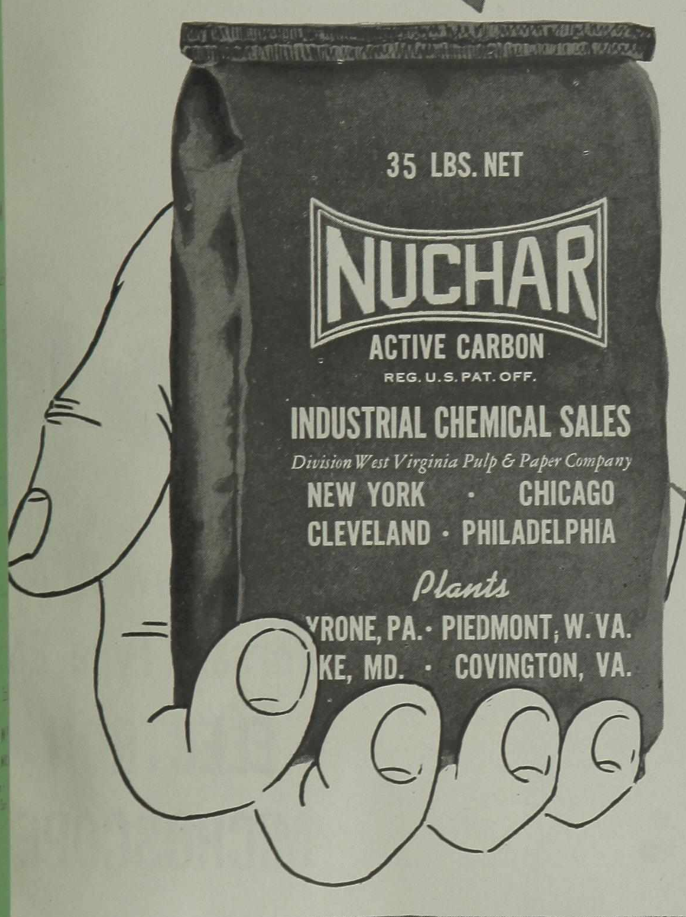
. . . excellent for making naphtha emulsions for cleaning operations and in all kinds of transparent water-in-oil emulsions. Its low combining weight, liquid state, and complete water miscibility make it a practical emulsifying agent in many applications.

CLEANSING AGENTS

Here's ONE PURIFICATION PLANT IMPROVEMENT THAT SHOULD BE CONSIDERED IN YOUR *POST-WAR PLANS*

Yes, more and more Nuchar Active Carbon is being used to supplement overtaxed purification equipment.

In normal times, the Chemical Process Industries use many purification methods, such as Distillation, Crystallization and Sublimation. Most of these methods involve the use of extensive equipment. Thus, chemical manufacturers should investigate the possibilities of purification by adsorption; a process in which little or no additional equipment is necessary. The effectiveness, as well as the economy of using Nuchar Active Carbon as a purifying medium, has been fully demonstrated over a wide field of industrial activity. It represents standard practice in many operating processes, such as: Chemicals, Drugs and Pharmaceuticals, Food Products, Industrial Water, Off-Grade Products, Oils, Fats, Waxes, Greases, Air, Recovery Processes, Trade Wastes, Water Purification. Let us show you how you can substitute the simple, low-cost Nuchar Active Carbon process for the more complicated purification methods which are being affected by material shortages.



Nuchar Active Carbons ★ Abietic Acid
★
Snow Top Precipitated Calcium Carbonate
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Liquid Caustic Soda ★ Chlorine
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Lignin ★ Liqro Crude Tall Oil
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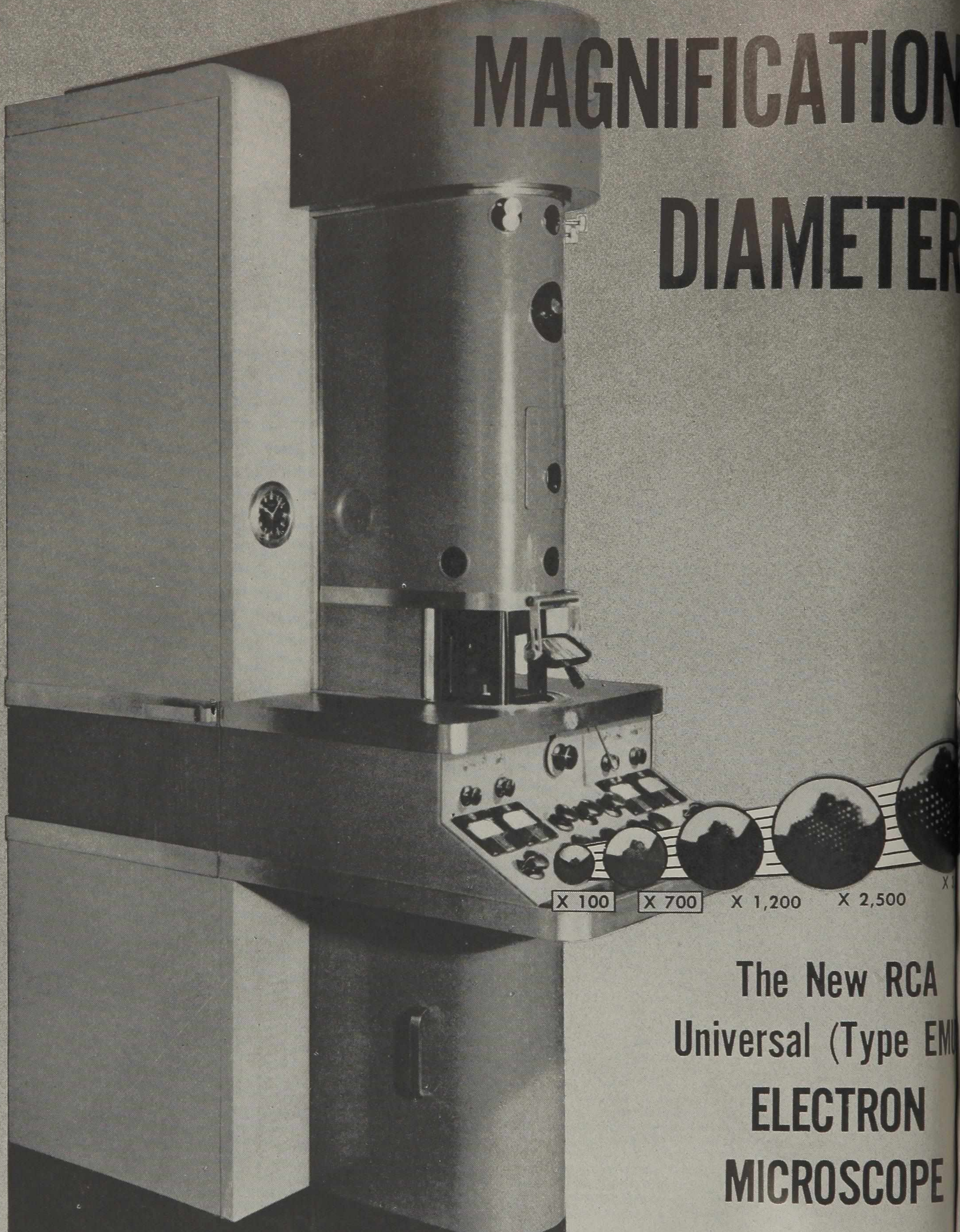

The New RCA Universal (Type EMU
ELECTRON MICROSCOPE

The new RCA Type EMU Universal Model Electron Microscope, also the new RCA Type E Console (Desk Model) Electron Microscope described and illustrated in this new RCA B Copy sent promptly on request. In writing this bulletin, please use your business lette

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, a twist of a knob

As you turn the knob you see the image enlarge. From the tiny speck, in the corner of the black masses formed by the intersection of the wires of the screen, as seen at 100 diameters in the small circle at the left . . . the image grows step by step while you watch . . . until it has expanded to more than 20,000 diameters, as seen in the largest circle to the right.

THE new RCA Universal (Type EMU) Electron Microscope is designed to provide (1) maximum operator comfort and convenience, (2) maximum simplicity and flexibility, (3) consistent top performance, and (4) maximum ease of servicing.

The operator of this microscope, by merely turning a single knob, can enlarge the clear, sharp image he is observing through 40 steps of magnification ranging from 100 diameters up to 20,000 diameters.

This is but one example of the ease with which this instrument can be used in practice. Making micrographs at any magnification is equally simple.

Detailed descriptions of the new RCA Universal (Type EMU), and the new RCA Console (Desk Model, Type EMC) Electron Microscopes are contained in the booklet shown at the left.

Copy of this important and interesting new booklet will be sent promptly on request.

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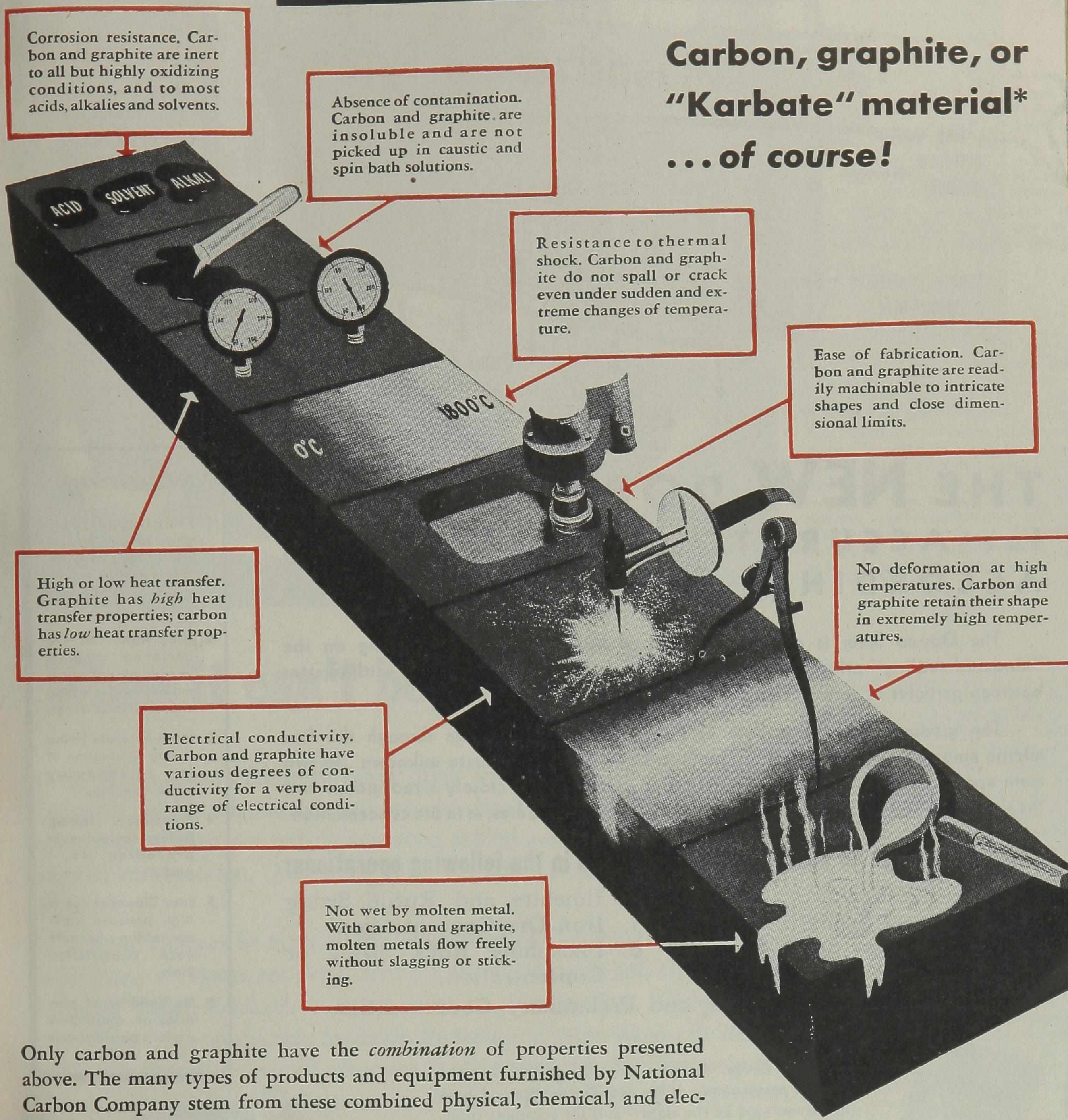
BAR OF *What?*

Carbon, graphite, or "Karbate" material* ...of course!



Only carbon and graphite have the *combination* of properties presented above. The many types of products and equipment furnished by National Carbon Company stem from these combined physical, chemical, and electrical properties.

We urge you to study them. They not only make possible the present applications but are constantly suggesting new ones.

Many of these applications can further improve your manufacturing operations by decreasing interruptions, speeding up output, and cutting production and maintenance costs.

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The word "Karbate" is a registered trade-mark of National Carbon Company, Inc.

*Carbon or graphite made impervious to seepage.

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Unit of Union Carbide and Carbon Corporation

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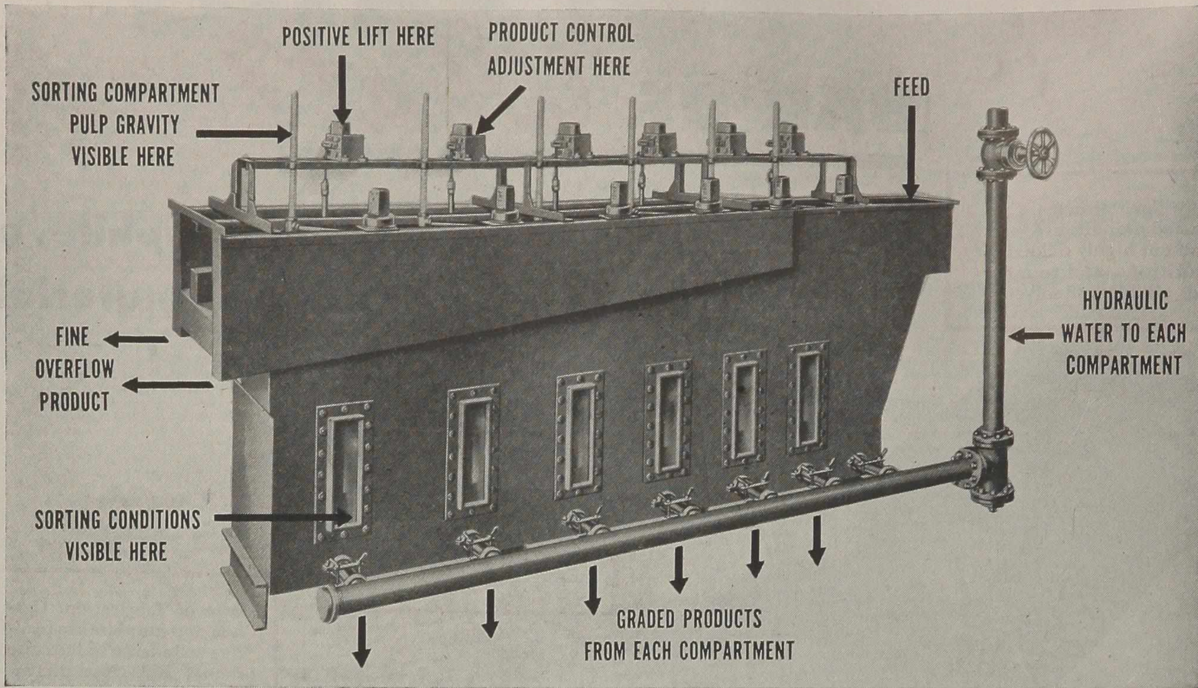

THE NEW DORRCO SIZER for ACCURATE CLASSIFICATION ACCORDING to SIZE and DENSITY

The Dorrco Sizer is a highly developed hydraulic classifier working on the "hindered settling" principle, which greatly magnifies the differences in settling rates between particles of varying size and specific gravity.

The grading of products both as to size and density down through the fine micron range can be controlled by the Sizer to an accuracy hitherto unknown. Its two main applications are the accurate grading of materials into closely sized groups and the separation of valuable minerals from unwanted gangue bodies, as in ore concentration.

The Dorrco Sizer is being used with success in the following operations:

1. Abrasive Sizing
2. Fine Coal Sizing
3. Specification Sand Sizing
4. Ilmenite and Rutile Sizing
5. Iron Ore Concentration
6. Phosphate Rock Sizing or Concentration.
7. Lead and Zinc Ore Sizing and Preliminary Concentration

Advantages

1. **Simple Control**—changes in hydrostatic tube clearly visible—control equipment close by and easy to set.
2. **Fully Automatic**—no operating attention needed except where major changes in feed characteristics occur.
3. **More Accurate Sizing** due to elimination of lag in changing valve opening.
4. **Preliminary Sorting** by feed compartment preceding No. 1 pocket.
5. **Easy Cleanout** due to high pressure water connection beneath each constriction plate.
6. **No build-up of particles** on constriction plate is possible, due to new design.

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Alone on the ocean's floor, the Navy diver works with care and precision. Hampered by his cumbersome equipment, beset with innumerable other difficulties, he must nevertheless perform skilled mechanical operations for essential construction. His work must be right . . . nothing can be left to chance.

Nor can chances be taken in the production of Columbia chemicals . . . for so many products are dependent for their standards and efficiency on chemicals which conform in every way to specifications. Columbia is meticulous in its production methods, its tests and inspections. In leaving nothing to chance in its own processes, it eliminates risks for its customers. This is why Columbia is the exclusive source of supply for so many.

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UNUSUAL STRENGTHS are amor the numerous advantages obtained i Columbia's new thermosetting plasti Allymer. Other points of superiority ar its resistance to heat, crazing and ma ring . . . form stability . . . resistanc to weather and to solvents, as proved i various critical war materials. Allymer now available in sample quantities fo experimental purposes. You may hav research reports and other free data b writing.

ONE FOR RIPLEY—A recent shi ment of 60,000 cases of bottled beer t the South Pacific traveled 9,000 mil with the breakage of only 27 bottle This remarkable packaging achievemer of the Glass Container Industry focuse attention on its splendid wartime recor Among the many products destined fo export in glass to our fighting me overseas, 1944 requirements call fo 678,800,000 beer bottles . . . 50,000,00 bottles for water purifier tablets . . 98,600,000 insect repellent bottles!

PIG IRON production gets a big boos when high sulphur content can be r duced. Soda Ash has the stuff, chem ically, to do it—but the problem is t bring it into sufficient surface contac with the molten iron. Columbia solve it with its Soda Briquettes—compresse pellets composed chiefly of Soda As Added to the ladle at the time the pig are cast, Soda Briquettes get the surfac contact necessary for effective desulphu izing—and reduce expensive dustin losses. A newly prepared folder will b furnished on request.

SODA ASH production records illu trate the tremendous Twentieth Centur growth of the nation's chemical industr A basic chemical for the Glass industr Soda Ash is also used extensively by th Textile and Paper industries and serv in a wide variety of cleansing operation In a single month, total U.S. productio of Soda Ash now approximates that fo the entire year of 1899 . . . and Columbia own annual production exceeds that to nage by a substantial margin.

COLUMBIA CHEMICALS inclu Soda Ash, Caustic Soda, Sodium Bica bonate, Liquid Chlorine, Silene EF (H drated Calcium Silicate), Calcium Chlorid Soda Briquettes, Modified Sodas, Caust Ash, Phosflake, Calcene T (Precipitated C cium Carbonate) and Calcium Hypochlorit


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LESS FOR THE HOME FRONT
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Into the manufacture of the vast quantities of ointments, salves, lotions, creams and similar products needed by the Medical Corps go great quantities of Lanolin U.S.P.
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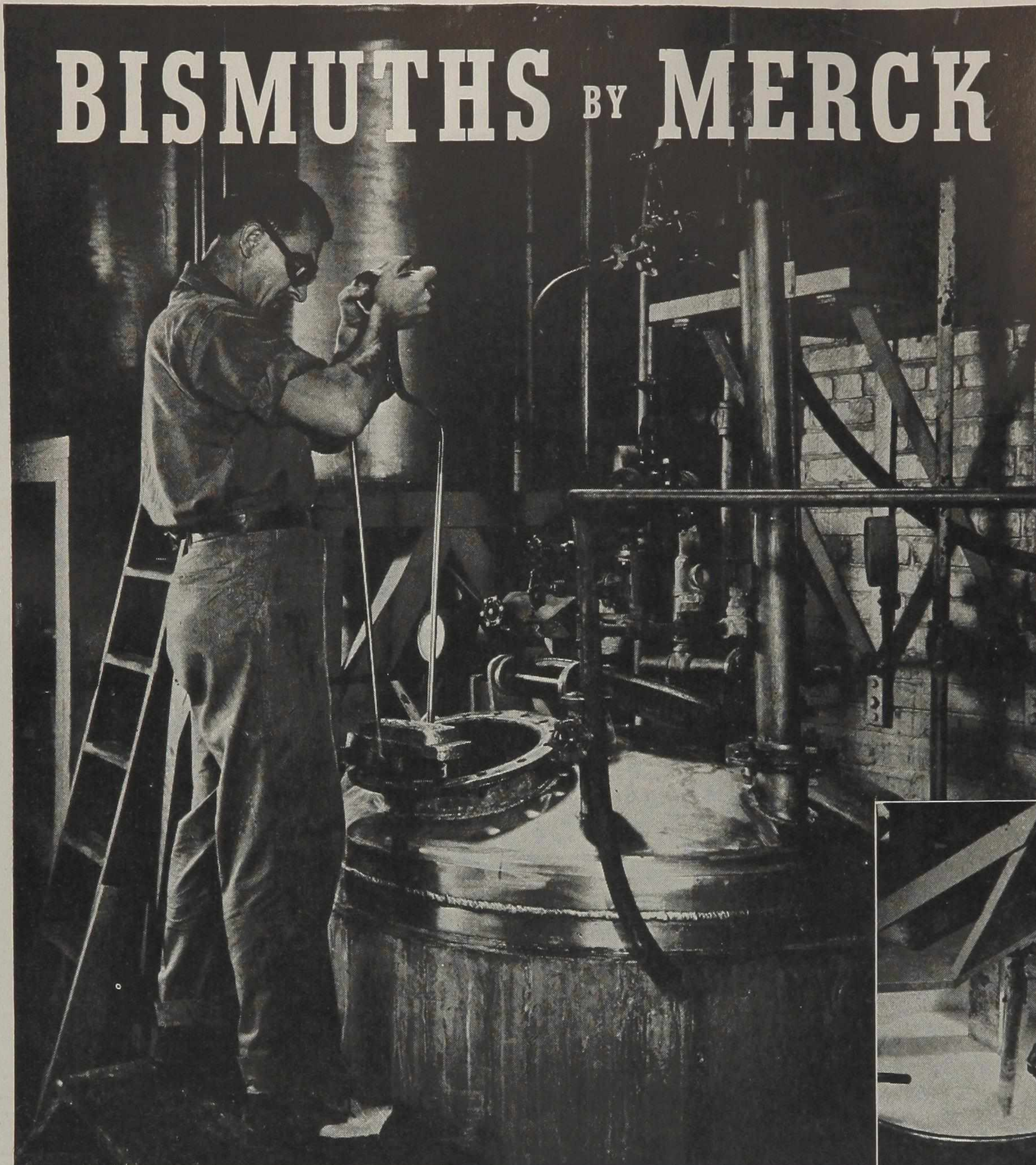

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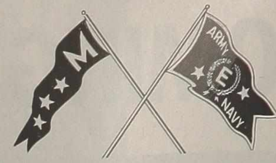


For every CORROSION problem in flow control, there'll always be a POWELL Valve to lick it!

Powell Corrosion-Resistant Valves have not just been "born"—they're a product of evolution—the result of nearly a century of patient study, research and experimentation by Powell's staff of Engineers and Metallurgists. Therefore you can be sure TODAY that TOMORROW you'll always be able to control efficiently the flow of any and all corrosive media. For Powell has evolved a complete line of valves of every type—Globes, Gates, Checks, Ys, etc.—in a wide variety of corrosion-resistant materials. These include such pure metals and special alloys as Aluminum, Aluminum Bronze, Everdur, Hard Lead, Herculoy, Inconel, Monel Metal, Nickel (Pure), Nickel Iron, Ni-resist, Silver (Pure,) Hastelloy Alloys "A", "B", "C" and "D", Durimet "T" and "20", Ilium, Misco "C", stainless Iron Alloys and many more. Others will be added as new requirements arise.

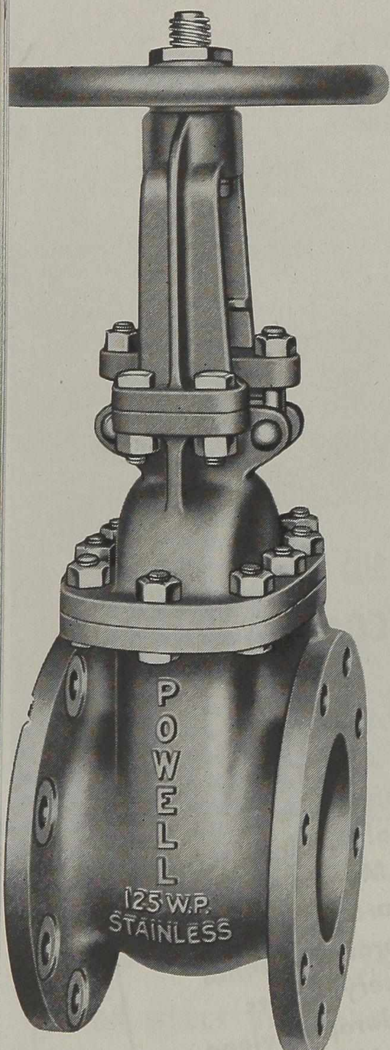
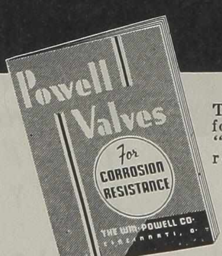


Fig. 2453—Large size Stainless Steel Gate Valve for 125 pounds W. P. Has flanged ends, outside screw rising stem threaded through bronze bushing in upper yoke arms, bolted flanged bonnet and taper wedge solid disc. Sizes, 2½" to 30", inclusive.



Write Dept. C, The Wm. Powell Co., for our new booklet—"Powell Valves for Corrosion Resistance."

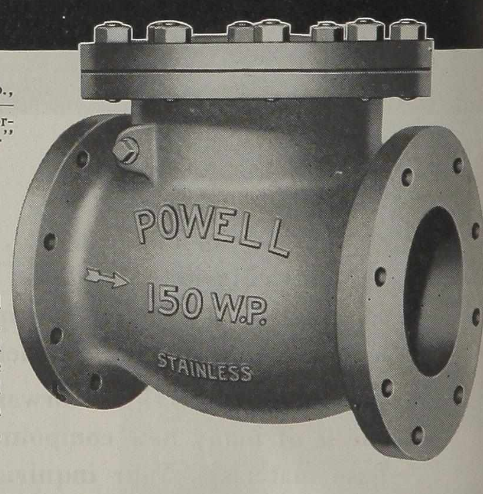


Fig. 2559—Large size Stainless Steel Swing Check Valve for 150 pounds W. P. Has flanged ends and bolted flanged cap. Disc is hung on a 5 degree angle and has sufficient lift to provide full straightway, unobstructed flow area through valve body. Sizes, 2" to 12", inclusive.

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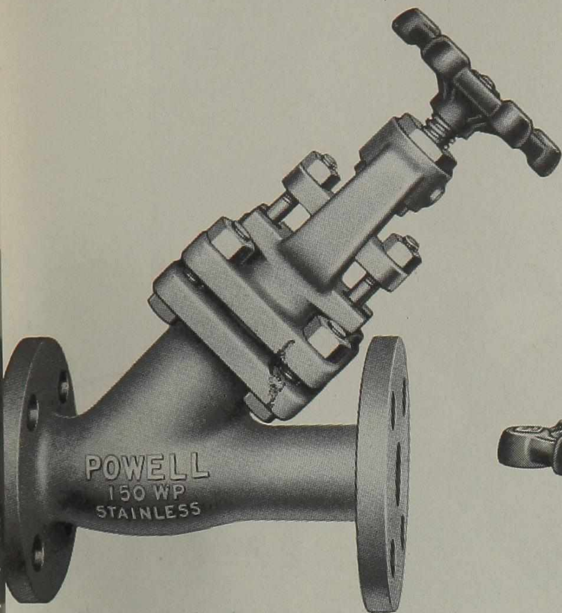


g. 2051—Stainless Steel "Y" Valve r 150 pounds W. P. Has flanged ends, tside screw rising stem threaded rough bronze yoke bushing, bolted ke bonnet and plug type disc. Sizes, " to 2", inclusive.

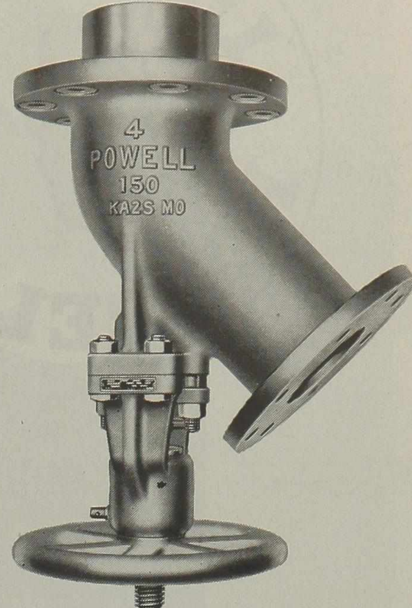


Fig. 2309—Stainless Steel Flush Bottom Tank Valve. For draining metal tanks and autoclaves. In this type, the disc rises into the tank when the valve is open. Sizes, ¾" to 8", inclusive.

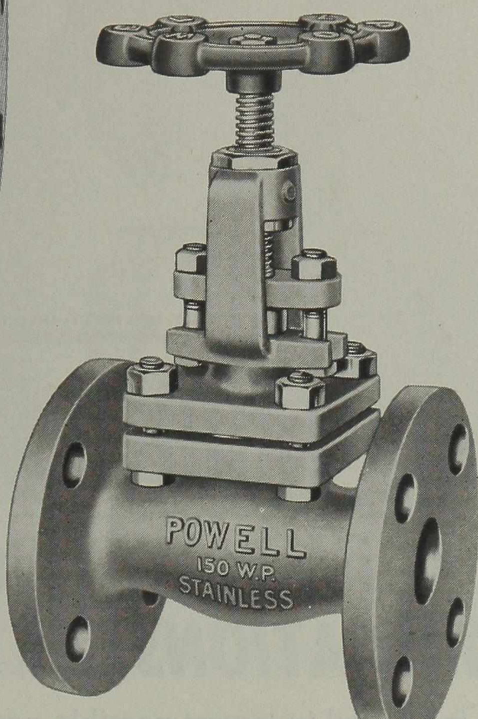
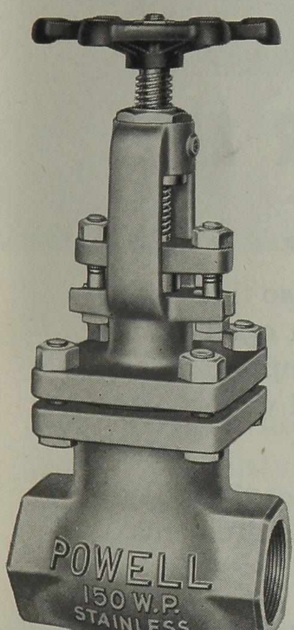


Fig. 1979—Stainless Steel Globe Valve for 150 pounds W. P. Has flanged ends, outside screw rising stem threaded through bronze yoke bushing, bolted flanged bonnet and plug type disc. Sizes, ¼" to 3", inclusive.



g. 1968—Stainless Steel Gate Valve 150 pounds W. P. Has screwed ends, tside screw rising stem threaded rough bronze yoke bushing, bolted ke bonnet and taper wedge solid c. Sizes, ¼" to 2", inclusive.

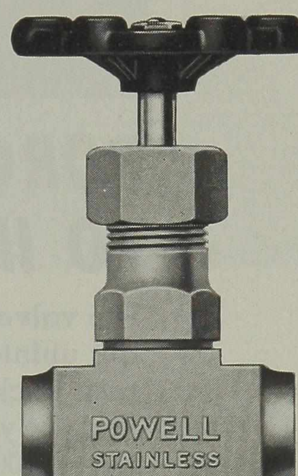


Fig. 1976—Stainless Steel Needle Globe Valve. For use on instrument lines, oil burners, equipment requiring close regulation, and for handling corrosive liquids and gases. Sizes, ⅛" to 1", incl.

The Wm. Powell Company

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ILLINOIS CHEMICAL PORCELAIN

Y-TYPE VALVES

PORCELAIN ADDS LONGER LIFE TO INSTALLATIONS . . . . .

The valve seat is located in lowest possible position so that you get uninterrupted flow of material when stem is in open position. Packing is acid-resisting asbestos—graphite impregnated. Ends of valve are ground parallel for gasketing. All valves are tested 100 lbs. hydraulic pressure.

ILLINOIS Porcelain Y-Type Valves are easy to operate. They can be used for most acid- and chemical-handling requirements.

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PORCELAIN SAVES CRITICAL MATERIALS

ALL VALVE SEATS ARE PORCELAIN TO PORCELAIN

NO ELECTROLYTIC ACTION IS POSSIBLE

ILLINOIS ELECTRIC PORCELAIN COMPANY

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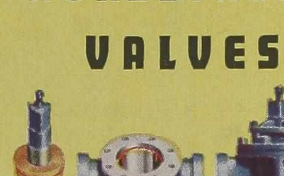
The laws of Physics never change

A FALLING apple brought forth Newton's Law of Gravity. Newton did not create a principle; he simply interpreted it. The principles of traveling pulleys, of fulcrums, levers and plug cocks are ABC's of physics. In valves, the most basic closure is a tapered plug. The Egyptians used it 5000 years ago. But because a plug would stick, Industry had to resort to gate closures, using a wedging principle. Then, when valves had to contend with high line pressures, extreme temperatures and corroding fluids, *trouble began.* So, Nordstrom applied Pascal's Law. He revolutionized the use of a plug valve by introducing pressure lubricant to seal the ports and make the plug easy to turn. He took the oldest of principles, applied modern engineering and thus solved the need for an all-purpose plug valve to give satisfactory service forever.

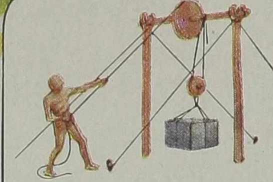
KEEP UPKEEP DOWN WITH NORDSTROMS

MECHANICAL PERFECTION REQUIRES PRESSURE LUBRICATION IN VALVES

NORDSTROM VALVES

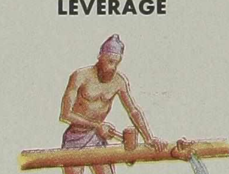


Basically, the Nordstrom consists of a plug and body. By turning a lubricant screw, multiplied pressure is transmitted through grooves in the plug and body to the bot-
... the plug. Leakage is prevented
...gardless of line pressure.



TRAVELING PULLEY

LEVERAGE



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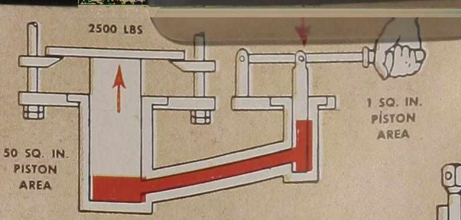

Nordstrom Lubricated Valves make use of the scientific principle known as Pascal's Law, as illustrated above. This law states that "a unit pressure applied to the liquid contained in a sealed vessel is transmitted to every part of the liquid with undiminished force," thus multiplying the force many times. Note how this law is applied to the plug.

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** This is the second in a series of bulletins focusing industry's attention on the possibilities of purified petroleum hydrocarbon oils. The next will appear in an early issue of this publication.*

Check List #2*

of properties which may suggest new applications of

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Sligh Oxidation Number: 0.0 to 0.9
Copper Stability Test: Not less than 20
Molecular Weight: 175 to 400
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Unsulphonatable Residue: Above 97.5%

Please direct inquiries on specific problems to Department of Industrial Research

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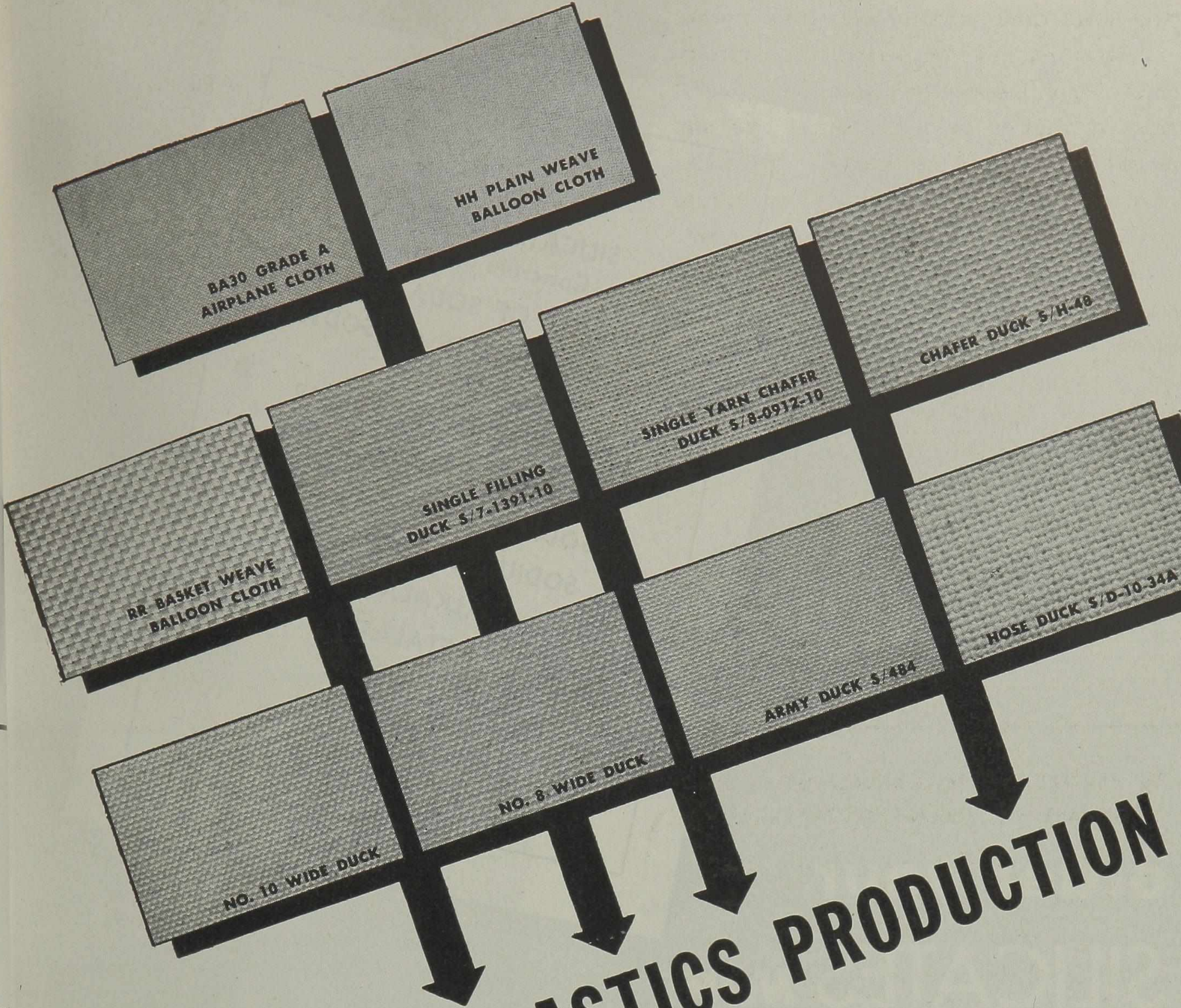

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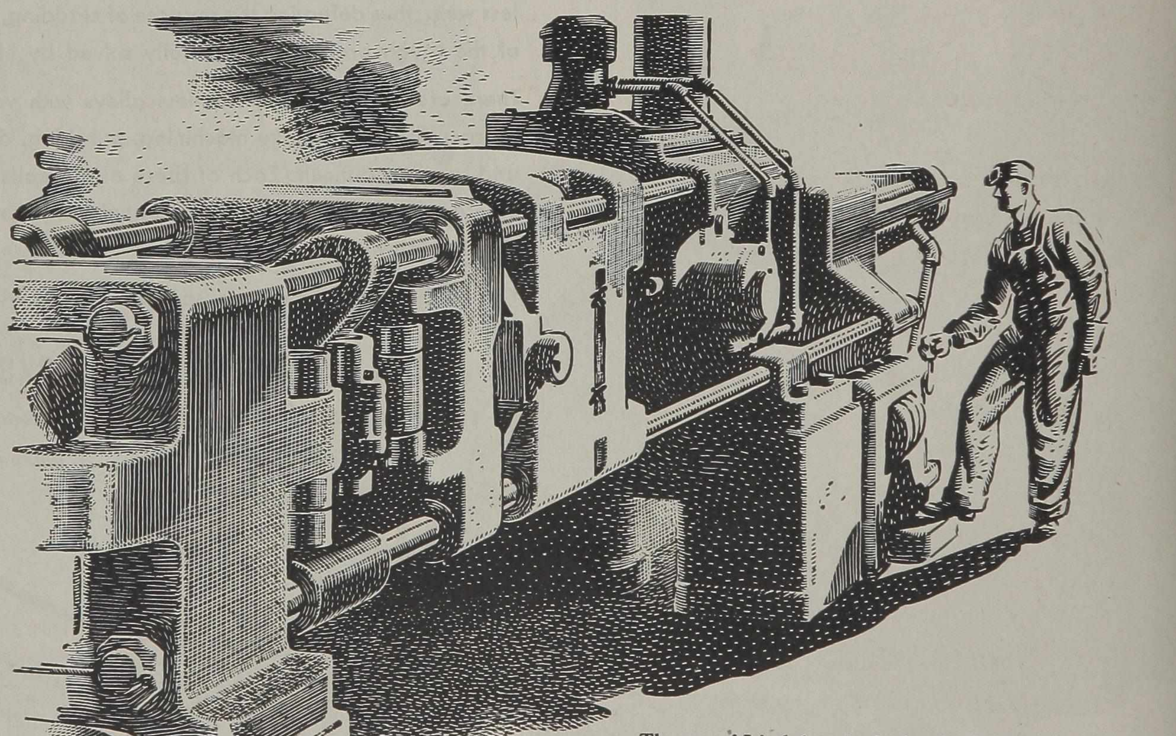

The use of Lindol as the hydraulic fluid in this die-casting operation—which involves high pressures and the presence of molten metal—is insurance against serious fires or explosions in case of leaks. This is one of many applications where Celanese organic phosphates render a vital service in reducing industrial hazards.

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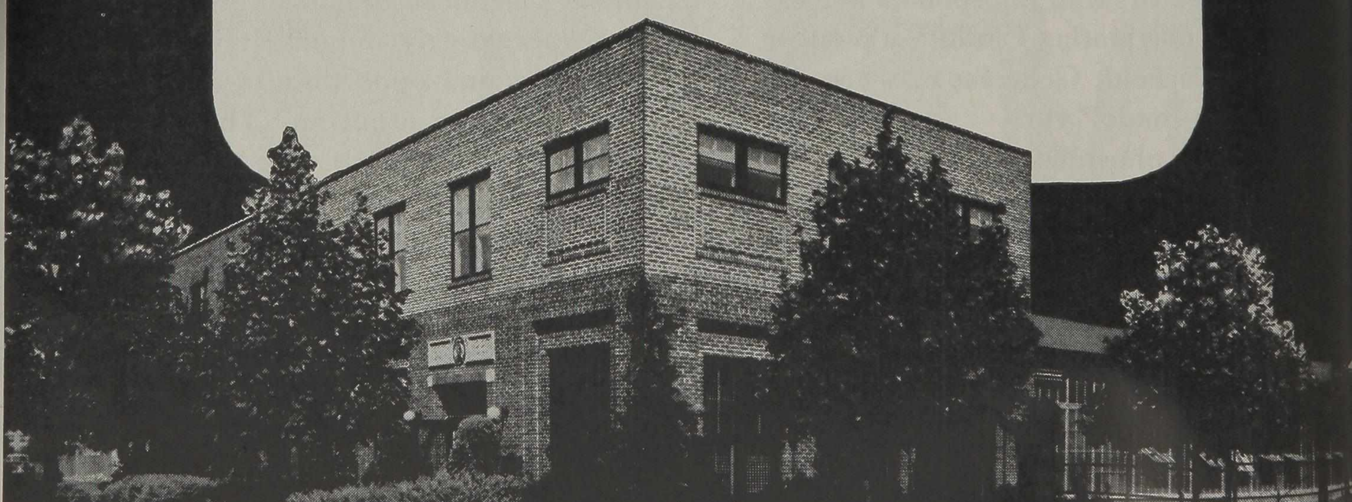

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Returning Veterans

by ROBERT L. TAYLOR, editor

A TRICKLE OF RETURNING VETERANS is already entering the mainstream of civilian wage earners, and the number will increase as the war progresses, with the greatest influx coming after final victory in Europe.

The chemical industry has a double responsibility to these men.

First, it shares the responsibility of all industry to place returning employees in their old jobs, to make them feel at home again and a useful part of the communities and organizations they left.

Secondly, as an industry-creating industry, it must shoulder a disproportionate part of the burden of providing the expanding national economy that is going to be necessary after the war to maintain a high level of employment among the working population as a whole, veterans and non-veterans alike.

THIS IS A GOOD-SIZED ORDER for an industry that inevitably faces some amount of shrinkage after a 100 per cent wartime increase. There will be difficulties, but they should not be insurmountable.

To make the first task easier, most of the returning soldiers and sailors will be better men than when they left. They will make valuable employees. They will have acquired many new skills. Their desire for training to equip them for better jobs will have been stimulated by their wartime experiences. Most of them will be ready to settle down to regular employment where they can make use of their abilities and be assured of a reasonable wage, reasonable security, and an equal chance with others for advancement.

One problem that is bound to come up, however, is that of the returning veteran whose job is now occupied by a capable and loyal employee who through no fault of his own spent the war years in a chemical plant instead of a battle area. As the law is now written, the veteran has priority. The incumbent employee must either be provided for elsewhere or be released. In some cases peacetime expansion plans may be big enough to take care of everybody. In others, especially where there will also be old employees returning from discontinued government projects for which they were loaned, lay-offs will be inevitable. The problem is one that will require the careful attention of management, for the means and method by which it is handled can easily make or break employee morale.

Most concerns will also have some men returning with physical handicaps. Doubtless their greatest desire will be to prove that they can resume their former places in society. Their placement need not be a difficult problem, but it is one that will require care and consideration.

Persons with handicaps are capable of performing many types of productive work. Through the use of preplacement physical examinations, combined with skill and aptitude tests where necessary, it is not difficult to match man specifications with job specifications in such a way that the handicapped person will not only be placed in work that he can do but work that he likes and that will give him satisfaction and enjoyment as well as a regular income. Experience even proves that such properly placed employees are better employees than their more fortunate fellows. They have fewer accidents, fewer absences, fewer resignations and fewer discharges for cause.

BUT ASIDE FROM THIS DIRECT OBLIGATION to provide jobs for its own former employees, chemical industry must also share the greater responsibility of helping to push forward the frontiers of scientific and industrial progress to provide new jobs and opportunities for people who cannot be absorbed in old industries.

As has been pointed out many times before, one of the prerequisites for continuous employment in a dynamic industrial economy is a constant evolution of new industries. As old industries satiate their markets and sales level off, they are no longer able to reabsorb employees whose jobs are eliminated by labor-saving technological developments. Such employees must depend for continuation of their livelihoods on some form of government handout or on employment in new industries that did not exist before.

New industries are born of new ideas plus risk capital. The chemical industry has always been a prolific source of the former, and its members, individually and collectively, can aid much in the establishment of political conditions more favorable to the latter.

Walter Savage Landis, 1881-1944

THE CHEMICAL INDUSTRY HAS LOST one of its most beloved and distinguished members. Dr. Landis' passing this month will be mourned by thousands from the ranks of the industry and the profession he served so faithfully for almost 40 years.

His contributions during his younger years in the field of ammonia oxidation, the rare gases, metallurgy, electric furnace technology, and the commercial production of cyanamide, cyanide and urea, will find a permanent place in chemical industrial history. In the many group activities in which he participated in later life he was always the wise leader and counselor—unselfish, possessed of rare vision, and with no tolerance for compromise with principle. Those who had the rich experience of knowing him personally will always remember his warm friendliness and his deep abiding desire to aid his fellow men.

The chemical industry has indeed lost one who contributed much to its stature and progress.

Postwar Exports

ENGLAND IS INSISTING THAT SHE CONTINUE to receive lend-lease after the end of the European war. Possibly therein lies a clue to the shape of postwar trade between the United States and not only England but other countries of Europe—for economically it appears that there will be little difference between victor and vanquished on that part of the globe.

England's position on postwar foreign trade is summarized by one observer in *The Economic Record:*

"If you talk to the informed Englishman about postwar problems, you will find him preoccupied with one thought—'Britain must export; we must export in order to eat.' He is anxious for American 'cooperation' in the postwar world. But when his various effusions are distilled off, the essence of his concept of 'cooperation' is the opening of the American market to British exports. That is how he wants us to 'cooperate.'

"England is in a pretty tough way. She has few natural resources: coal, iron, some worn-out tin mines. She must import a large part of her food, all of her oil, her rubber, and all of her nonferrous metals and industrial raw materials.

"She is no longer a great creditor nation. So far in the war her creditor position has fallen from fourteen billion pounds prewar to about four billion pounds at present. Even this remainder is shrinking.

"There is only one alternative to this rather gloomy picture for England and that is the continuation of the principle of lend-lease whereby we will continue to *give* England food and raw materials equal to the deficit in her trade balance."

Most of the countries of Europe will find themselves in about the same boat as England, if not a worse one. With the United States the most productive nation in the world, there probably will be little choice but to continue lend-lease. In fact there is reason to believe that this assistance may even be extended to additional nations, including the enemy.

Such a course may bring a sizable increase in export business to some branches of the chemical industry. It is extremely important, however, that industry not lose sight of the fleeting nature of this business—not only fleeting but obviously unhealthy from the standpoint of the American economy as a whole.

An expanding world trade on a sound cash basis is one thing, but playing Santa Claus to the world is something else. Perhaps the latter role is going to be a necessary and justifiable one for a while, though we hope not long, but in the meantime industry will do well to keep in mind all of the things behind the roseate picture that seems likely in postwar exports.

Safety: 1943

INDUSTRIAL SAFETY STATISTICS FOR 1943, just released by the National Safety Council, show a slight increase in frequency and a slight decrease in severity for the chemical industry. The figures for the last three years are as follows:

	'41	'42	'43
Frequency	9.48	9.90	10.07
Severity	1.30	1.29	1.12

This is a good record. It is exceptionally good when one considers such wartime conditions as inexperienced employees, high turnover, pressure to meet schedules, and shortages of some types of protective equipment.

Doubtless a considerable part of this record has been due to active recognition by plant management of these greater hazards and more favorable conditions for accidents, with the result that greater emphasis has been placed on safety education.

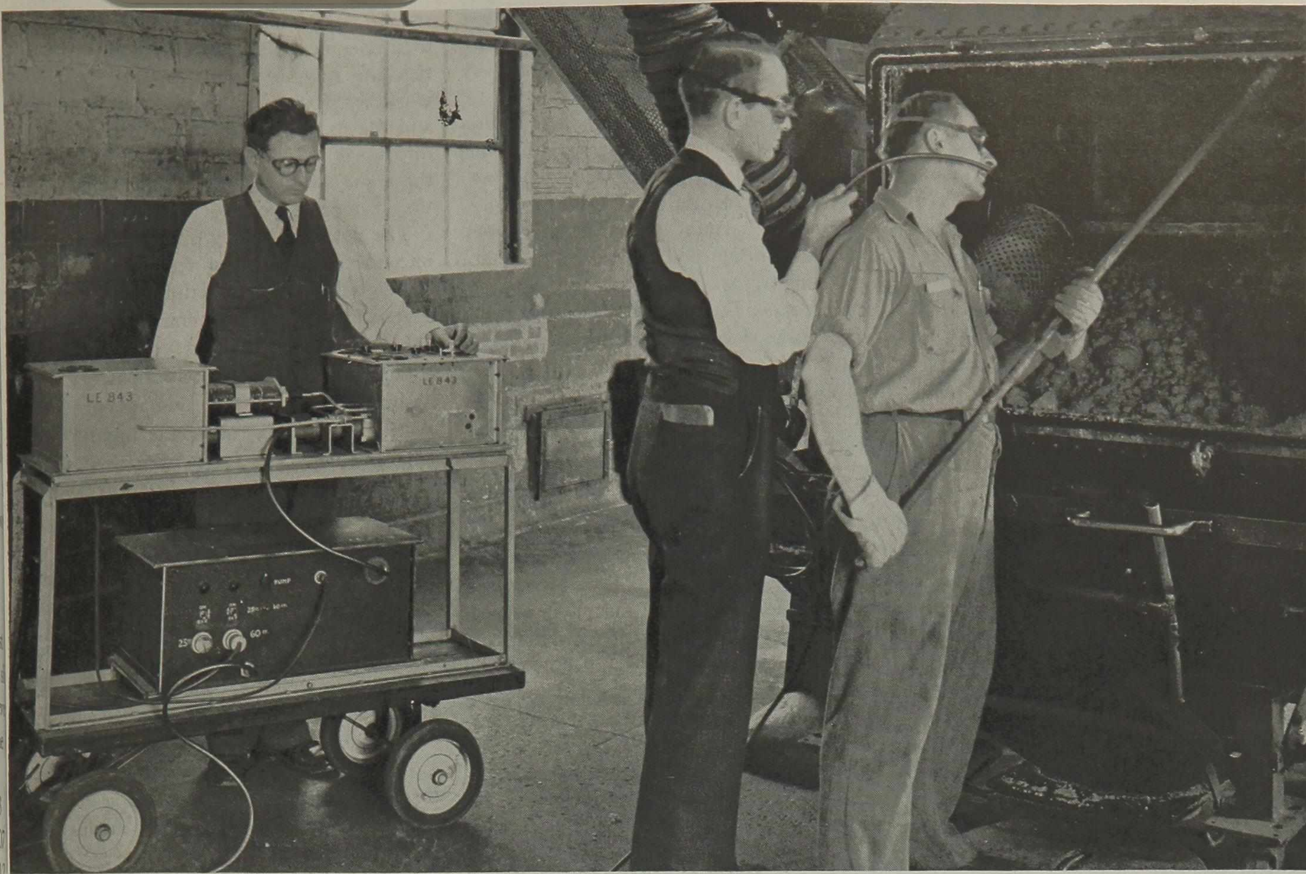
It would be unfortunate indeed if this advantage in the constant battle against accidents were allowed to slip away when the wartime pressures are released. It is a relatively easy job to maintain a high level of safety consciousness among a plant force once that level has been solidly established. But it is something else to have to raise the level once it has slipped badly.

The National War Fund

THE NATIONAL WAR FUND again directs its appeal to all Americans here at home to help make life a little brighter for our fighting men and for our civilian allies in the war zones.

The Fund finances such worthwhile efforts as the USO, the United Seamen's Service, War Prisoners Aid, assistance to Axis refugees, and medical and emergency rehabilitation aid for battle area civilians.

In these times of world strife there is need for the true spirit of giving by individuals. The National War Fund deserves your generous support.



Carbon bisulfide vapor concentration is being measured by an ultraviolet photometer.

PLANT OPERATION

Combating HEALTH HAZARDS In the Chemical Industry — Part I

by WILLIAM J. BURKE, Chemical Engineer

Division of Industrial Hygiene, New York State Department of Labor, New York, N. Y.

WAR CONDITIONS HAVE ACCENTUATED the hazards of working with chemicals. Recognizing the difficulties confronting management and employees alike, Chemical Industries has asked a chemical engineer with long experience in the field of industrial hygiene to prepare a study of the overall problem. Part I of this study, presented here, discusses the health hazards most commonly met in the manufacture and use of chemicals. Part II will appear next month and will cover modern methods of protection against these hazards.

WORKERS engaged in the manufacture or use of chemicals are not only subjected to the more usual causes of industrial accidents, but because of the inherent physical and chemical properties of many of these materials, they are also exposed to the danger of systemic disease as a result of absorption of these substances into the body. Since it would be impossible to discuss in a brief article the whole field of industrial hazards, we shall limit ourselves to a consideration of those associated with some of the more typical injurious substances, and of the protective measures employed to cope with these occupational exposures.

Injury to health may result from short- or long-time exposure depending upon the nature of the materials involved. Such injury may be acute, may develop slowly, or in some instances be cumulative in its effect. Acute poisoning is usually caused by exposure to high concentrations of toxic chemicals. When such injury results from a single exposure of short duration (anywhere from a few minutes to a few hours) it is classed as an accident under the Compensation Laws of New York State. In contradistinction to acute poisoning, we have sub-acute poisoning or chronic occupational diseases which result from prolonged exposure to relatively low concentrations of injurious substances.

Public attention to health hazards in the manufacturing field was directed particularly to the chemical industry in the United States during World War I mainly because of injuries to health resulting from undesirable working conditions in the many chemical plants which had mushroomed almost overnight. At that time very little thought was given by the manufacturer to the welfare of the workers he employed. There is no excuse for a repetition of this condition in the present emergency. We can profit by past experience and the great advances which have been made during the past twenty-five years in the evaluation and control of these hazards.

Under the present exigencies there may exist one or more of the following conditions causing additional problems requiring attention: (1) employment of new workers having no previous experience in handling chemicals; (2) processing or use of much larger quantities of injurious substances under conditions where formerly only small amounts were handled; (3) necessity of replacing relatively non-toxic materials by others of a more toxic nature due to lack of supply; (4) appointment of supervisors not having thorough knowledge of proper safety measures; (5) difficulties in obtaining proper protective equipment or repairs on present equipment; (6) speed-up in production; (7) longer hours of exposure; and (8) shortage of doctors for the plant medical office.

Although the above conditions confront the manufacturer with difficult problems in the protection of the health of his workers, he is increasingly becoming convinced that it is not only humane but good practice and good business to provide effective protective measures and safety equipment. During the past year the cost of compensation claims alone in New York State for injury resulting from exposure to harmful substances amounted to over a million dollars and involved injury to more than three thousand workers.

This expenditure is far from the complete cost, since it is generally agreed that direct compensation and medical expenses are only one-fifth of the total cost. Other indirect expenditures borne directly by the manufacturer include such items as: (1) cost of instructing new workers to replace injured ones, (2) time loss by plant officials in attending compensation hearings and in some cases court litigation, (3) legal expenses, (4) reduced production due to absenteeism and increased labor turnover, (5) spoilage of materials, and (6) loss of time of other workers attending injured ones. An item not included in figuring this indirect cost, but of special significance at this time, is the possible loss of a highly skilled worker who cannot be replaced satisfactorily under the present manpower shortage.

Modes of Poisoning

In order to decide on proper protective measures for exposure to injurious substances, one must have a knowledge of their chemical and toxicological properties, the way in which they are used by workers, portals of entry into the body, and the extent and duration of exposure or dosage. It is convenient to classify these substances by the manner in which they enter the body.

The portals of entry of toxic chemicals into the body are the respiratory tract, the digestive tract, sometimes the skin, or a combination of these channels.

Fortunately the bulk of chemicals encountered in industrial operations are not absorbed through the skin to produce systemic poisoning; otherwise this type of exposure would be far more serious than it is. A partial list of substances which may be absorbed into the body through the skin and cause systemic disease is acrylonitrile, aniline, carbon bisulfide, dinitrobenzene, ethylene chlorohydrin, dimethyl sulfate, hydrogen cyanide, nitrobenzene, toluidine, trinitrotoluene (TNT) and organo-metallic compounds of lead, arsenic and mercury. With the exception of aniline, nitrobenzene, and hydrogen cyanide, absorption of these chemicals through the skin usually plays a minor role as compared with other modes of entry into the body.

Danger from absorption through the skin may occur from spillage due to careless handling, an over-flowing tank, or a

Every section of the du Pont nylon plant at Seaford, Delaware, is air-conditioned. The huge vents shown in this view provide fresh, clean air at all times.

break in a pipe line or some unit-processing equipment. Other sources may be the continuous wearing of soiled work clothes or failure immediately to remove garments which have become accidentally soaked with chemicals capable of being absorbed through the skin. Garments contaminated with chemicals of a volatile nature may also expose the worker to the additional hazard of breathing their vapors.

Other than systemic poisoning due to direct body contact, there is also the possibility of surface skin injury such as burns, skin irritation and different kinds of skin diseases. Burns usually result from contact with concentrated corrosive acids or alkalies which in lower concentrations may produce only skin irritation. Special types of skin diseases may result from sensitization to almost any chemical under certain circumstances, especially in allergic individuals. These are very common in industry and account for over 50% of all compensation claims for occupational diseases in New York State.

Entrance into the digestive tract is by ingestion, that is to say, by swallowing. Although this is the principal way in which poisons enter the body in ordinary life, this is not the case in industry. There are circumstances, however, where workers may ingest some poisonous chemicals. This may result from eating food, or chewing tobacco or gum contaminated with these chemicals, by contact with dirty hands or clothing, or by exposure to the atmosphere of the workroom. The ultimate swallowing of small quantities of toxic dusts which had originally been inhaled and subsequently trapped in the mouth or back of the throat is another source. Accidental ingestion by swallowing may also result from the use of a drinking vessel which had previously been used for poisonous liquids and not properly cleansed.

The importance of industrial poisoning by ingestion has in general been overestimated in the past. The ingestion of radium or other radioactive substances is an outstanding exception: the number of girls who died during World War I as a result of painting these compounds on instrument dials by pointing the paint brushes with their mouths demonstrates the serious consequences resulting from ingestion of radioactive substances.

By far the most important source of poisoning by chemicals is inhalation through the respiratory tract. Injurious substances entering the lungs may cause local damage to this organ; or by absorption into the blood stream may cause systemic disease with injury to the blood or blood-forming organs, the nervous system, or other organs of the body, particularly the liver and kidneys.

The necessity of maintaining the air of a workroom in a safe condition may be realized when we consider that in the course of eight hours a worker breathes about twenty-nine pounds of air, or approximately six times the weight of food consumed in a day. With longer hours of working the quantity of air breathed would, of course, be greater, and the possibility of injury from impure air would be increased. Many other factors play a part in determining the rate and extent of absorption by the worker of toxic contaminants in the air which he breathes: the extent of his physical activity, for example, influences his respiratory rate which in turn directly affects the rate of absorption. In the case of carbon monoxide, the further fact that this gas has an affinity for hemoglobin approximately 300 times that of oxygen must be taken into account in evaluating exposure and absorption. These are only examples. It is clear, however, that air-borne contaminants are of vital importance as potential health hazards. For this reason they will be discussed in further detail.

Measuring air velocity at the face of an exhausted hood. Hoods should be checked often for leaks or other faults.

Types of Atmospheric Contaminants

Air contaminants produced by injurious chemical substances may exist in the workroom atmosphere in three physical states: solid, liquid or gas. The solid particles may be further subdivided into dusts and smokes.

Dusts are air-borne solid particles disseminated into the atmosphere by such mechanical operations as crushing, grinding, mixing, screening, dumping, loading, packaging, conveying and various other mechanical operations. In general these industrial dusts range from 0.5 to 10 microns in size and most frequently average about 3 microns. The size of the dust particles will vary considerably depending upon the nature of the material and operations which produce them.

Smokes are solid particles suspended in air, but usually of smaller size than dust. They range from 0.2 to 1 micron and are produced by operations giving rise to fine particles, such as the melting or burning of metals or reactions between gases as in the formation of ammonium chloride from ammonia and hydrogen chloride. Fumes may also be produced by the direct condensation of a gas to a solid, or by the sublimation of such substances as sulfur, iodine, anthraquinone or phthalic anhydride.

Liquid particles form a mist which is the result of the mechanical dispersion of a liquid into small droplets. This may occur in spray painting or atomizing or may be produced by entrainment with gas bubbles passing through a liquid as in electroplating or gas scrubbing processes.

Gaseous contaminants may include vapors as well as the true gases since the former also exist in the atmosphere in the gaseous state. Vapors differ from true gases in that they are condensable to liquids at ordinary temperatures. They escape from boiling liquids or result from the evaporation at normal temperature of volatile liquids (organic solvents, mercury, etc.) and some rather highly volatile solids such as iodine and naphthalene.

Some of the more important harmful substances that may be present in the working environment are grouped below according to their physical states.

Dusts and Fumes. Inorganic substances include such materials as the compounds of lead, antimony, mercury, thallium, selenium; oxides of arsenic, cadmium, calcium, manganese and zinc; the metallic fluorides; yellow phosphorus; the hydroxides and carbonates of sodium and potassium; and solid radioactive substances. Most of these materials when inhaled in sufficient quantities are capable of producing systemic poisoning. The hydroxides and carbonates of the alkali metals as well as calcium oxide, however, tend to produce only local irritating effects. Zinc fumes, while not regarded as poisonous, nevertheless produce anaphylactic reactions—the zinc shakes.

Organic dusts or fumes include such compounds as acetanilide, benzidine, dinitrophenol, dinitrotoluene, the chlorinated naphthalenes and diphenyls, hexachloroethane, the naphthylamines, picric acid, trinitrotoluene, and tetryl. The toxicological effects of these compounds upon the body are too diverse for discussion here, but by way of illustration it may be pointed out that the chlorinated naphthalenes and diphenyls are especially toxic to the liver while substances such as the naphthylamines and benzidine are capable of producing cancer of the bladder.

Proper clothing and equipment for a particular job is illustrated by this woman operator. Her clothing is flameproof.

Liquid Particles. Chrome plating and spray painting are two of the more important sources of liquid droplets in the atmosphere. In the former case a strong solution of chromic acid is thrown into the air in the form of a fine mist when gases are released at the electrodes because of the low current efficiency of the plating process. Another acid mist which is frequently encountered is that of sulfuric acid solution. This may arise from such dissimilar processes as the pickling of metals and the charging of lead storage batteries. Acid mists are decidedly irritating to the upper respiratory passages, especially the nose and throat, even causing ulceration and perforation of the nasal septum in some cases.

Spray painting with lacquers gives rise to a great variety of liquid particles since the average lacquer contains several volatile constituents. The volatile solvents used in formulating lacquers may be esters, such as the acetates of the lower alcohols and of ethylene glycol and its monoalkyl ethers, various ketones, ethers and Cellosolves. The diluents may include materials such as petroleum naphtha, benzene, toluene, xylene, or solvent naphtha as well as the lower alcohols.

Of the solvents and diluents used, petroleum naphtha and most of the esters and alcohols are considered relatively innocuous. In sufficient concentration they tend to produce a slight narcosis, or skin irritation, on direct contact. Others not so harmless are methyl alcohol, the glycol ethers and the aromatic hydrocarbons. Some of these substances tend to have a special affinity for the nervous system, while others exhibit characteristic toxicological effects such as optic atrophy by methyl alcohol and aplastic anemia by benzene.

In addition to these volatile substances the lacquer spray contains particles of a non-volatile nature such as gums, resins, cellulose esters, plasticizers and pigments. The principal health hazard associated with these results from the use of pigments containing lead compounds.

Vapors. The various solvents and diluents previously mentioned in connection with lacquer spraying may also be responsible for injury to health when present as vapors in application by dipping, brushing, or flowing processes. This group also constitutes a general class of

Sampling air for lead fume content with an electrostatic precipitator.

solvents which may be used in various operations, such as in the extraction and purification of drugs, the manufacture and application of printing inks, the coating of rubber and synthetic resins on fabrics, the removal of paints and varnishes, the manufacture of artificial leather, and the application of synthetic rubber cements. Other industrial solvents which are likely to be encountered in industrial operations are carbon bisulfide in the viscose rayon and rubber industries and the chlorinated hydrocarbons such as carbon tetrachloride, ethylene dichloride, perchloroethylene and trichloroethylene.

Tetrachloroethane, while not used to the extent of the other chlorinated hydrocarbon solvents, is of particular interest because of its exceedingly high toxicity compared with the others. It is used to some extent for organic synthesis, as a solvent for photographic film and also for many of the same general uses as the other chlorinated products.

In addition to these there are dyestuff intermediates, some of the more volatile of which are aniline, mono- and dichlorobenzene, nitrobenzene, mononitrotoluene and dimethylaniline. Two other volatile liquids that are of increasing importance at this time because of their use in the manufacture of synthetic rubbers Buna S and Buna N are styrene and acrylonitrile.

The vapors from most of the volatile liquids enumerated will cause systemic disease when inhaled in sufficient quantities.

Gases. The majority of gases may be classified according to their physiological action into three general divisions: (1) irritants, (2) asphyxiants, and (3) substances with a drug-like effect. Some of the outstanding physiological effects of these various groups are described by Henderson and Haggard (see bibliography).

(*1*) *Irritants.* Gases of this class have the property in common that they induce inflammation in tissues with which they come in direct contact, particularly the conjunctiva of the eyes and mucous membranes of the respiratory tract. Inflammation of the respiratory organs may not only be restricted to the upper respiratory tract and bronchi, but the lung tissue itself may be damaged.

The extent of injury to the respiratory organs by gases of this class is governed to a large degree by their solubility in water. Those gases of readily soluble nature such as ammonia, hydrogen chloride, hydrogen fluoride and formaldehyde act mainly on the upper respiratory tract where they are trapped by the moisture present. They seldom get down into the lungs except in cases of severe exposure. Those of less soluble nature—sulfur dioxide and chlorine, for example—may act both on the upper organs of respiration and on the lungs; while such slightly soluble gases as nitrogen dioxide, ozone, and phosgene may penetrate into the lungs. As a general rule the less soluble gases are more insidious in their action since it is possible to work in the presence of toxic concentrations without being aware of the danger.

(*2*) *Asphyxiants.* These gases may be further divided into simple and chemical asphyxiants. The former are physiologically inert, but when breathed in high concentrations, they exclude oxygen from the lungs. Gases of this nature are carbon dioxide, hydrogen, and helium. Chemical asphyxiants are those which because of their reaction with the hemoglobin of the blood prevent the transportation of oxygen, or by their action on some tissue constituent prevent its utilization. Carbon monoxide and hydrogen cyanide are both chemical asphyxiants. The former, as previously shown, produces tissue asphyxia by displacing oxygen from the blood; the latter, by its poisonous action on oxygen receptors in tissue cells.

(*3*) *Drug-like substances.* These gases may act as anesthetics when absorbed into the blood stream from the lungs, or this anesthetic action may be secondary in importance to other toxicological effects of a more serious nature depending upon the specific action on the tissues. Gases which may be listed in this group are the saturated hydrocarbons methane, ethane, propane and butane, and the unsaturated ones ethylene, propylene and butylene. Others are such halogen compounds as methyl, vinyl and ethyl chlorides and methyl bromide.

Evaluation of Environmental Contaminants

The most effective procedure for the evaluation of exposure to air-borne contaminants is a correlated chemical and medical investigation.

In the chemical investigation it is necessary to study the process to deter-

Table I. Maximum Allowable Concentrations (M.A.C.) in Air of Various Common Chemicals

Vapors	*p.p.m.*
Acetic acid	10
Acetone	1000
Acrylonitrile	20
Amyl acetate	400
Amyl alcohol	200
Aniline	5
Benzene	50
Butyl acetate	400
Butyl alcohol	200
Bromine	1
Carbon bisulfide	20
Carbon tetrachloride	75
Chloroform	100
Dichlorobenzene	75
Dichloromethane	500
Dichloroethyl ether	15
Dimethylaniline	5
Ether	400
Ethyl alcohol	1000
Ethylene dichloride	100
Iodine	1
Isopropyl alcohol	500
Isopropyl acetate	500
Mercury	0.01
Methyl alcohol	200
Monochlorobenzene	75
Mononitrotoluene	5
Methyl bromide	35
Nitrobenzene	5
Gasoline	1000
Stoddard solvent	750
Styrene	400
Tetrachloroethane	10
Tetrachloroethylene	200
Toluene	200
Trichloroethylene	200
Turpentine	200
Xylene	200
Gases	*p.p.m.*
Ammonia	100
Arsine	1
Carbon monoxide	100
Carbon dioxide	5000
Chlorine	1
Formaldehyde	5
Hydrogen chloride	10
Hydrogen cyanide	20
Hydrogen fluoride	3
Hydrogen sulfide	20
Nitrogen dioxide	40
Ozone	1
Phosgene	1
Phosphine	1
Sulfur dioxide	10
Fumes and Dusts	*Mg. per cu.m.*
Barium peroxide	0.5
Arsenic or arsenic trioxide (as arsenic)	0.15
Cadmium or cadmium oxide (as cadmium)	0.1
Chlorodiphenyl	1.0
Dinitrotoluene	1.5
Ferrous welding fumes	30.0
Lead or lead compounds (as lead)	0.15
Manganese or manganese compounds (as manganese)	6.0
Mercury or mercury compounds (as mercury)	0.1
Pentachloronaphthalene	0.5
Trinitrotoluene	1.5
Trichloronaphthalene	5.0
Zinc oxide	15.0
Mists	*Mg. per cu.m.*
Chromic acid	0.1
Sulfuric acid	5.0

mine whether the exposure is continuous or intermittent, and if the latter, how long an exposure is involved. Secondly, it is necessary to determine whether the exposure is moderately uniform or consists of peaks and valleys.

With proper chemical data as to the degree and type of exposure, the industrial physician is provided with essential information for judging environmental conditions. This provides him with a basis for a decision as to the type of physical examination he wishes to make in the given case.

In recent years rather comprehensive tables have been published listing figures of maximum allowable concentrations of atmospheric contaminants of many of the common injurious materials. The limits specified indicate for each substance the maximum concentrations to which the normal individual can be exposed over long periods of time without injury to health. These tables provide manufacturers and others interested in protecting the health of workers with a handy yardstick for routine industrial control of these health hazards.

The chief criticism of such tables is the general trend to accept the figures too literally and thereby give them more value than was intended by their authors. The values are based on the best experience and evidence available at the moment; but in many cases adequate supporting data are still lacking.

In issuing these tables it was not the intent, therefore, to imply that compliance with the figures listed would guarantee protection against ill health on the part of the workers exposed, nor would the maintenance of the recommended standards provide a substitute for medical control. In plants that do not have proper medical control (of which there are a great many) these tables provide guidance as to the need for control measures.

The following table of Maximum Allowable Concentrations (M.A.C.) is presented with these limitations in mind. The figures specified are those which were preferred in the tables consulted, with some revisions and additions that have been made on the basis of our experience and that of others.

The above table can be used to calculate the amount of air required in general ventilation to reduce the contamination below the specified limits. For example:

Where uniform distribution of an evaporating solvent is achieved, knowledge of the maximum allowable concentration in parts per million of that solvent makes it possible to evaluate the number of cubic feet of air required to maintain this concentration in the time required to evaporate a gallon of the solvent, as follows:

$$\frac{\text{391 cu. ft.}}{\text{lb. molecular wt. of solvent}} \times \frac{\text{lbs. per gal.}}{\text{of solvent}} \times \frac{1000{,}000}{\text{M.A.C.}}$$

The volume occupied by the vapors of a pound molecular weight of solvent at 25°C. and normal pressure is 391 cu. ft.

The necessity of reducing the concentration of the air contaminants to the threshold limits is generally recognized by manufacturers. The more progressive manufacturers, however, recognize the fact that it is good practice to go even further and remove, as far as practical, even the so-called "nuisance" factors in the atmosphere—substances causing discomfort, bad odor, slight eye or throat irritation or the like.

Editor's note: The second and concluding part of this article and the bibliography will appear next month.

UNSAFE PRACTICES

Prevention of injury to health in the handling and processing of chemicals requires a cooperative effort on the part of both workers and management. It is the employer's responsibility to provide all necessary safety measures. These include not only proper equipment but proper maintenance of this equipment and intelligent supervision. Workers, on the other hand, must cooperate in the proper use of the safeguards provided; in avoiding carelessness; in not taking chances; and in paying meticulous attention to carrying out all rules and regulations established for their safety.

The following unsafe practices on the part of employees are among the most frequent causes of industrial accidents and health injuries:

1. Failure to use personal protective equipment which is provided, such as respirators, goggles, leggings, creams, gloves, aprons, safety shoes and the like.
2. Disregard of instructions to remove soiled work garments.
3. Practice of eating and drinking in the workroom, contrary to the posted notice specifically prohibiting it.
4. Failure to wash hands contaminated with poisonous chemicals; wiping them on handkerchief or clothing instead.
5. Practice of washing hands with lacquer thinners in defiance of rules prohibiting such practice.
6. Disregard of rules requiring regular baths, or the frequent washing of hands, face and hair.
7. Failure to change from regular clothing into suitable work clothing, even when this is provided for the purpose.
8. Failure promptly to wipe up and remove from the floor substances of a deleterious nature which have been accidentally dropped or spilled.
9. Failure to follow instructions in the matter of entering a reaction or storage vessel without first ascertaining that fumes or vapors of a dangerous nature have been removed; or failure to provide himself with a life-line.
10. Failure to observe regulations prohibiting the storing or pouring of strong acids in close proximity to cyanide plating tanks.
11. Failure to remain at station while engaged in watching a reaction vessel whose contents may boil over if not properly controlled.
12. Practice of blowing a stream of compressed air into a carboy of acid in order to force off the acid; or failure to use the inclinators or siphons provided.
13. Failure to use fans provided in exhaust systems for the removal of toxic air-borne contaminants.
14. Insistence upon wearing an inferior respirator rather than one of approved type because the former is more comfortable.
15. Practice of spraying in an open room even where spray booths are provided; or assuming a wrong position in the booth, such as between the object sprayed and the exhaust of the booth.
16. Failure to report defective equipment to superior; or knowingly using such equipment against advice.
17. Failure to blank off pipe lines containing deleterious liquids when conducting repairs on the line; or failure to use metal protective shields provided for use in opening an acid line flange.

The unsafe practices listed above are by no means complete. However, they are a fair index of the problem, and indicate the general nature and great variety of the faulty practices which so often lead to trouble. Conversely, they indicate the safe practice measures which if followed would protect the workman from injurious exposure to the chemicals with which he comes into contact in the course of his work.

Many of these safe practice procedures are simple and well understood. Others are less familiar, and it is necessary, therefore, to instruct workers carefully and impress upon them their importance, in order to obtain from them the cooperation which is essential to their safety.

CHEMICAL EXPORTS Show Wartime Increase

by T. N. SANDIFER, Chemical Industries' Washington Correspondent

LEND-LEASE EXPORTS OF CHEMICALS and related products over the past three years have averaged $176,600,000 a year, according to figures released here for the first time by the Foreign Economic Administration. This well overshadows the nine-year prewar average of $150,000,000 for cash exports in the same classification. With extension of lend-lease and easing of commodities and shipping, the outlook for a continued upward trend seems good.

DEMAND from the allied nations for American chemicals has been tremendous, as might be expected from the fact that the United States has been for many years the world's largest producer of chemicals and allied products. The full scope of this contribution probably will not be known until some time after the war, but it has been conservatively estimated that total production of chemicals for domestic and lend-lease use together has doubled since 1939.

Since there are more than 40 nations and countries listed as eligible to receive lend-lease, ranging from Australia to Yugoslavia in alphabetical order, and since chemicals enter into almost every industrial process involved in the war, probably the most surprising aspect of the subject is that chemical production in this country has only had to double. The next is that the latest lend-lease report to Congress mentions chemicals in only one place. Nowhere on any of the numerous charts and graphs in the report are chemical exports listed as such. So far as known, no formal report on this aid has been issued.

In response to a request by CHEMICAL INDUSTRIES, however, the Foreign Economic Administration has prepared the accompanying table indicating the scope of chemical lend-lease activities for the period March 1941 to April 1944. While no statement was issued in connection with this tabulation, the President, in his lend-lease report, made an observation which is undoubtedly pertinent: "In spite of this tremendous volume of lend-lease exports and the inevitable effects of war requirements and shipping shortages on normal commercial trade, the dollar value of cash exports from the United States has been maintained at prewar levels and has been increasing for the past 12 months."

This obviously refers to lend-lease and export trade as a whole. As an idex to the situation in chemicals, however, figures were obtained from the Bureau of Foreign and Domestic Commerce which show that the average annual value of United States exports of chemicals and related products during the period 1920-29 was $174,977,000, and for the immediate pre-World War II period, 1930-1939, was $144,766,000.

Moreover, the Bureau predicts "Postwar foreign markets for chemicals and allied products should be large, show an expansion from the peak peacetime level, and easily reach the figure of $276,900,000 projected for the year 1948 inasmuch as practically the entire industrial, economic and socal life of the world must use chemicals in some form and use more and more each year."

New chemical consuming industries offer potentialities for large trade in consonance with an increased general demand for end products, the Bureau further points out. Postwar competition from other chemical manufacturing countries is expected to be keen, but the feeling is that the United States can meet all fair competition, following the successful conclusion of this conflict, as it did after the first World War.

Future of Lend-Lease

Meanwhile, returning to United States exports under lend-lease, the officially indicated intention in Washington is that this activity, covering various commodities, shall be continued for at least a year, and perhaps longer, during the immediate post-hostilities era. With this in mind, some further mention of normal chemical exports to various parts of the world, including some of the countries covered in the attached lend-lease figures, may offer some basis of comparison of the trend of cash exports in chemicals, and those under lend-lease.

Space does not permit a detailed re-

(*Turn to page 460*)

United States Exports of Principal Chemicals and Allied Products to Selected Countries, 1942

(*Figures are in millions of dollars*)

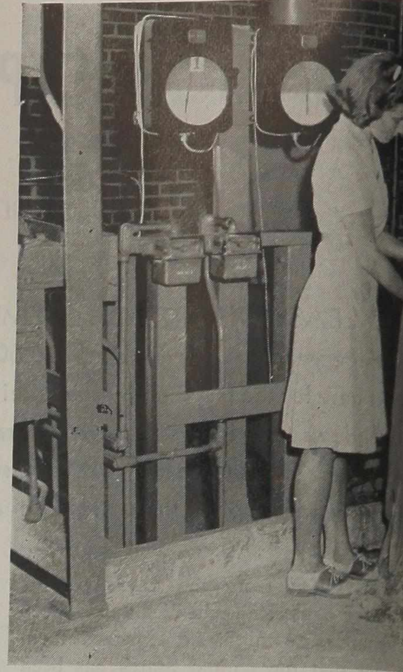
	Argentina	Brazil	Chile	Colombia	Cuba	Mex.	Peru	Venezuela	Central Am.
Coal tar products	1.5	0.6	0.7	0.7	0.4	1.9	0.4	0.9	0.1
Medicinals	2.5	2.4	1.0	2.1	4.2	4.3	1.0	1.5	2.6
Chemical specialties	1.3	0.9	0.4	0.7	1.5	2.6	1.1	0.6	2.9
Industrial chemicals	3.6	3.1	1.8	1.1	1.8	7.1	0.8	0.6	0.6
Fertilizers	— Under $50,000 —			0.1	0.7	0.3	— Under $50,000 —		
Paints	1.6	1.3	0.5	0.4	0.8	1.8	0.3	0.6	0.5
Naval Stores	0.8	0.6	0.3	0.1	0.4	0.2	0.1	..	0.1
Sulphur	0.3	0.4	— Under $50,000 —			0.2	— Under $50,000 —		
Soap and toiletries	0.3	0.5	0.1	0.4	0.5	0.6	0.2	0.4	1.4
Total	11.9	11.8	4.8	5.6	10.3	19.3	3.9	4.6	8.2
All chemical products	13.3	12.9	5.4	6.1	11.3	24.5	4.8	5.4	8.9

Lend-Lease Exports of Chemicals and Related Products To All Countries, March 1941 through April 1944

	United Kingdom	U.S.S.R.	Australia & New Zealand	Africa, Middle East & Mediterranean Area	India & China	Latin America	Other Countries	Total
Coal Tar Products	$4,315,546	$21,116,613	$576,352	$365,740	$327,724	$427,976	$2,282,328	$29,412,279
Medicinal & Pharmaceutical Preparations	12,740,135	15,339,283	2,545,548	7,791,887	6,829,137	152,087	972,397	46,370,474
Chemical Specialties	24,741,492	6,489,931	2,788,875	14,617,357	1,759,601	156,327	4,882,321	55,435,904
Industrial Chemicals	68,021,169	63,522.458	3,688,017	5,247,930	2,226,795	291,889	7,672,835	150,671,093
Pigments, Paints & Varnishes	7,437,820	378,054	924,598	1,975,390	1,551,846	94,458	136,762	12,498,928
Fertilizers & Fertilizer Materials	15,910,055	125,943	439,690	1,303,645	118,161	822	179,059	18,077,375
Explosives, Fuses, etc	89,038,834	104,372,419	1,880,988	13,156,248	3,389,984	175,447	3,350,527	215,364,447
Soap	5,430	1,124,673	1,207	593,540	419	290	137,811	1,863,370
Toilet Preparations	......	......	......	6,265	......	......	27,361	33,626
Total	222,210,481	212,469,374	12,845,275	45,058,002	16,203,667	1,299,296	19,641,401	529,727,496

NEW PROCESSES

A New Chemical Method for RECLAIMING NYLON



Waste nylon material, including cast-off hosiery, is here about to go into

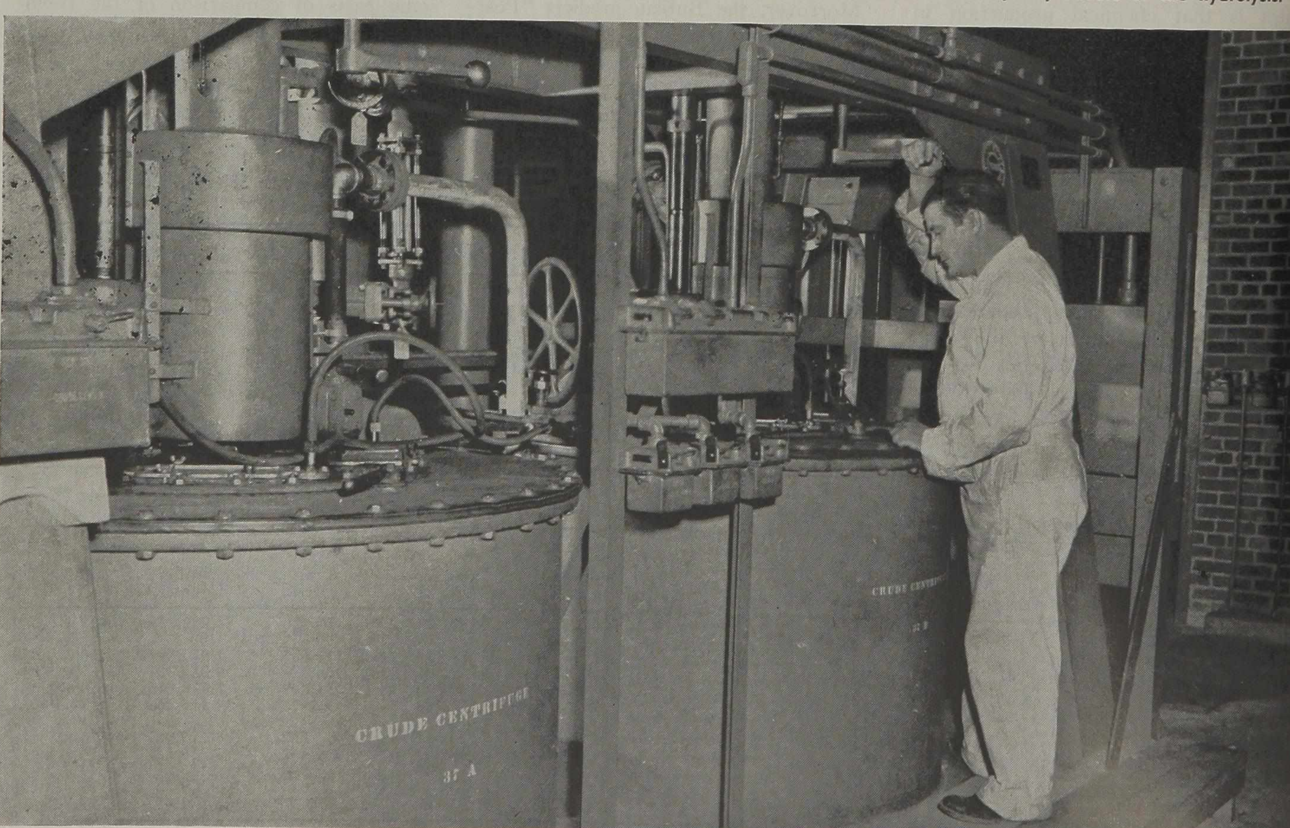
Photos courtesy Du Pont

IN A NEW UNIT OF THE DU PONT NYLON PLANT at Seaford, Delaware, nylon scraps, cuttings and old stockings are being reconverted by acid hydrolysis back into adipic acid and hexamethylenediamine, the intermediates from which they were made. New nylon made from these regenerated materials is identical in all respects with that made from fresh chemicals.

NYLON'S usefulness in the military program was proved early in the war, and the need for this unusual and versatile material soon became so great that every possible step was taken to increase production and conserve the output for essential government uses.

This has involved not only the rearrangement and addition of equipment in the Du Pont Company's two nylon plants but also the reuse of nylon waste gathered from a variety of sources. Clean, undyed waste can be reclaimed by a "waste lock" process, which has been in operation since the beginning of the war. But the newest development in the waste conservation program is an acid hydrolysis plant, constructed at Seaford, Del., to recover nylon chemicals out of waste material that has been dyed or which is contaminated with dirt or other materials. This process is, in effect, a "chemical unraveling" of nylon back to the original adipic acid and hexamethyl-

In these 40-in. centrifugals crude adipic acid crystals are separated from diamine sulfate and other liquid products of the hydrolysis.



the hopper of the new nylon reclamation unit constructed at the Du Pont nylon plant at Seaford, Del.

An operator dumps a bag of nylon waste into the hopper of a hydrolyzer. Sulfuric acid is also added.

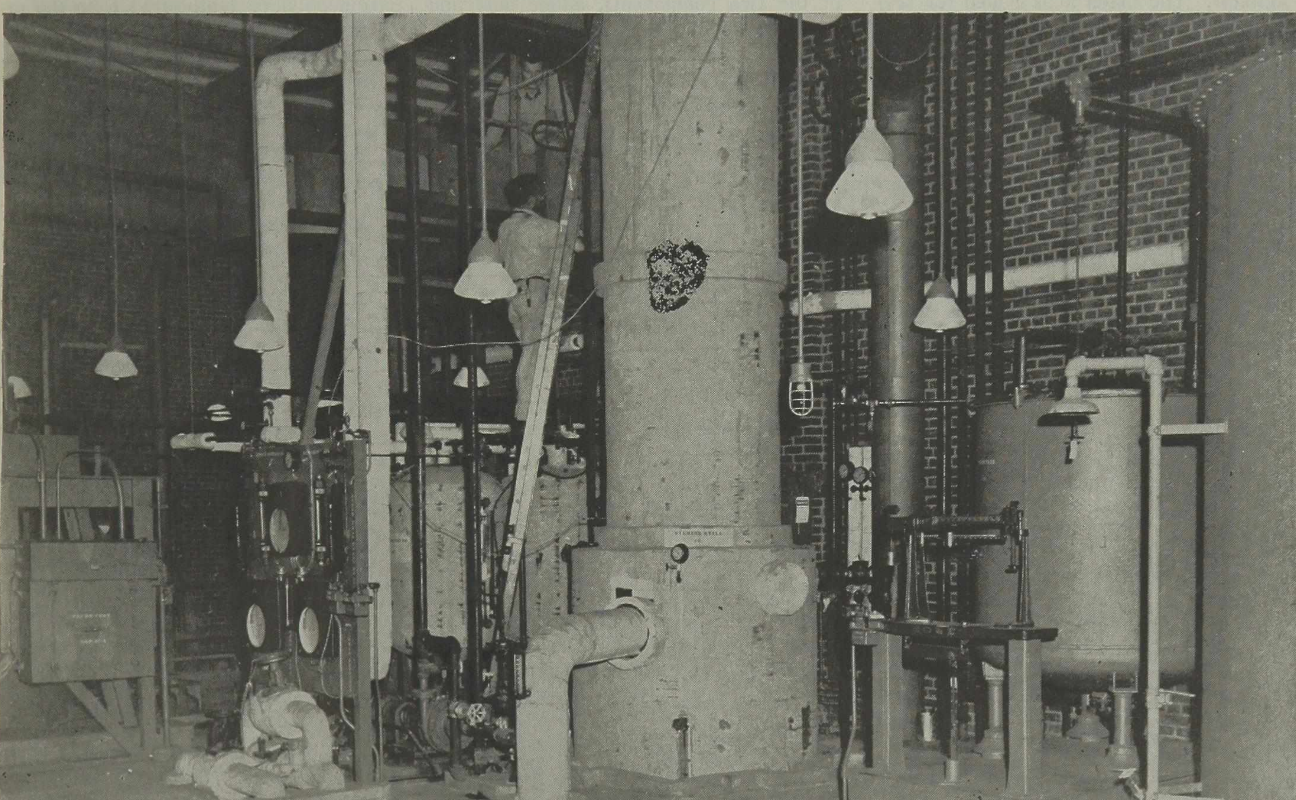
enediamine from which it was manufactured.

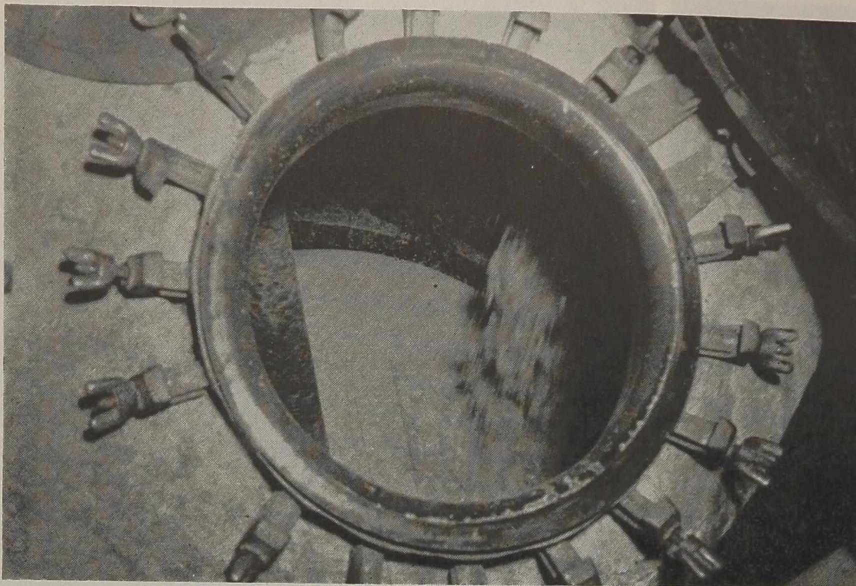
The procedure was devised because of the urgent need for more nylon in the face of equipment and material shortages which militated against increasing the already taxed capacity of the Du Pont high pressure synthesis plant at Belle, W. Va. It is at the Belle plant that the original adipic acid and diamine for nylon are manufactured.

Dr. C. D. Myers and several associates at the Nylon Research Laboratory in Wilmington, Del., worked out the A. D. process (so named after adipic acid and diamine) on a laboratory scale. It was then stepped up to pilot plant proportions in temporary equipment in Wilmington. Finally, after securing the necessary government clearances for material, the large capacity plant was brought in.

A variety of waste material can be used in the recovery process: worn-out nylon stockings collected in the nation-

Diamine solution from the hydrolysis is distilled in this 40 ft. bubble plate column to take out the water and pure hexamethylenediamine.





Regenerated adipic acid in a glass-lined tank ready for recrystallization.

wide salvage drive, fiber waste from the nylon plants and weaving mills, clippings from cutting rooms where parachutes and other military articles are made, also drippings collected when spinnerets are changed or spinning machines cleaned out. The waste must be sorted to eliminate excessive amounts of non-nylon fiber or foreign materials, for the process can economically handle only limited proportions of common impurities.

The sorted waste is dumped into a sulfuric acid solution in the hydrolyzer, a 1,900-gallon lead-lined tank equipped with heating and cooling coils and an agitator. The material is boiled for several hours, during which time the nylon is depolymerized and part is further broken down into adipic acid and diamine sulfate. Upon cooling, the adipic acid crystallizes out into grains about the size of fine sand, and the diamine sulfate remains in solution. The materials reach an equilibrium before complete hydrolysis. But after the first batch of crystals are removed in a 40-inch centrifuge and the filtrate cycled back into the hydrolyzer the reaction continues. Three cycles of boiling, cooling and centrifuging are carried out with each batch of waste.

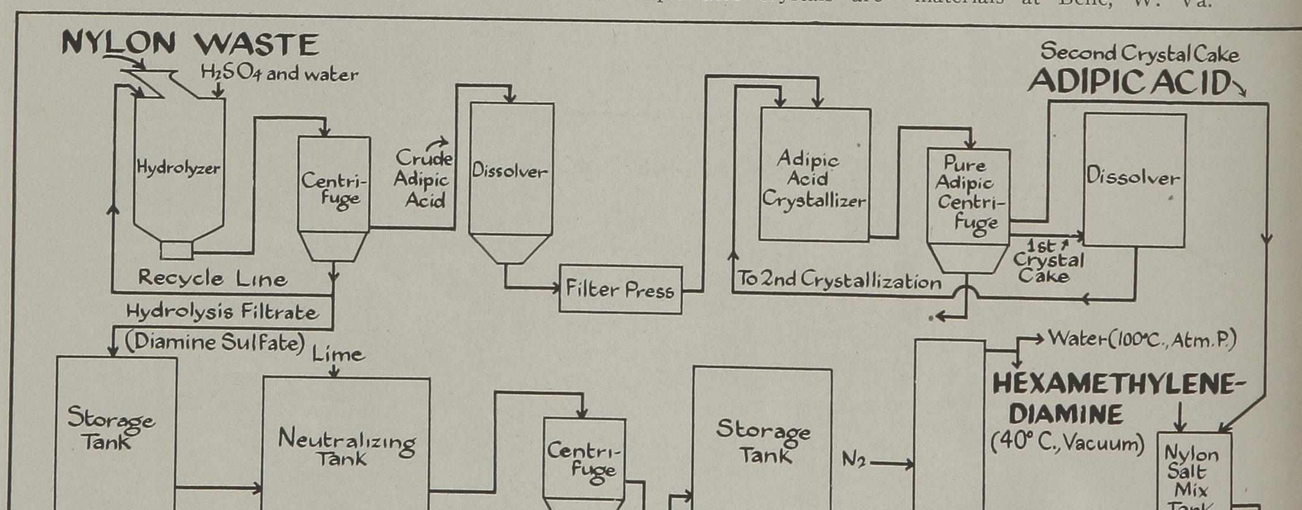
The remaining steps in the A. D. process are directed toward the purification of the two components, adipic acid and diamine. The adipic acid crystals are dissolved in water at or just below boiling and the solution is passed through a filter press to remove solid impurities. Activated charcoal is also used at this point to help clarify the adipic acid solution, which is then run into a glass-lined tank and cooled to obtain purer adipic acid crystals. After centrifuging the crystals are again dissolved and carried through an additional crystallization, after which the purified acid crystals are are carried to a nylon salt mix tank to join the diamine which has meanwhile been recovered and purified.

First step in the diamine recovery part of the operation is treatment of the dimine sulfate with lime. The resulting insoluble calcium sulfate is separated from the dilute diamine in a centrifuge of the same type as that used in the adipic acid separation.

The filtrate is now piped to a special still, which with the pot and riser column stands 40 feet high and extends through the roof of the building. The still is equipped with twelve plates of bubble-cap construction. The water is first removed at atmospheric pressure. A vacuum pump then reduces the pressure within the still so that the diamine can be distilled and condensed in pure form.

After the recovered adipic acid and diamine are brought together in the proper proportions in the mix tank the material is clarified with activated charcoal and the nylon salt solution is then ready to be made into new nylon polymer.

It is interesting to note that the nylon salt recovered by this A. D. process makes a polymer which is the equal of virgin polymer synthesized from the raw materials at Belle, W. Va.



Plant Investment and Production Costs For SYNTHETIC RUBBER

ON AUGUST 31 THE OFFICE OF RUBBER DIRECTOR released a special report giving the first official figures on investment and operating costs of government synthetic rubber plants. Because the postwar fate of a large portion of the present synthetic industry probably will depend on achieving competitive prices with natural rubber, the information in this report is of unusual interest to all who have a stake in the industry. The text of the report, prepared by E. R. Gilliland and H. M. Lavender, Jr. of the Office of Rubber Director, is presented here in somewhat condensed form.

TO MEET a national emergency the United States government undertook the production of synthetic rubber and the main essential ingredients for its manufacture. In this program, monetary considerations were definitely secondary to obtaining a sure supply of synthetic rubber in the shortest possible time.

To insure the success of this program in almost untried fields, it included a variety of different processes for the production of raw materials as well as several different types of synthetic rubbers. The following considerations were important in selecting processes:

1. The probable adaptability of the final product as a replacement for natural rubber.
2. The state of development of a process.
3. The availability of the basic raw materials necessary for the production of the polymer and the necessary intermediates.
4. Military and industrial needs for special polymers.
5. The estimated time of construction.
6. The use of certain critical materials.

On the basis of these considerations Buna-S was chosen as the best general purpose rubber and became the backbone of the program.

The second main synthetic chosen for the government program was Neoprene-GN. This polymer had been produced on a commercial scale for almost a decade and had demonstrated its value as a synthetic rubber.

Butyl rubber was also chosen for part of the program, but it was felt that the experience in both its manufacture and use was so limited that it would be unwise to gamble a major portion on it.

These three synthetic rubbers form the real basis of the government synthetic rubber program.

Synthetic Rubber Plant Investment

Table I gives the estimated investment per long ton of actual capacity for the various monomer and synthetic rubber plants in the Government program.

It will be noted from this table that the plant investment cost per ton of capacity for the three synthetic rubbers, Buna-S, Butyl and Neoprene, indicates that the amount of equipment required is roughly the same. There are investments in private plants to produce such raw materials as alcohol, butylenes, naphtha, butane, ethylene, calcium carbide, soap and other necessary ingredients which are not included in these figures.

Production Costs

The following cost analysis has been based on the out-of-pocket operating charges. It does not contain any provision for amortization, sales expense, profit or interest on investment. However, it does include plant insurance, taxes, nominal royalties and a small management charge to cover expenses which are not capable of direct allocation and which may or may not include some profit.

POSTWAR RUBBER COSTS

BELOW are actual present costs and estimated postwar costs of synthetic rubber as reported August 31 by the Office of Rubber Director. The figures shown do not include amortization, sales expense, profit, or interest on investment.

	Costs, cents per lb. Present	Postwar
Neoprene-GN	24.04	19
Butyl	21.51	10-14
Buna S	12.2	10.7
Butadiene	8	7
Styrene	7	5

For comparison, the overall average c.i.f. cost of production for all types and qualities of plantation rubber during the period 1935-1938, was about 10 cents per pound according to Everett G. Holt, chief of the Commercial Research Division of the Rubber Development Corp.

Table I—Plant Investment for U. S. Government Synthetics

	Investment per long ton estimated actual capacity
Buna S	$663
Butyl	779
Neoprene-GN	717
Average all synthetics	675

A. Neoprene-GN

Table II presents the approximate current operating costs for Neoprene-GN, together with an estimate of its possible postwar cost. This cost includes feedstock and direct operating costs, but excludes amortization, preliminary expense and research. It will be seen from the table that the present costs average approximately 24 cents per pound of Neoprene-GN, with acetylene purchased at 11.67 cents per pound. It has been estimated that acetylene may sell for approximately 7 cents per pound in the postwar market. This may result in reducing the cost of Neoprene to approximately 19 cents per pound. High as these costs may appear to be, Neoprene-GN, as a result of its

Table II—Neoprene-GN and Butyl Plant Operating Costs

[Cents per pound of product including feed stocks but excluding amortization, preliminary expense, research]

	Neoprene-GN		Butyl
	Present cost Acetylene @ 11.67¢/#	Post war cost Acetylene @ 7.00¢/#	Present cost
1. Production materials:			
(a) Feedstocks	11.10	6.70	2.51
(b) Other chemicals	4.19	4.19	4.12
Sub-total	15.29	10.89	6.63
2. Utilities	1.33	1.33	1.71
3. Other Costs:			
(a) Operating labor	1.50	1.39	3.51
(b) Supervision	0.13	0.13	0.20
(c) Repairs and maintenance	1.22	1.22	3.08
(d) Operating supplies	0.79	0.79	...
(e) Laboratory	0.30	0.30	0.92
(f) Packing and shipping	0.29	0.29	0.76
(g) Plant overhead	...	...	2.75
(1) Salaries, wages	1.29	1.19	...
(2) Insurance	0.05	0.05	0.14
(3) Taxes	0.04	0.04	0.06
(4) Miscellaneous	0.40	0.40	0.25
Sub-total	6.01	5.80	11.67
4. Royalties and management fees	1.89	1.75	1.50
Total	24.52	19.77	21.51
5. By-product credit	−0.48	−0.40	...
Total out of pocket	24.04	19.58	21.51

Fig 1

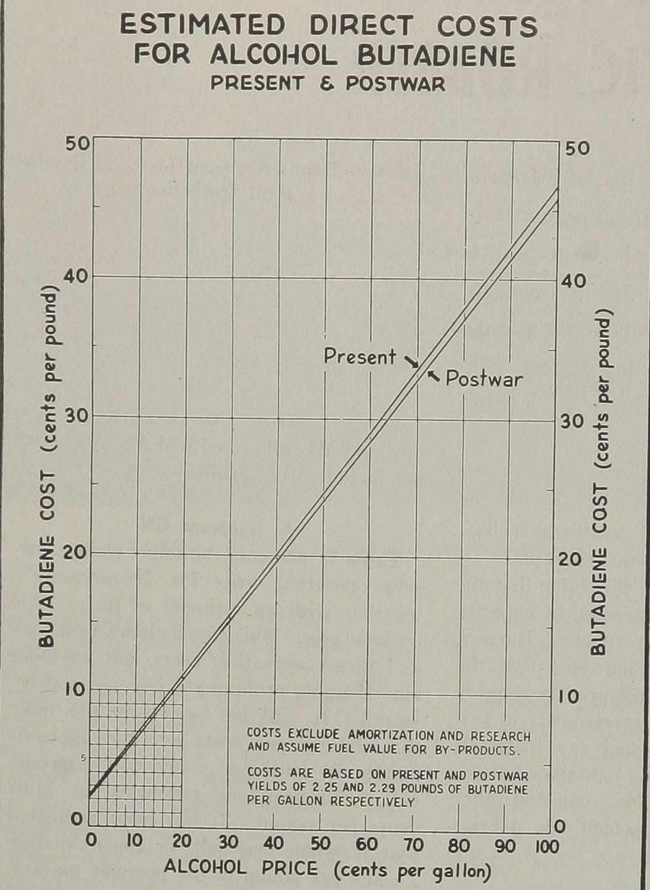


Fig. 2

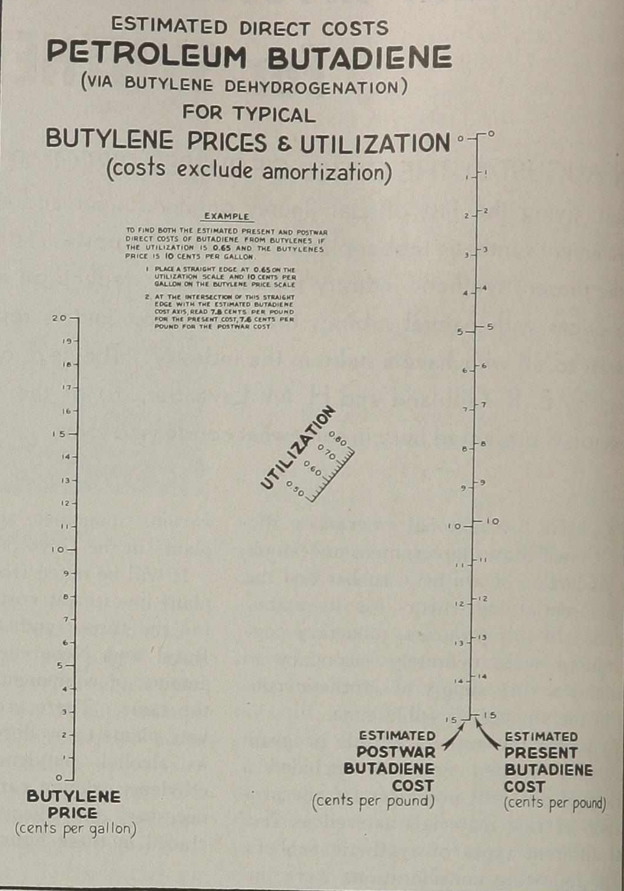


Fig. 3

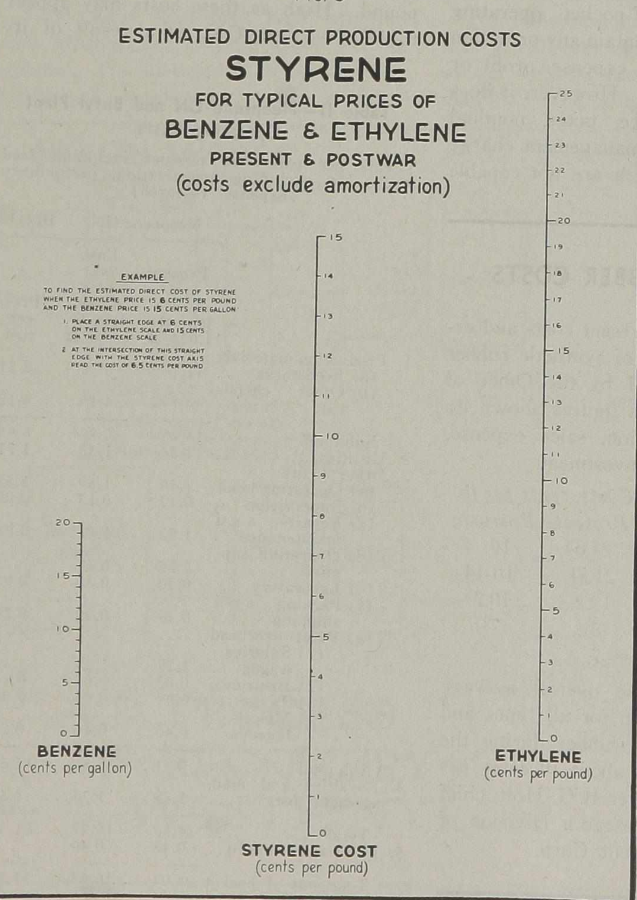
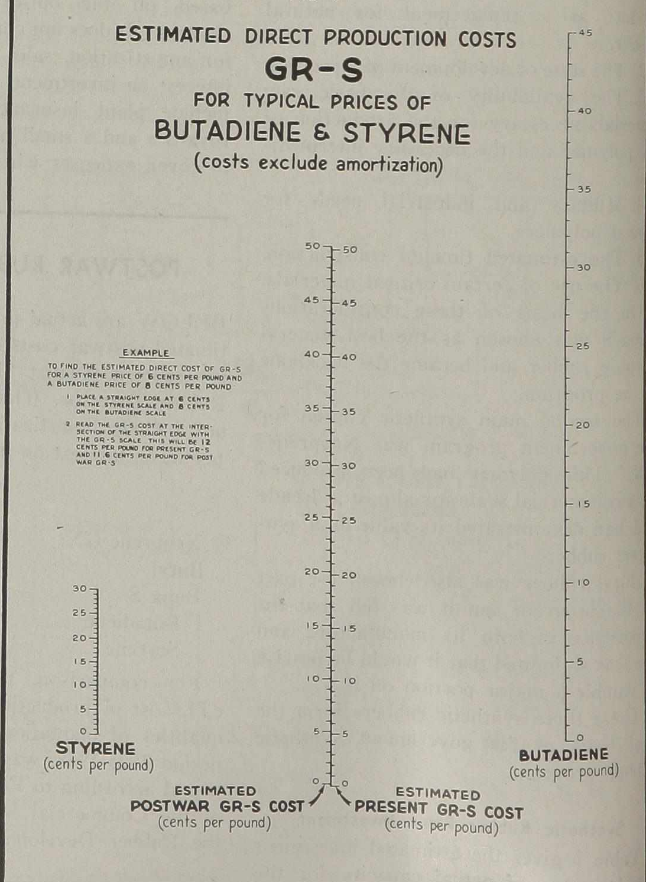


Fig 4



social properties, should play an important part in the future rubber field.

B. Butyl

The Government Butyl program is comprised of two plants, one of which is still under construction.

To date the maximum month's production for the completed plant has been 41 percent of rated capacity. On the basis of this reduced operation it will be seen from Table II that Butyl rubber is being manufactured for an average operating cost including feedstocks of 21½ cents per pound.

While it is not possible to predict accurately the ultimate costs on the basis of present experience, it is believed that Butyl rubber may be manufactured at an operating cost, including feedstocks, of 10 to 14 cents per pound. However, its status as general purpose rubber is still uncertain and it will take large scale manufacture, consumption and use before its ultimate position is determined. In any event, appreciable quantities of Butyl, should be used as a special purpose rubber for cases where it is superior to natural rubber.

C. Buna S

At the present stage of the program the most important evaluations of production costs are those for Buna-S type rubbers. It is the main general purpose synthetic rubber and will probably be the chief competitor of natural rubber. For these reasons the following cost analysis is largely limited to Buna-S and its raw materials.

Butadiene

The government butadiene program involves a number of different processes but it can be divided into four main categories based on the feed stocks employed. 1) Alcohol. 2) Butylene. 3) Butane. 4) Naphthas or other petroleum fractions.

1. *Alcohol process.* So far, the greatest tonnage of butadiene has been produced from alcohol, and over the next six months it may still account for more than half of all production. The investment cost per ton of rated capacity is moderate and when it is considered that the plants have operated at over 180% of rated capacity, the investment per annual ton of butadiene, based on actual production, is less than $300.

The alcohol butadiene program involves three plants containing 11 identical units each having an original rated capacity of 20,000 short tons of butadiene. These plants have operated for over a year and their production costs are well determined. Average production costs from the three plants above the cost of the alcohol feed stock for the butadiene are summarized in Table III. The operating charges of approximately 2¢ per pound of butadiene are small in comparison to the cost of the alcohol employed, which for an ultimate yield of 2.25 pounds of butadiene per gallon of 190 proof alcohol, amounts to about 40¢ per pound of butadiene with the present alcohol price in the vicinity of 90¢ per gallon. Therefore, the economics of the alcohol butadiene process are largely those of industrial alcohol production and the resulting cost of the butadiene is given in Figure 1, as a function of alcohol price. Estimates on industrial alcohol for large scale consumption after the war have ranged from as low as 12¢ to as high as 20¢ per gallon. Using a somewhat optimistic price of 15¢ per gallon the resultant direct cost of the butadiene is estimated to be 8¾¢ per pound.

2. *Butylene Dehydrogenation Process.* The main process for the production of butadiene in the petroleum field is based on the dehydrogenation of normal butylene. The estimated operating costs for these plants above the cost of butylenes, as given in Table III are considerably higher than those for the alcohol butadiene plants. Consequently, any reduction in these charges plays a much more important part in the cost of the butadiene produced.

At the present time the larger dehydrogenation plants have not achieved stabilized operation and therefore, their operating costs have fluctuated widely. For that reason the estimates given in Table II are based mainly on the cost data from two of the smaller plants.

The cost of the butylenes necessary to produce a pound of butadiene depends on both the market price of butylene and the ultimate level of the yields (utilization). Consequently, in Figure 2 the butadiene cost is presented as a function of the butylene utilization (pounds butadiene produced per pound butylene consumed) and the net cost of butylenes themselves. Currently butylenes range from about 8¢ to 12¢ a gallon and the utilization ranges from 0.60 to 0.75. With 0.65 utilization and 9½¢ per gallon butylene (about present average value) butadiene costs approximately 7.6¢ per pound. In the postwar picture it should be possible with a utilization of 0.65 and butylenes available at 6¢ per gallon to produce butadiene by this process for as low as 6.4¢ per pound.

3. *Butane Dehydrogenation Process.* Three plants are included in the government program to produce butadiene from butane. Sufficient experience in stabilized operation has not been obtained on any of these plants to predict ultimate costs. However, preliminary indications are that one or more of the plants will be able to produce butadiene competitively with the butylene dehydrogenation units.

4. *Naphtha Cracking Process.* The processes based on naphtha give a relatively small weight percent of butadiene (yields of 2½ to 5%) and, therefore, their economics involve the evaluation and disposal of a large number of other products. At the present time it does not appear that these processes will be competitive with some of the others except for a very small amount of production for which integrated facilities are available for the utilization of a high percentage of the byproducts.

5. *Summary.* To summarize, at the present time butadiene from alcohol costs approximately five times as much as butadiene from the low cost butylene dehydrogenation. The cost of butadiene from alcohol will continue to be high as long as the price of alcohol is based largely on the cost of grain. If, in the postwar period, sufficient alcohol can be obtained synthetically from petroleum or from molasses or other low cost agricultural products, this cost differential will close rapidly and the two processes would be competitive, if the prices of alcohol and butylene were approximately 9½¢ and 6¢ per gallon, respectively, or 15¢ and 13½¢, respectively. These prices of alcohol are somewhat less than are generally estimated for the postwar market and on the basis of the present calculations it appears that the butylene and butane dehydrogenation plants will be the low cost butadiene producers. However, an improvement in the Carbide and

(*Turn to page 446*)

Table III—Butadiene, Styrene and Copolymer Plant Operating Costs

[Cents per pound of product excluding feedstocks, amortization, preliminary expense, research]

Item	Butadiene				Styrene		Copolymer	
	From alcohol		From butylene (dehydrogenation)					
	Present	Post-war	Present	Post-war	Present	Post-war	Present	Post-war
1. Chemicals (excluding feedstocks	0.18	0.13	0.57	0.50	0.42	0.42	2.10	1.90
2. Utilities	.95	.75	1.20	1.20	.46	.46	.26	.26
3. Other costs.								
(a) Operating labor	.14	.12	.48	.44	.27	.25	.52	.45
(b) Supervision	.02	.02	.07	.07	.06	.06	.05	.05
(c) Repairs and maintenance	.19	.30	.62	.60	.23	.30	.40	.40
(d) Operating supplies	.04	.03	.15	.15	.01	.01	.02	.02
(e) Laboratory	.04	.03	.25	.25	.05	.05	.10	.10
(f) Packaging and shipping	.01	.01	.02	.02	.01	.01	.33	.25
(g) Plant overhead	..	..	.20	.20	..	..	..	..
(1) Salaries, wages	..	..	.20	.20	.16	.15	.33	.30
(2) Insurance	.02	.02	.06	.06	.03	.03	.03	.03
(3) Taxes	02	.02	.01	.01	.01	.01	.08	.08
(4) Miscellaneous	.32	.27	.15	.15	.27	.27	.09	.09
Sub-total other costs	.80	.82	2.21	2.15	1.10	1.14	1.95	1.77
4. Royalties and management[1]	.51	.63	.65	.63	.68	.63	.52	.51
Total	2.44	2.33	4.63	4.48	2.66	2.65	4.83	4.44
5. Byproduct credit	—.23	—.14	..	..	—.14	—.14	..	..
Total out-of-pocket	2.21	2.19	4.63	4.48	2.52	2.51	4.83	4.44

[1] Management fee is scaled down with increased yearly production in a uniform manner for all producers.

Registration at the Hotel Pennsylvania Headquarters on the eve of the convention.

A. C. S. LOOKS to FUTURE in New York Meeting

THE LARGEST NATIONAL MEETING of the American Chemical Society convened in New York this month to hear over 500 papers on war-important progress in the many fields of chemistry. President Midgley announced transfer of ownership of Universal Oil Products Co. to the Society. Priestly Medal presented to Conant.

HEARTENED by the successful turn of the war, the American Chemical Society looked toward the coming peace in its 108th national meeting in New York, September 11-15. Although the major attention of the record-breaking turnout of 10,000 members was still on war production, the two-fold emphasis was expressed by the theme: "Speed the Victory—Plan the Peace"; and in many of the informal discussions industry leaders took a long look ahead at the problems of peacetime production and employment.

Most of the hurdles in the production race have been cleared, military needs have leveled off, and the serious drain of trained manpower into the armed services has virtually been stopped. The feeling was evident throughout the meeting that the time had come to size up the postwar prospects and make plans to employ a returning army of workers in a slower-paced peacetime economy.

A high point of the meeting was the surprise announcement by President Midgley that ownership of the Universal Oil Products Co. will pass to the Society under the terms of a gift. Valued at between $10,000,000 and $15,000,000, the company is a leading research and development organization in the petroleum field. Income from the property will be approximately $1,000,000 a year and will be used for research under the direction of the Society, results of which will be published and made available to the public without payment. The gift was made in the names of the six joint owners of the company: Phillips Petroleum Corp., Shell Oil Co., Standard Oil Co. of California, Standard Oil Co. (Indiana), Standard Oil Co. (New Jersey), and the Texas Co.

Chemistry in the Future

The Priestly Medal of the Society was awarded to Dr. James Bryant Conant, president of Harvard University, for his work on the Baruch Committee in the development of the synthetic rubber program.

In his acceptance address, Dr. Conant foresaw an increasingly progressive chemical industry based on competitive research. "I do not believe," he remarked, "that without technological competition the maximum effectiveness of the application of physics and chemistry to industry can be obtained. Therefore, I for one, look forward with confidence to a continuation of the situation which now exists by and large in the chemical industry. And I hope that in other industrial fields where research has as yet played but a little part similar strong independent and keenly competing research and development units will arise."

Asserting that we would have already lost the war were it not for our trained technical men, Dr. Conant stressed the nation's dependence on scientists both for military security and continued prosperity. "We know that the national welfare depends on science, and likewise, the future of science depends on the national welfare."

Need Scientific Approach

Bernard M. Baruch, speaking at the subscription dinner, lauded Dr. Conant for his material contribution to the synthetic rubber program and expressed the hope that the scientific method, so notably successful in that program, might find application in other fields as well: "One point I would like to stress—one that profoundly impressed me, the need for a greater use of trained scientific, practical minds such as Conant's to help solve the many economic and social problems that face us. This struck me above everything in my contacts with Dr. Conant on the rubber program which covered political, economic and scientific matters.

"A trained, and, mind you, I say trained, scientific researcher thinks only of the object he has before him, not of any ideology, not of himself, not of his publicity, not of what anybody thinks of him or his associates, not of another job —but only of one thing—what do the facts justify. How helpful it would be if we could have more trained minds to see errors, to pass judgment and guide action before it is too late.

"So, I hope that in the future, even in the fields of economic, political and social matters, national and international, more of these trained scientific minds, these experienced searchers after facts, truths and realities, will be asked to help solve them."

Baekeland Award Established

Horace E. Riley, Chairman of the North Jersey Section, announced at the subscription dinner that the Leo Hendrik Baekeland award had been established by his Section of the Society to encourage the creative talents of the younger American chemists. The first presentation of the award, which was instituted with the co-operation of Bakelite Corporation, New York City, will be made in May, 1945. The Baekeland award will consist of $1,000 and a gold medal suitably inscribed, and may be presented biennially to an American chemist who has not yet reached his fortieth year, in recognition of accomplishments in pure or industrial chemistry.

The North Jersey Section, celebrating its silver anniversary, was host to the convention; and its chairman, Mr. Riley, served as general chairman of the meeting.

Youthful Outlook Necessary

Dr. R. P. Soule, Tricontinental Corporation, told the Division of Industrial and Engineering Chemistry that a high level of employment after the war would depend on the technological contributions of chemists and engineers which would bring products and services within the reach of an ever-widening market. A confident and even adventurous attitude on the part of management will be necessary to maintain an expanding economy, he emphasized.

Another facet of the same general opinion was expressed by President Midgley in his Presidential Address, "Accent on Youth":

"Youth is original and creative, while age is simply experience. Both are essential elements on any team that is to make for lasting progress."

He supported his contention by citing a table of the 85 most important inventions, 46 of which were by men 35 years old or less. He added that men in their early 20's often have a stronger motive to make their mark and make money than older colleagues of 50 who might make less effort to repeat earlier successes; and many men who develop outstanding inventions are called upon to spend much of their later life in looking after their commercialization.

In conclusion, he criticized military authorities for what he considered a short-sighted policy:

"It is our confirmed opinion that the inroads they have made on the ranks of young professional chemists engaged in war production and research, simply for the purpose of getting a few more younger men into the ranks of the Army is a short-sighted policy. No one denies the essentiality of the chemist's work, in both production and research in prosecuting a successful military campaign.

"Without such service any army is doomed to defeat and destruction quite as surely as though it had no men in the ranks whatsoever. Also, bear in mind that the work of the chemist arrives at the fighting front in completely finished form. Chemists are not required for its proper function in battle. Now, when one considers that even during peacetime normal production there has never been a surplus of trained chemists to serve industry, the handicap under which war-

The Division of Industrial and Engineering Chemistry meets for luncheon at the Capitol Hotel.

Committee chairmen were on hand to greet the early registrants Sunday evening at the Pennsylvania. Left to right are I. D. Garard, vice-chairman in charge of publicity; Horace E. Riley, chairman of the host section and general chairman of the meeting; A. Walti, chairman of the Group Meals Committee; and J. W. Haught, Meeting Rooms Committee Chairman.

time chemical industry is placed when its ranks of trained chemists are depleted in order that the army may have a few more young men can be easily understood."

Similar concern over the lack of young chemists for the postwar industry was expressed by the Committee on Professional Training of Chemists, reporting a summary of opinions expressed by the faculties of universities, colleges and technical schools:

"Since the trend has been toward well-trained men in responsible positions, the effect of the recent Selective Service rulings will be serious to the whole country," it is pointed out. "New processes and developments in chemical industry will be retarded. Some feel that the policy will react adversely in national trade, in view of the fact that other countries are continuing to train their young people along scientific lines."

"Consternation" over the virtual cessation of training of chemists and chemical engineers was voiced, according to the Committee. College faculties as well as industries will suffer from the scarcity of recently-trained young men, it is held. The effect of the Selective Service regulations on research will be serious, it is predicted, in that the number of graduate students available to complete training is being drastically cut.

"The present Selective Service regulations which have nullified the quota arrangement by which a limited number of well-qualified students were to complete their education as chemists, both at the undergraduate and graduate levels, are considered by the majority of department heads who have stated their opinions to us as 'one of the greatest tragedies in the history of American science'," the Committee says.

"The present wholesale drafting of scientific personnel, graduate and undergraduate students between the ages of 18 and 26, except those classified 4F and women, is considered by many as extremely shortsighted and an unprecedented example of waste. Apparently, most feel that Selective Service started out with high aims and reasonable plans for action, but the new ruling, effective May 1944, fails to recognize the significance of scientifically trained men in this emergency.

"Several men stress that ours is the only country among those at war which has not recognized the necessity of continuing the training of chemists and chemical engineers and men trained professionally in other scientific fields. It is pointed out that reports from enemy countries show that enrollments in their technical schools are not down to the same extent as are the enrollments in our colleges and universities."

Kettering Reports on Triptane

The development of "triptane" by the General Motors Research Laboratories was reported to the general meeting by Charles F. Kettering, vice-president of General Motors. This organization recently found a way to make 99% pure triptane (the details of which are not yet generally revealed because of war secrecy restrictions) in tank car quantities. Sufficient quantities of pure triptane have been made in a new pilot plant to permit extensive testing, even in airplanes. It has thus been demonstrated that the gains possible with triptane, especially when lead tetraethyl is added, depend upon the particular engine and conditions of operation, and have amounted to as much as four times the power and a quarter less fuel than is obtained with present 100-octane gasoline.

The objective of this research is to find the best combination of engine-and-fuel to give the greatest output of useful work or power per total dollar, irrespective of what form the engine-fuel combination may take. Results show that there is still a large field for the improvement both of fuels themselves and of engines to use such fuels to best advantage.

Also at the general meeting, the $1,000 American Chemical Society prize, provided by Alpha Chi Sigma, was awarded to Dr. Arthur C. Cope, associate professor of chemistry at Columbia University.

Solvents From Farm Residues

At the symposium on wood sugars, Dr. J. W. Dunning and Dr. E. C. Lathrop of the U. S. D. A. Bureau of Agricultural and Industrial Chemistry's Northern Regional Research Laboratory, Peoria, Illinois, discussed their new process for converting farm residues, such as corncobs, sugarcane bagasse, flax shives, oat hulls, and cottonseed hulls, into sugars suitable for the manufacture of such industrial solvents as ethanol, furfural, butanol, and acetone. This process is a two-stage operation in which the pentosans are first hydrolyzed by dilute acid, after which the cellulose is saccharified by a new concentrated-acid process that uses less than one-fourth the amount of acid required by known concentrated-acid processes.

By means of the process developed by Dunning and Lathrop, relatively pure, separate solutions of 5-carbon sugars and 6-carbon sugars are obtained from farm residues. The solutions have a sugar content of 10 to 15 percent, which is that used in industrial fermentation. This separation of the sugars makes it possible to use them for the production of the most profitable chemicals — industrial alcohol, butanol, and acetone from the 6-carbon sugars and furfural from the 5-carbon sugars.

A semi-works plant is to be constructed to try out the process on a large scale. It will be capable of producing about 2,000 pounds of dextrose, 1,800 pounds of xylose (equivalent to about 800 pounds of furfural), and 1,000 pounds of lignin per day. The 6-carbon sugars produced will be fermented to ethanol or to butanol and acetone in the existing fermentation pilot plant of the Northern Regional Research Laboratory, which has a capacity of 500 gallons of 100-percent ethanol per day. The 5-carbon sugars will be used as a source of pure xylose or distilled with acid to produce furfural. By the joint operation of the two plants it will be possible to determine the practicability of the process and operating costs.

Phosphor Crystals

Participating in a symposium on fluorescence and luminescence held by the Society's Division of Physical and Inorganic Chemistry, Dr. Leverenz of the R. C. A. Laboratories, Princeton, N. J., pictured new developments which should soon come into general use.

"Phosphor crystals in fluorescent lamps will inexpensively illuminate workplaces and homes or gaily brighten the streets of our cities with varicolored sign tubing," Dr. Leverenz said. "Kindred phosphors in the screens of electron microscopes will aid in fathoming the mysteries of bacteria and molecules in order to ensure a healthier and happier life.

"Other possible uses for phosphors include intense light sources for sound recording and theater projection; indirect illumination wherein the very walls, ceilings, and murals luminesce to illuminate as well as decorate the room; luminescent plastics in thousands of forms to make night-time safer and more colorful; and phosphors emitting specific radiations for controlled treatment of living tissues and organisms.

Utilization of Waste Liquors From Wood Hydrolysis

Dr. Donald F. Othmer, head of the Department of Chemical Engineering at the Polytechnic Institute of Brooklyn, and two members of his Polytechnic group, Dr. Robert S. Aries and Dr. Raphael Katzen, presented a paper on "Utilization of Waste Liquors from Wood Hydrolysis," which described a process for obtaining a new plastic by utilizing waste wood, at the unit process symposium of the Division of Industrial and Engineering Chemistry.

Three other papers presented by Dr. Othmer's Polytechnic group were: "Esterification of Butanol and Acetic Acid," Drs. Othmer and Charles E. Leyes; "Esterification of 2, 3-Butylene Glycol with Acetic Acid," Drs. Othmer, Nathan Schlechter, and Seymour Marshak; and "Pyrolysis of 2, 3-Butylene Glycol Diacetate to Give Butadiene," Drs. Othmer, Schlechter, and Robert Brand.

In presenting this paper on the utilization of waste liquors from wood hydrolysis, Dr. Othmer said that by means of a continuous method of chemically adding water to wood, his group obtained from a ton of sawdust more than 1000 pounds of a high grade ingredient for plastics as well as valuable chemicals as by-products, including 120 pounds of acetic acid, 60 pounds of furfural and 500 pounds of sugar, which would make hundreds of pounds of alcohol.

Lignocellulosic Residues

Use of America's forests as a chief source of raw materials for products ranging from sugar to synthetic rubber was prophesied by Robert S. Aries, research associate at Yale University, speaking at the Division of Cellulose Chemistry.

"Wood and waste is perhaps the most promising source of raw materials for low cost plastics for postwar housing; wood is the most abundant, compact and relatively cheap source of cellulose; and the liquors which pulp and paper mills in the United States discharge into streams at present could produce 40 million gallons of vitally needed industrial alcohol, reducing stream pollution simultaneously."

Fischer-Tropsch Synthesis of Petroleum

V. I. Komarewsky and C. H. Riesz of the Institute of Gas Technology, Chicago, Ill., before the Division of Gas and Fuel Chemistry, discussed the Fischer-Tropsch synthesis and the gas industry. While the extent of American petroleum resources is a controversial subject, there is unanimous agreement that processes for the production of alternative liquid fuels should be investigated and developed in the interests of national defense, both present and future. The Fischer-Tropsch synthesis of petroleum employs gas as a raw material and consequently, it is of particular interest to the gas industry since it represents a potential new use for gas. For these reasons, the subject is being investigated at the Institute of Gas Technology in Chicago.

Since the start of World War II, two new developments have been announced, "naphthene synthesis" and "iso-synthesis." The second process is of special importance since it implies that high-octane aviation gasoline can be produced. A deficiency of the process up to the present time has been the fact that only straight-chain paraffin hydrocarbons are formed from which high-octane gasoline could be produced only by means of additional processes. By means of the theory, the choice of catalyst and reaction conditions has been narrowed so that it may become possible to direct the reaction toward the production of desired products, e.g., 100-octane.

The interest of the gas industry in the Fischer-Tropsch process is two-fold. First, both natural gas and manufactured gas may be processed to obtain gas suitable for the synthesis and as such a new use for gas may be developed. Second, the lagest demand for gas occurs during the winter months, and therefore, stand-by water gas plants are idle in manufactured gas plants during the summer months whereas natural gas is sold at lower price to industrial consumers to maintain a uniform load on pipe-lines.

Mrs. R. J. Moore, chairman for the Women's Tea, chats with Mmes. R. E. Kirk and H. E. Riley.

1 Correct method for lifting bag by two men. Note that men do not grip corners, although all four corners are supported. Gripping corners may tear the closure and spill contents.

2 Correct method for lifting bag by one man. Support bag underneath both ends, preferably at diagonal corners. Never drag a paper bag; nails and splinters may cause snagging or puncturing.

3 When bag must be carried by hand, one method is to place it flat on the shoulder as above. Another is to hold it at diagonal corners with edge resting against stomach. Either method minimizes strain.

Proper Handling of PAPER SHIPPING SACKS

PAPER shipping sacks, or multiwall bags are used for transportation and storage of a wide variety of dry and non-liquid chemical products. With paper now the most critical of the nation's war materials, it is important from the standpoint of preserving bags for reuse, as well as for protection of their contents, that they be handled in a manner that will minimize possibilities of damage.

To assist shippers and users of bagged chemicals in doing this, the Manufacturing Chemists' Association, with the cooperation of the Paper Shipping Sack Manufacturers' Association, has prepared an illustrated manual showing correct methods of handling and storage of paper shipping sacks when filled with chemicals or chemical products. The major points to be remembered are illustrated here through the courtesy of the M.C.A.

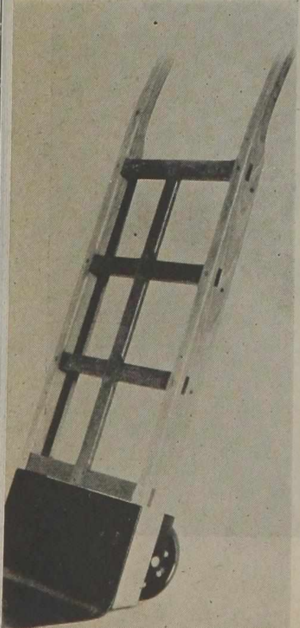
Some additional subjects covered in the manual, but not illustrated here, include:

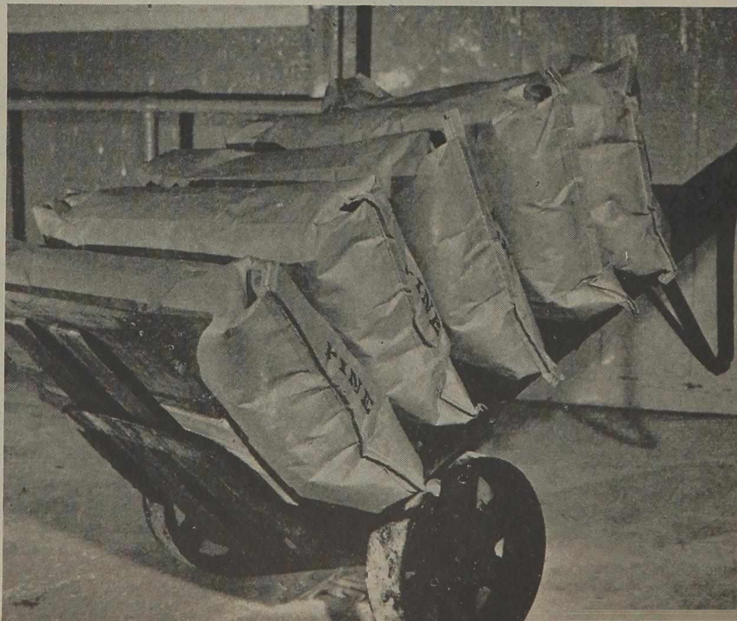
Opening Freight Car Doors: Occasionally, shifting in transit will cause bags to jam against a car door so that it cannot be opened without tearing some of the bags. If only the unloading door is jammed, the opposite door should be opened first and the unloading doorway cleared. If bags are jammed against both doors, one door should be opened carefully, preferably using a specially designed pulley type door

8 The most desirable types of hand trucks for handling paper bags are those designed specifically for the purpose. Like the one below, they have solid metal fronts and extended lips. Avoid use of narrow lips.

9 Narrow lips may be extended by use of specially designed removable platform racks or by simple home-made detachable rack. Cover exposed metal straps, braces, nuts, bolts, with heavy cardboard or burlap.

10 Proper pallet loading of interlocked stacked bags. Note alternating layer arrangement. Be sure pallet surfaces are dry, smooth, free from projections. Use only double-faced pallets for tiering.





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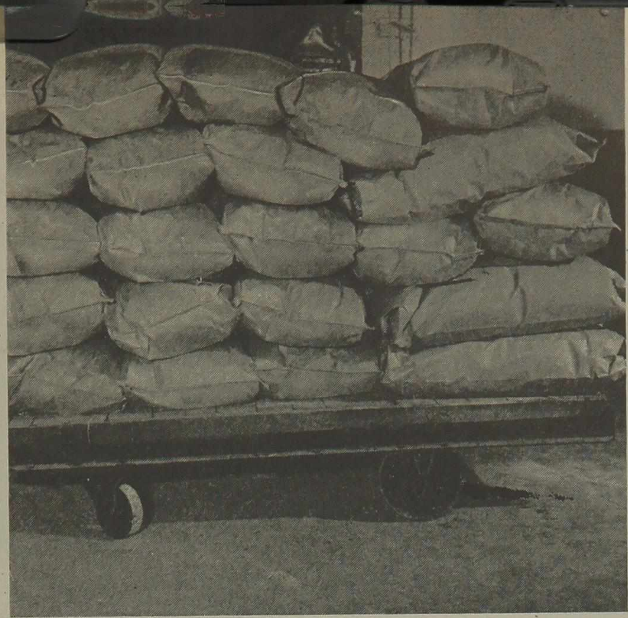

4 Bags preferably should be conveyed on hand trucks, pallets or other approved ypes of handling equipment, rather than by and. Always load bags flat, as on two-vheel hand truck above. Do not overload.

5 Proper method of loading bags on four-wheel hand truck. When stacked in any other way, package distortion and insecurity of load will result. To prevent snagging at posts, doors, etc., bags should not overhang.

6 Before lifting any bag in bottom tier from freight car or truck, turn each over to make sure there are no punctures. If seriously damaged, slip bag and contents into overslip bag (above) and tie mouth.

NG SAC

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reight Car Doors:
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car door so that it
ut tearing some of
loading door is jam
should be opened
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lly designed pulley

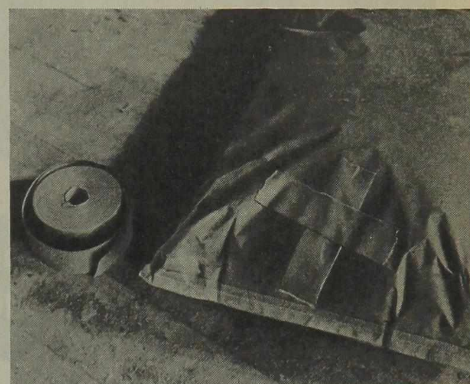
pener to minimize damage to the bags. harp door-prying tools should not be sed.

Marine Unloading: Platforms equipped rith spreader bars and canvas slings are atisfactory. Rope slings should be voided. Wooden platform slings should ever be raised from nor lowered onto acks of bags. Landing platforms of ood dunnage are recommended.

Storage of Bagged Materials: Storage pace should be protected against exposure o the elements, well ventilated and cool. Ordinary warehouses are satisfactory, but torage in hot, excessively dry areas hould be avoided. Dry cement or wooden oors are recommended.

Sacks can be stacked to any desired height, depending upon the ability of the product to withstand constant pressure without caking. Stacks of bags may be secured either by changing the direction of the tiers (interlocking) or by inserting kraft paper between the layers. Wire-tied bags should be stacked alternately, bottom to bottom and top to top. Corners of storage piles should be protected.

Where Bags Will Be Scrapped: Bags which cannot be reused can be opened with a knife. These bags always have a scrap value if properly sorted and bundled or baled, and may be sold to wastepaper dealers. Bags containing asphalt plies must be bundled separately.



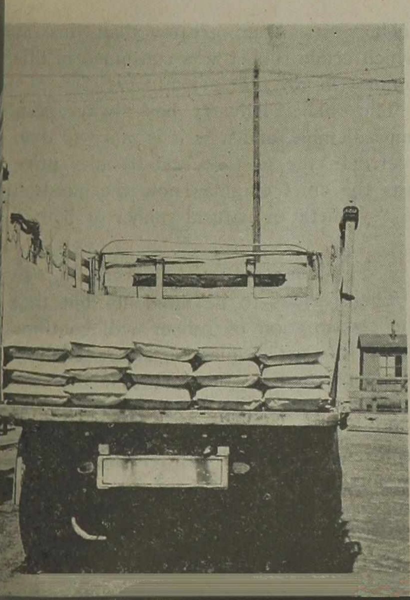
7 If no overslip bag available, clean torn area and patch with strip of gummed tape.

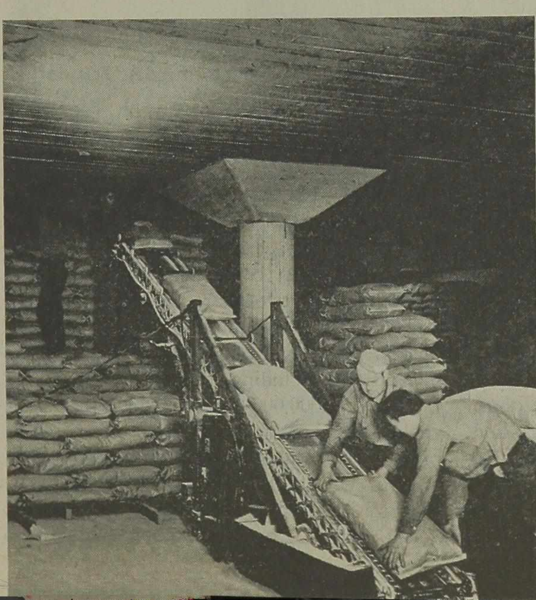
allet loading of
bags. Note alterna
Be sure pallet
ree from projections
allets for tiering.

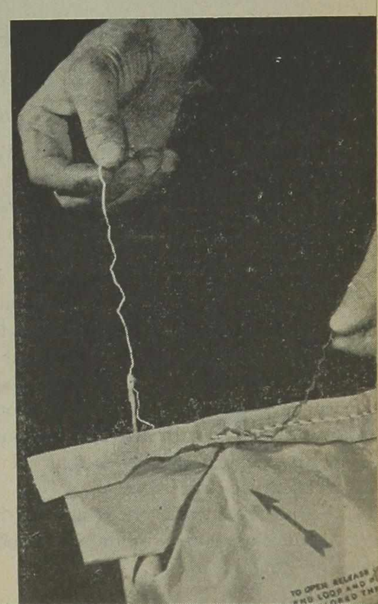
11 Auto truck loading showing protection of bags against damage from stake sides by lining with heavy paper. Be sure truck platform is clean, smooth, and has projecting hardware covered. Stack bags securely.

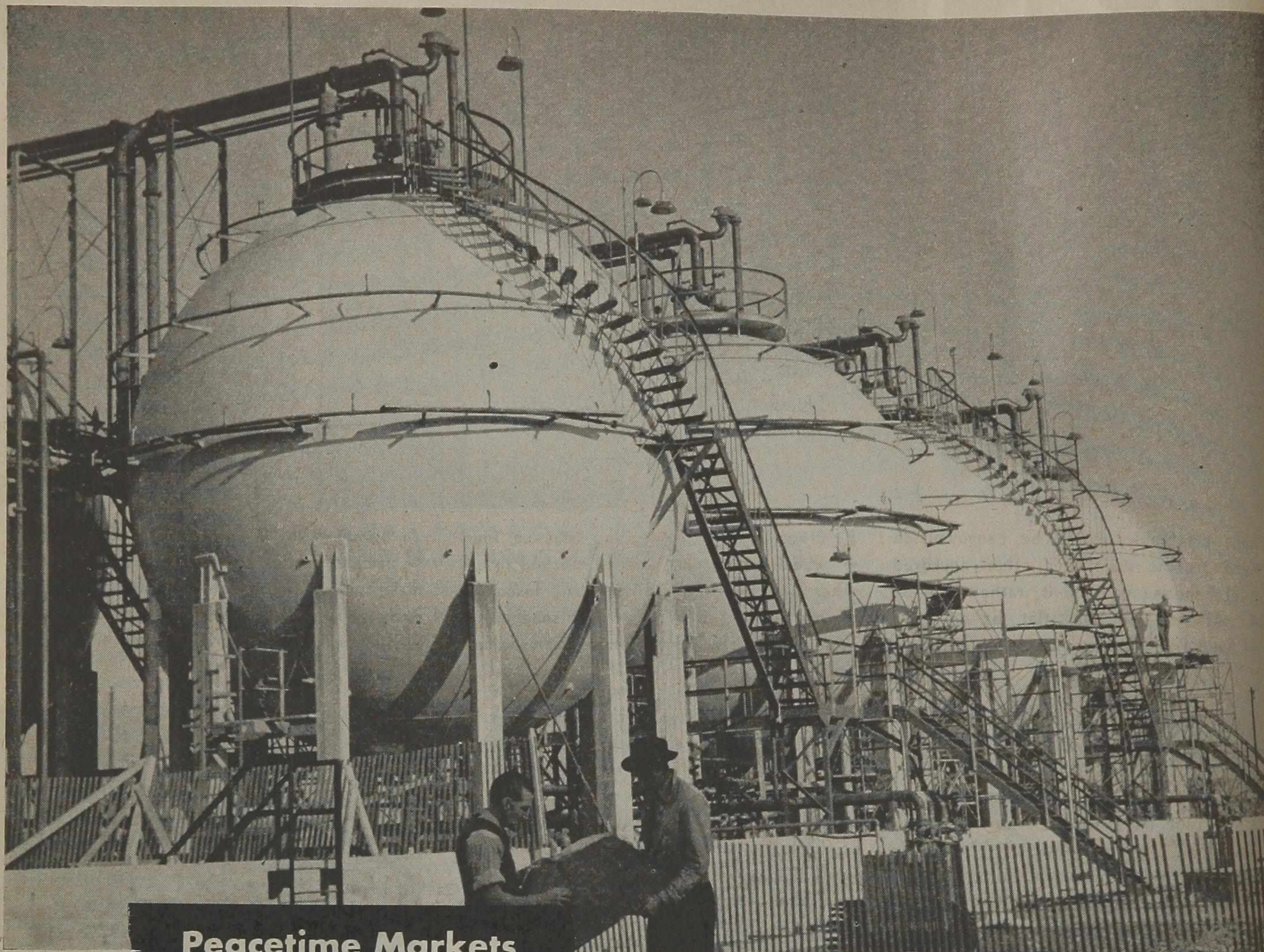
12 Gravity and power conveyors are often used for handling paper bags. Such equipment should be custom designed, and bag manufacturers as well as manufacturers of conveying equipment should be consulted.

13 Correct method of opening a sewed bag. Turn top of bag with colored or looper thread toward you and, starting from left, pull loose ends of the thread on each side of the bag until entirely unravelled.









Peacetime Markets for CHEMICALS

Butadiene storage at the Buna-S plant of Polymer Corp., Sarnia, Ont.

III. THE RUBBER INDUSTRY: Natural

Postwar Chemical Requirements Will Be Sizable •

DESPITE THE OBSCURING EFFECT of political, economic and technological uncertainties, the outlook for rubber, and therefore rubber chemicals, appears to be good. Synthetic rubber will continue to be made in much greater quantities than before the war, regardless of the outcome of the natural-synthetic controversy.

THE SYNTHETIC rubber industry had its commercial beginnings in this country only nine years before the war started in Europe. Even as late as 1940 the annual production of synthetic rubbers was only about 4,000 long tons, a pitifully small amount in comparison with the 608,000 long tons of natural rubber used the same year.

But the attack on Pearl Harbor and the events which followed so soon after in the Far East completely changed the picture. Only two years ago the Baruch Rubber Survey Committee was sweating out its report with its important recommendations including the annual manufacture of 1,000,000 long tons of synthetic rubbers. Sixteen months later, in March of this year, Rubber Director Dewey was able to write, "During February 53,000 long tons of synthetic rubbers were produced and we are now making synthetic rubbers at a rate greater than that at which crude rubber was consumed in this country in any year prior to 1941."

The rubber industry has always been unpredictable, and now it is more so than ever. In the past several decades price was the chief enigma; now the question is "synthetic or natural rubber or both?"

Consumption of Rubber

There seems to be no doubt but that the consumption of rubber will continue to increase. The question in this country is complicated by the fact that the rate of annual production of synthetic rubbers right now is greater than our peacetime requirements, and that after the war the proportion of synthetic to natural rubber will depend on politics as well as economics. Estimates of the annual consumption

or Synthetic,

By HARRY L. FISHER*

of rubber within the next five years for this country approach 1,000,000 long tons. These are astounding figures, but so are those for the past few years.

The major change in the rubber industry during the last five years has, of course, been the almost complete substitution of synthetic rubbers for natural rubber. In the conversion of synthetic rubbers into manufactured goods, the same general types of compounding materials are used as for natural rubber, namely vulcanization accelerators, fillers and pigments, softening agents, antioxidants, inorganic activators, and others of varying nature. The proportions, however, frequently vary; for example, about 50 per cent more of the accelerator is used in synthetic rubber than in natural.

Chemical Requirements

In addition the synthetic rubber industry requires large amounts of *processing*—as distinct from *compounding*—chemicals, nearly all of which are different from those used in the manufacture of natural rubber goods. Besides the raw material substances, such as butadiene and styrene, and to a lesser extent, chloroprene, isobutylene, isoprene and acrylonitrile, large amounts of chemicals are needed as stabilizing agents, emulsifiers, polymerizing agents, modifying agents, reaction stoppers, and precipitating agents. The proportions used of many of these are small but the actual amounts are great. To provide a clearer idea of the chemical raw materials and processing materials that are required, it may be of interest to review the chief synthetic rubbers and their methods of manufacture.

The chief synthetic rubber being manufactured in this country is GR-S (Government Rubber—Styrene) also known as Buna S. Although based on the German Buna S, the success of its manufacture on a large scale is due directly to the work of American chemists, chemical and mechanical engineers, and rubber technologists, who banded together in fine cooperation and mutual giving from their varied experiences to do a marvelous job. Therefore, GR-S is not exactly the same as the German Buna S even though the proportions of butadiene and styrene are approximately the same. The total amount of GR-S to be manufactured this year will be approximately 700,000 long tons. GR-S can be termed an all-purpose rubber.

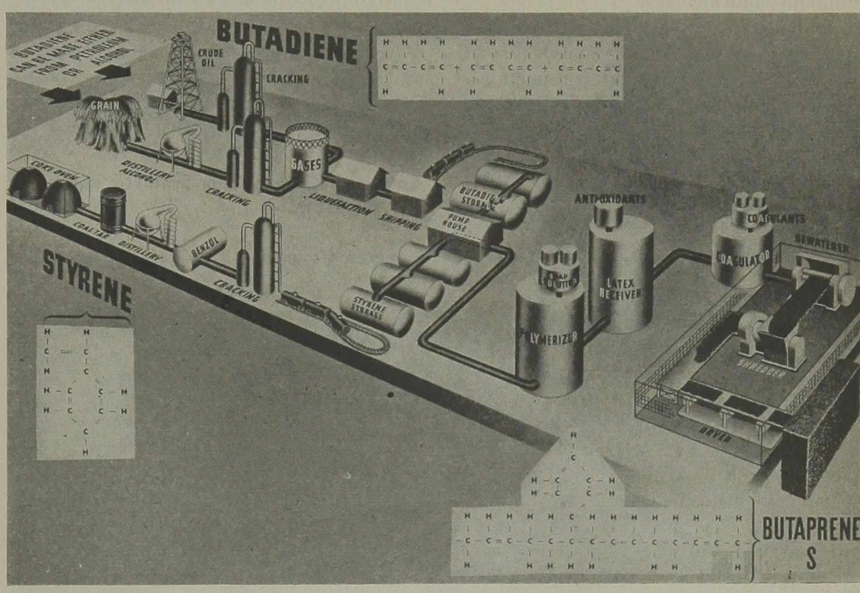
GR-S is made in the form of an emulsion. When the reaction has reached the desired stage, the unreacted butadiene and styrene are removed, the copolymer is coagulated with a salt or acid, washed and dried.

A general formula for emulsion polymerization of butadiene copolymers is as follows:

	Parts by Weight
Butadiene	50 to 75
Styrene	50 to 25
Emulsifier (soap, sodium alkyl sulfate)	1 to 5
Polymerization catalyst (a peroxide: hydrogen peroxide, sodium perborate, potassium persulfate)	0.1 to 1
Modifying agent (organic halogen derivatives, mercaptans, and other thio compounds)	0.1 to 5
Water	100 to 400

Buna N (GR-A) is made from butadiene and acrylonitrile and is being manufactured in both government and private plants in comparatively small amounts, a total of about 20,000 long tons annually. The emulsion method as given above is used, with the substitution of acrylonitrile for styrene. Buna N is especially good for resistance to heat and oil.

Neoprene (GR-M) is made by the emulsion polymerization of chloroprene (2-cholor-1,3-butadiene). Then annual production is about 60,000 long tons. Neo-



Basic flowsheet for manufacture of Buna-S type synthetic rubber.

prene is more like natural rubber than any of the other synthetic rubbers, but it is more heat and age resistant than natural rubber.

Butyl (GR-I) is manufactured in a continuous process in the presence of a catalyst at a temperature much below 0°C. by the copolymerization of approximately 98 parts of isobutylene and 2 parts of isoprene. The 1944 production will amount to about 20,000 long tons. Butyl makes a remarkably stable vulcanized rubber and because of its low permeability to gases is used for the manufacture of inner tubes.

Non-Government Synthetic Rubbers

Synthetic rubbers which are not made in government-controlled plants are Thiokol, Koroseal, and Vistanex.

Thiokol A shows the greatest resistance of all the synthetic rubbers to the action of oils and solvents. It is prepared by the interaction of ethylene dichloride and sodium tetrasulfide. Thiokol B is made from beta,beta'-dichloroethyl ether in place of ethylene dichloride.

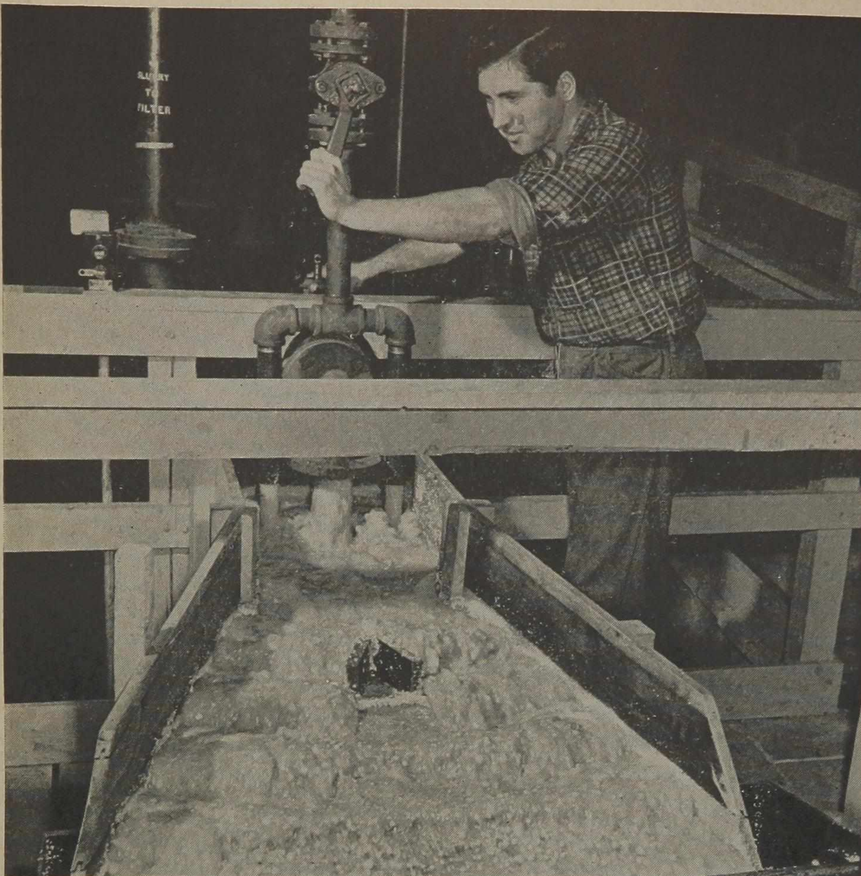
Koroseal is polyvinyl chloride plasticized with an approximately equal weight of tricresyl phosphate, dioctyl phthalate, and other similar materials. It is not vulcanizable but can be molded and tubed into many useful articles. It does not burn or support combustion and therefore is much used in insulation on airplane and naval vessels.

Vistanex is polyisobutylene. It is the precursor of butyl rubber and is also made by catalytic polymerization at low temperatures. Like Koroseal it is not vulcanizable but is moldable.

Butadiene, the chief basic material for synthetic rubber from a volume standpoint, today is being made about one-third from petroleum and two-thirds from alcohol. Most of the butadiene from petroleum is made by the dehydrogenation of butylenes, the remainder from butane and by thermal cracking. At present the alcohol is obtained by fermentation, but it can of course also be obtained from ethylene from petroleum. Over 500,000 long tons of butadiene will be manufactured this year.

Styrene (phenylethylene or vinylbenzene) is made by the dehydrogenation or cracking of ethylbenzene, which in turn

* U. S. Industrial Chemicals, Inc., Stamford, Conn.



This slurry of Buna-S latex from the coagulators will be washed, filtered and dried.

is prepared largely by the addition of benzene to ethylene in the presence of aluminum chloride.

Stabilizing agents such as phenyl-beta-naphthylamine and tertiary-butylcatechol are required only in small proportions, 0.02 per cent, but on the basis of 690,400 long tons this small proportion amounts to 138 long tons.

In the case of emulsifiers, if the maximum figure of 5 parts as given in the formula is used, then for 800,000 long tons of emulsion polymers, there will be required 40,000 long tons of soap or other emulsifying agents.

Other materials can be calculated in a similar manner. Research is going on at a rapid pace and there surely will be changes in the actual substances used.

Compound Chemicals for Synthetic Rubbers

The best properties of all vulcanizable synthetic rubbers except Neoprene are brought out by the addition of carbon blacks. More carbon blacks are needed for the synthetic rubbers than for natural rubber.

Zinc oxide, magnesia and litharge are activators and fillers and are used very much as in natural rubber. Other inorganic materials used to a considerable extent are barytes, blanc fixe, calcium silicate, titanium dioxide, various clays, whiting, lime, soapstone, talc, asbestos, and mica.

Each of these 75-lb. bales of crude Buna-S represents about 19 lbs. of styrene and 56 lbs. of butadiene.

Accelerators

The proportion of sulfur used for vulcanizing GR-S or Buna S is somewhat less than for natural rubber. Organic accelerators are, of course, used with GR-S as with natural rubber but, as already mentioned, are usually required in greater proportion, i.e. 1.5 parts per 100 parts of GR-S instead of 1.0. Mercaptobenbothiazole and several of its derivatives are much used. The thiuramdisulfide compounds, diphenylguanidine, and some of the aldehydeamines also find wide application.

The synthetic rubbers are ordinarily more resistant to aging but antioxidants are used to make them even better in this respect and as an aid to better processing. Favored substances are the familiar phenyl-alpha-naphthylamine, phenyl-beta-napthylamine, N,N'-diphenyl-phenylene-diamine, a condensation product of acetone and diphenylamine, and p,p'-dimethoxy-diphenylamine.

Softeners

Since the synthetic rubbers are more resistant to oxidation than natural rubber and also since they have a different internal structure, they do not breakdown the same on the mill, and softening agents must be added to give proper milling and increased tackiness. In some cases as much as half the weight of the rubber is added for proper processing. Accordingly larger amounts of softeners are needed for the synthetic rubber program. Refined asphalts, coal tars, coumarone resins, pine tars, turpentine products, paraffin waxes, mineral rubbers, and stearine pitches are required in large amounts. Stearic acid is of course much used, and for special purposes dibutyl phthalate, dioctyl phthalate and other high-boiling esters are used.

GR-S, Neoprene, and other synthetic rubber latices are increasing in use. This means that compounding ingredients must be dispersed and therefore dispersing agents are needed. The sodium alkylnaphthalenesulfonates and sodium alkyl sulfates are used for this purpose.

Other Chemicals

All of the chemicals mentioned above require simpler chemicals for their preparation. Mercaptobenzothiazole means aniline and carbon bisulfide. Similarly the following can be added: methyl and

A PARTIAL LIST OF CHEMICALS USED IN THE RUBBER INDUSTRY

Chemical	*Use*
Acetin	plasticizer, softener
Acetone	solvent
Acetylene	intermediate
Acrylonitrile	intermediate
Aluminum hydrate	filler, reinforcing agent
Aluminum oxide	abrasive filler
Aluminum stearate	lubricant—rubber surface
2-Amino-1-butanol	dispersing agent
2-Amino-2-methyl-1-propanol	dispersing agent
Ammonium bicarbonate	blowing agent
Ammonium carbonate	blowing agent
Amyl naphthalene	plasticizer, softener
Anhydroformaldehyde-aniline	accelerator
Anhydroformaldehyde-p-toluidine	accelerator
Antimony oxide	coloring agent
Antimony sulfide	activator
Barium carbonate	filler
Barium stearate	lubricant—rubber surface
Barium sulfate	filler, reinforcing agent
Benzoic acid	retarder, accelerator
Benzol	swelling agent, solvent
Benzothiazyl disulfide	accelerator
p-Benzyloxy-phenol	antioxidant
Butadiene	intermediate
Butyl acetate (primary and secondary)	solvent
Butyl acetyl ricinoleate	plasticizer, softener
Butyl alcohol (primary, secondary and tertiary)	solvent
Butyl oleate	plasticizer, softener
Butyl stearate	plasticizer, softener
Cadmium	color agent
Cadmium red	color agent
Cadmium red lithopone	color agent
Cadmium sulphide	color agent
Calcium carbonate	filler, reinforcing agent
Calcium silicate	filler, reinforcing agent
Calcium stearate	lubricant—rubber surface
Calcium sulfate	filler
Capryl alcohol	solvent, plasticizer, softener
Carbitol phthalate	plasticizer, softener
Carbon black (channel type)	color agent, reinforcing agent
Carbon bisulfide	solvent, intermediate
Carbon tetrachloride	solvent
Carvacrol	antioxidant, antiseptic
Caustic soda	reclaiming agent
Chlorcarvacrol	antioxidant
2-Chlorobutadiene	intermediate
1-Chlor-1-nitropropane	anti-gelling agent
Chlorthymol	antioxidant
p-Coumarone-indene resin	extender, plasticizer, softener
Crotilidene aniline	accelerator
Cyclohexane	solvent
Cyclohexanone	solvent
Degras	plasticizer, softener
Diacetone	solvent
2, 4-Diamino diphenylamine	antioxidant
Diamylamine	intermediate
Diamylnaphthalene	plasticizer, softener
Diamylphenol	plasticizer, softener
Diazoaminobenzene	blowing agent
Dibenzyl ether	plasticizer, softener
Dibenzyl sebacate	plasticizer, softener
Dibutylamine	intermediate, accelerator activator
Dibutyl-ammonium oleate	accelerator
Dibutyl phthalate	plasticizer, softener
Dibutyl sebacate	plasticizer, softener
Dibutyl tartrate	plasticizer, softener
Dibutyl xanthic disulfide	accelerator
Dicaprylcarbinol acetate	plasticizer, softener
Dicapryl phthalate	plasticizer, softener
β, β'-Dichloroethyl ether	intermediate
Dichloropentane	solvent
Diethanolamine	solvent, dispersing agent
Diethylamine	intermediate
Diethylene glycol	plasticizer, softener
Diglycol stearate	lubricant—mold
Dimethylamine	intermediate
Dimethyl sebacate	plasticizer, softener
Dinaphthyl-p-phenylenediamine	antioxidant
Dioctyl phthalate	plasticizer, softener
Di-ortho-tolylguanidine	accelerator
Dipara methoxy diphenylamine	antioxidant
Dipentene	solvent, plasticizer
Diphenyl ether	plasticizer, softener
Diphenylguanidine	accelerator
Di-tertiary-butyl-m-cresol	plasticizer
Ethyl alcohol	solvent, intermediate
Ethylene dichloride	solvent
Ethylidine aniline	accelerator
Ethyl monoethanolamine	intermediate
Formaldehyde-aniline condensate	accelerator
Glycerine	surface preservative
Glyceryl monostearate	lubricant—mold
Graphite (plumbago)	color agent, filler for bearing compounds
Hexane	solvent
Hexamethylenetetramine	accelerator
Hydrogenated fatty acids	plasticizer, softener
Hydroquinone	antioxidant
Hydroquinone monobenzl ether	antioxidant
Isobutylene	intermediate
Isoprene	intermediate
Isopropyl alcohol	solvent
Isopropyl ether	solvent
Lamp black	color agent, reinforcing agent
Lanolin	plasticizer, softener
Lauric acid	activator
Lead oleate	plasticizer, softener
Lead silicate	activator
Levulinic acid	solvent, plasticizer, softener
Lignin	filler
Lime, hydrated	activator
Litharge (lead oleate)	activator
Lithopone (white)	color agent
Magnesia (magnesium oxide)	activator, filler
Magnesium carbonate	filler, reinforcing agent
Magnesium silicate	filler
Magnesium stearate	lubricant—rubber surface
Mercaptobenzothiazole	accelerator
Mesityl oxide	solvent
Methanol	solvent
Methylcyclohexane	solvent
Methyl ethyl ketone	solvent
Methyl hexyl ketone	plasticizer, softener, solvent
Methyl isobutyl ketone	solvent
2-Methylpentadiene	solvent
Monoamylamine	intermediate
Monoamyl naphthalene	plasticizer, softener
Monobutylamine	intermediate
Monobutyl-m-cresol	anti-gelling agent
Monobutyl phthalate	retarder
Monochlorbenzene	solvent
Monochlortoluene	solvent
Monoethanolamine	dispersing agent, solvent
Naphtha	solvent
Naphthenic oil	plasticizer, softener
Nitroethane	solvent
Nitromethane	solvent
Nitropropane	solvent
p-Nitrosodimethylaniline	accelerator
Octyl acetate	plasticizer, softener
Octyl proprionate	plasticizer, softener
Octyl stearate	plasticizer, softener
Oleic acid (red oil)	activator
Orthodichlorbenzene	solvent
Palmitic acid	plasticizer, softener
Petrolatum	plasticizer, softener
Petroleum ether	solvent
Petroleum sulphonate	plasticizer
Phenyl-alpha-naphthylamine	antioxidant
Phenyl-beta-naphthylamine	antioxidant
Phenylhydrazine	plasticizer, softener
Phenyl tolyl guanidine	accelerator
Phthalic anhydride mixture	anti-scorching agent
α-Picoline	solvent
Piperidine	accelerator
Propanediol	dispersing agent
Propylene dichloride	solvent
Pyridine	solvent
p-Quinonedioxime-dibenzoate	vulcanizing agent
Red lead oil	filler
Selenium	vulcanizing agent
Selenium diethyl dithiocarbamate	accelerator
Shellacs	stiffening agent, plasticizer, finishing material — surface, insulating material
Silica	filler
Silicon carbide	abrasive filler
Soap	lubricant—rubber surface, mold
Sodium acetate	retarders—accelerators
Sodium bicarbonate	blowing agent
Sodium diethyl dithiocarbamate	accelerator
Sodium hypochloride	bleaching and gloss producing
Sodium laurate	activator
Sodium nitrite	blowing agent
Sodium tetrasulfide	intermediate
Stearic acid	activator
Stearine pitch	plasticizer, softener
Stoddard solvent	solvent
Styrene	intermediate
Sulfur	vulcanizing agent
Sulfur chloride	vulcanizing agent
Sulfur monochloride	vulcanizing agent
Tellurium	vulcanizing agent
Tetrachloroethane	solvent
Tetrachloroethylene	solvent
Tetrahydronaphthalene	solvent
Tetramethylthiuram disulfide	accelerator
Tetrasodium pyrophosphate	dispersing agent
Thiocarbanilide	accelerator
Thymol	anti-oxidant
Titanium dioxide	color agent, reinforcing agent
Titanium oxide	reinforcing agent
Titanium pigments	color agents
Toluene	solvent
Trichlorbenzene	solvent
Trichlorethylene	solvent
Triacetin (glyceryl triacetate)	plasticizer, softener
Tributyl phosphate	plasticizer, softener
Tricresyl phosphate	plasticizer, softener
Triethanolamine	dispersing agent, solvent
Triphenylguanidine	accelerator
Turpentine	solvent
Vinyl emulsions	rubber substitute, extender
Vulcanizable oils	rubber substitutes
Waxes	sun-checking agents, surface finishing materials
Wax emulsions	tack eliminators
White lead carbonate	activator
Xylene	solvent
Yellow iron oxide	color agent
Zinc borate	flame retardant
Zinc butyl xanthate	accelerator
Zinc carbonate	filler
Zinc dibenzyl dithiocarbamate	accelerator
Zinc dibutyl dithiocarbamate	accelerator
Zinc laurate	activator
Zinc oxide	activator, reinforcing agent, color agent
Zinc peroxide	vulcanizing agent activator
Zinc stearate	activator, lubricant—rubber surface
Zinc sulfide	color agent

ethyl alcohol, benzene, toluene, carbon tetrachloride, ethyl chloride, ethylene dichloride, acetone, methyl ethyl ketone, the toluidines, the naphthylamines, diphenylamine, and many others. Solvents are also used in large amounts, special petroleum oils, gasoline, naphtha, and solvent naphtha.

Reclaimed Rubber

Reclaimed rubber will continue to be an important consumer of chemicals. Reclaiming is replasticization of vulcanized rubber. This process can be applied with certain modifications to synthetic rubbers as well as natural rubber. It is likely that between 200,000 and 300,000 tons of reclaimed rubber will be processed annually, as during the early part of the war. Caustic soda and softening agents, oils and tars, are used in the reclaiming process.

Rayon, though not usually considered a rubber chemical, nevertheless figures prominently in the synthetic rubber industry's overall consumption of chemicals. GR-S shows less resilience or comeback and less elongation at higher temperatures than at ordinary temperatures. As a tire bounces along a road the constant flexing causes a building up of considerable heat. Furthermore, like natural rubber, GR-S is a poor conductor of heat. These conditions in bus and truck tires mean extra high temperatures which are bad for both rubber and cotton cord, and the result is premature deterioration and ply separation.

Rayon

Rayon withstands heat better than cotton, and rayon cord is stronger than cotton cord of the same diameter. Rayon tire cord can therefore be made of a smaller diameter and still be as strong as regular cotton cord. Accordingly a thinner carcass can be built using smaller rayon cord which is as strong as a thicker carcass with regular cotton cord. Such a carcass means less rubber in the tire, and therefore more rapid dissipation of the heat. The consequence is lower temperature, slower deterioration, and longer life for the tire. The rubber industry undoubtedly will continue to be a large consumer of rayon and thus of the chemicals that go into rayon.

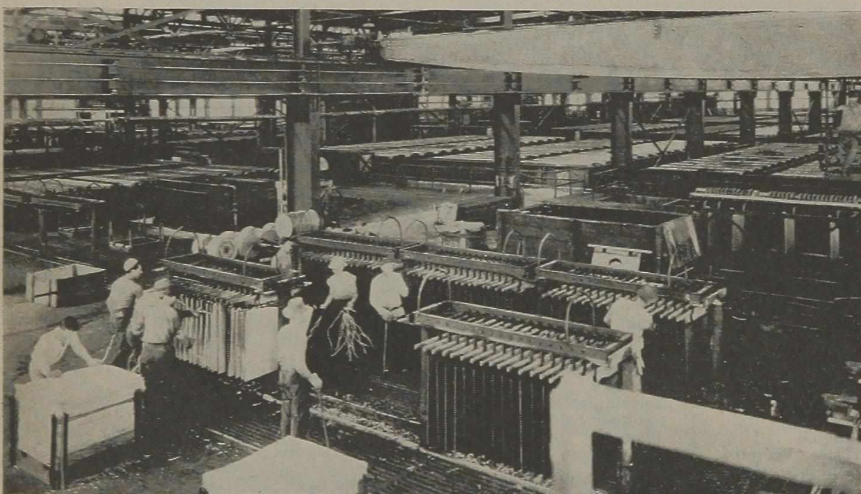
Future Outlook

Not only will the world continue to move on rubber tires, it will actually ride on rubber, because rubber will be used more and more for its resilient qualities in cushions for seats, in spring suspensions, and in shock absorbers. It will be used in furniture, mattresses and vibration dampeners. It may even be used in street pavements. Furthermore rubber will be used to a greater extent in mechanical goods as the properties of the newer synthetics become better known.

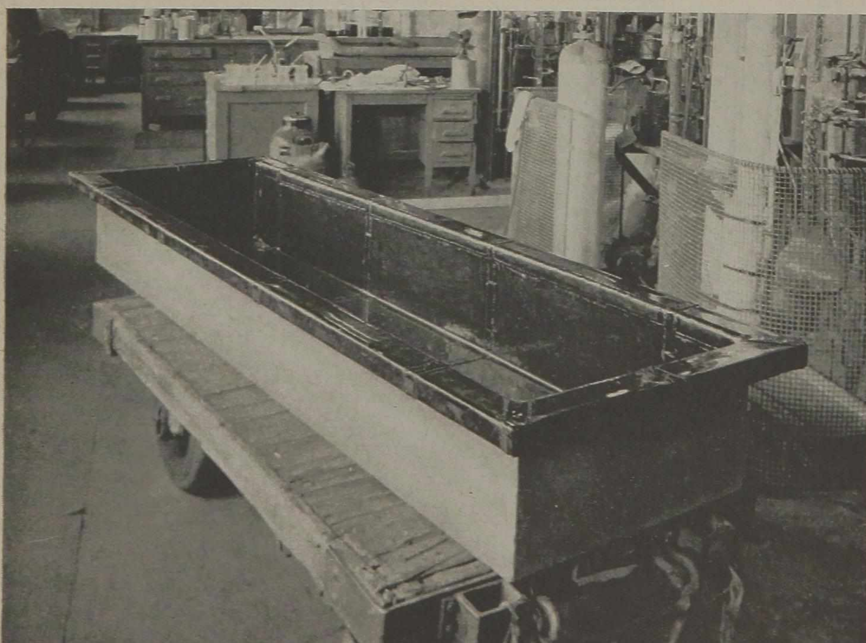
Finally, synthetics as well as natural rubber will continue to be converted into rubber derivatives which are useful as transparent films for packaging, adhesives, molding resins, paints and varnishes, and tank linings. All these materials are obtained from rubber by the action of various chemical agents such as hydrogen chloride, chlorine, sulfonic acids and stannic chloride.

The chemical rubber future is bright indeed.

Next month Kenneth E. Bell, technical director of the A. C. Lawrence Leather Co., will discuss the prospects for postwar consumption of chemicals in the leather industry. This will be No. 4 in the "Peacetime Markets for Chemicals" series.—Editors.



One of the new and unusual uses of rubber is in Plastikon rubber putty for window sashes that must withstand acid atmospheres, such as in the electrolytic tank house (above) of the copper refinery of Phelps Dodge Refining Corp. at El Paso, Texas. Ordinary putty hardens and cracks when exposed to acids. Below: Rubber tank linings that resist chemical corrosion are a growing industrial use of rubber, and rubber mattresses and upholstery show promise for household use.



HEADLINERS in the NEWS

DR. J. MARK HIEBERT has been elected divisional vice-president and general manager of the Frederick Stearns & Co. Division, Detroit, of Sterling Drug Inc.

DR. BENJAMIN LEVITT has joined the staff of the Chemical Manufacturing and Distributing Co., in the capacity of consultant and head of research and development.

DR. MARTIN LASERSOHN, formerly medical director of Winthrop Chemical Co., has been appointed assistant to the president and has been elected assistant treasurer.

L. F. WEYAND, general sales manager of the Minnesota Mining & Manufacturing Company's Adhesive and Coating Division since 1936, has been promoted to general manager.

A. FELIX DU PONT, vice-president of E. I. du Pont de Nemours & Co., has retired as a member of its Finance Committee, effective August 1, 1944.

ERNEST K. GLADDING, formerly of the Nylon Division, has been appointed to the position of director of the development department of E. I. du Pont de Nemours & Co.

EDWARD B. YANCEY has been elected to the positions of vice-president and member of the Executive Committee of E. I. du Pont de Nemours & Co.

WILLIAM H. WARD succeeds Mr. Yancey as general manager of the Explosives Department. He has been assistant general manager since 1935.

A C S Meets in New York

Gathering in divisional groups, symposia, luncheons and dinners, committees and a large general meeting, the 10,000 registrants at the 108th meeting of the American Chemical Society listened to more than 500 technical papers and heard national figures Dr. James Bryant Conant and Bernard M. Baruch define the more general role of chemists in the postwar future. Dr. Conant, whose address, "Science and the National Welfare," was occasioned by his receiving the Priestley Medal, is shown at the right accepting the medal from President Midgley. A fuller account of the meeting will be found on page 382.

Thomas Midgley, Jr.; C. L. Brown, divisional chairman; Cary Wagner, divisional secretary; and R. E. Burk, du Pont, at the dinner of the Division of Petroleum Chemistry.

George Scatcher, M. I. T.; Peter Pringsheim, Ray Control Co.; and O. K. Rice, divisional chairman, at the dinner of the Division of Physical and Inorganic Chemistry.

A highlight of the meeting was the Subscription Dinner Wednesday evening at the Waldorf-Astoria, at which Bernard M. Baruch addressed the guests on "Chemistry and the Future." Left to right are Karl T. Compton, Marston T. Bogert, President-Elect of the Society Carl S. Marvel, Mrs. George Baekeland, Mr. Baekeland, Mrs. Horace E. Riley, Mr. Riley, Bernard M. Baruch, President Midgley, August Merz, Mrs. Per K. Frolich, James B. Conant, Mrs. Merz, Wallace P. Cohoe, Mrs. Conant, Per K. Frolich, Mrs. Cohoe and Bradley Dewey. It was at the dinner that two important events, the founding of the Baekeland Award and the transfer of the Universal Oil Products Company to the Society, were announced. After the banquet the guests were entertained by Dunninger, Master Mentalist.

There was "standing room only" at many of the Industrial and Engineering Chemistry Division's meetings. Left to right are S. P. Burke, Columbia University, who will head the Christmas Symposium; Roland P. Soule, Tricontinental Corp., who addressed the Division's luncheon on "Technology and Employment"; Chairman R. Norris Shreve, Purdue University; Henry B. Hass, Purdue University; and Nathan Shlechter, Kellex Corporation. The latter three are shown at the symposium on unit processes.

Riley McGaugham, Plough, Inc.; W. J. Mitchell, Carbide and Carbon Chemicals Corp.; H. W. Zabel, General Aniline and Film Corp.; and P. J. Leaper, General Chemical Co., at the Industrial Division luncheon.

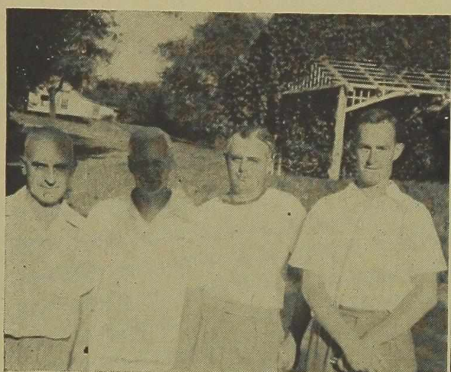
Sitting at the speakers' table at the Alpha Chi Sigma dinner are John R. Kuebler, Grand Recorder; Col. H. A. Kuhn; Marston T. Bogert; and Gen. Porter, who was the speaker of the evening.

Divisional officers met for breakfast Wednesday morning. In the foreground are C. R. Wagner, petroleum chemistry; Charles R. Parsons, secretary of the Society; and Arthur C. Cope, chairman of the divisional officers. Left to right along the table are Walter J. Murphy, industrial chemistry; A. C. Elm and W. H. Lutz, paint, varnish and plastics; Victor Conquest, general vice-chairman of the 1945 Chicago meeting; N. B. Guerrant, agricultural and food chemistry; M. L. Moore, medicinal chemistry; and L. L. Quill, chemical education.

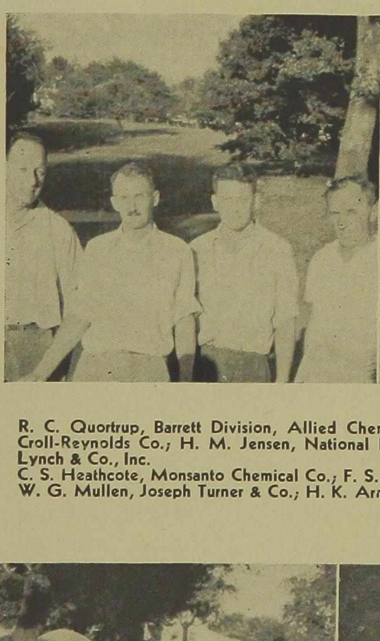
Others at the divisional officers' breakfast were, from left to right, T. F. Young, physical and inorganic chemistry; E. J. Hoffman; E. W. Huffman, analytical and micro chemistry; C. B. Purves, cellulose chemistry; C. R. Fordyce, cellulose chemistry; Elmer M. Nelson, biological chemistry; Erwin Brand, biological chemistry; and P. M. Gross, physical and inorganic chemistry.

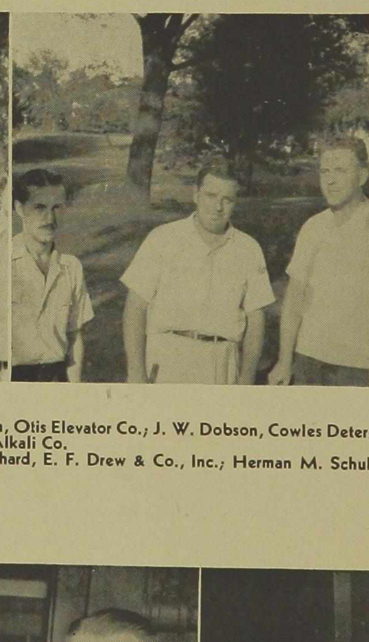
Salesmen's Association Golfs at Plandome

Charles Alexander, L. Sonneborn Sons, Inc.; Robert Fisher, Fisher Chemical Co.



Ira Vanderwater, R. W. Greeff & Co.; C. Frost, Innis Speiden & Co.; J. B. Eakins, J. S. & W. R. Eakens Co.; C. H. Slater, J. T. Baker Co.
James McInnes, Jr., Treasurer of the Salesmen's Association, Commercial Solvents Corp.; P. B. Marsden, R. L. Hutchins, Commercial Solvents Corp.
L. L. Brenneshaltz, Sterling Drug Co., Inc.; Paul W. Hiller, Innis Speiden & Co.; Murray Wixon, American Cyanamid Co.; Myron D. Reeser, Howse Publishing Co.





R. C. Quortrup, Barrett Division, Allied Chemical & Dye Corp.; Dave Jackson, Croll-Reynolds Co.; H. M. Jensen, National Lead Co.; M. Rybezanium, Merrill Lynch & Co., Inc.
C. S. Heathcote, Monsanto Chemical Co.; F. S. Miklosey, Nixon Nitration. Works; W. G. Mullen, Joseph Turner & Co.; H. K. Armitage, Emery Industries, Inc.

C. K. Sutton, Otis Elevator Co.; J. W. Dobson, Cowles Detergent Co.; C. V. Douglas, Diamond Alkali Co.
G. C. Reinhard, E. F. Drew & Co., Inc.; Herman M. Schulman, Washine National Sands, Inc.

W. J. Kramer, Philipp Bros., Inc.; Jim Ferries, Niagara Alkali Co.; B. L. Landers, Philipp Bros., Inc.
Harold Feuchter, J. T. Baker Chemical Co.

Walter M. Neill, St. Regis Paper Co.; William D. Newberg, William D. Newberg Co.; Jack Seidler, Whittaker Clard & Daniels, Inc.
Ira Vanderwater, R. W. Greeff & Co.; Howard Farkas, U. S. Stoneware Co.

BETWEEN THE LINES

Wet and Colder for Naval Stores

Naval stores producers are still having great difficulty meeting demands swollen by new uses as well as wartime requirements. If production does not increase soon, War Production Board may take action to protect the more vital industrial users.

SHORTLY after the end of the 1944 crop year, the Chemicals Bureau of War Production Board began manifesting concern over the outlook for rosin production; this concern led to a warning early in the summer that a possible deficit of 600,000 barrels of rosin might occur for the crop year which will end in March, 1945. Estimated production is placed at 1,650,000 barrels of rosin and domestic and foreign demands for the same period are placed at 2,207,000 barrels.

One reason for anticipated increased requirements is that new uses have evolved for rosin. It is being used, for illustration, as a substitute for alkyd resins, which are in even shorter supply. A current analysis by official sources of probable 1944-45 requirements contemplates the following: foreign requirements, 460,000 barrels; paper and paper size, 480,000; soap, 250,000; paint, varnish and lacquers, 165,000; synthetic resins, 185,000; chemicals, 230,000; miscellaneous uses, 437,000 barrels.

A number of steps to increase production have been discussed from time to time, but production at this date has not been materially increased, which brings nearer the possibility that the Chemicals Bureau may take action later to protect the more vital industrial users. Steps to increase production have included assistance to producers with manpower problems, which incidentally extend to the woods labor affecting all kindred operations, and efforts to help producers get the necessary field and plant equipment.

Before taking action along lines which have been discussed frankly by WPB officials with industry representatives, it was thought advisable for the Chemicals Bureau to give further study to the situation.

Three Large Producers

The wood naval stores industry has assumed increasing importance during the war. Three large producers are credited with approximately 85 per cent of such wood naval stores products as wood rosin size, solros, steam distilled turpentine and dipentine. Five small producers are said to do the balance of the business in the industry.

Wood rosin size is a fundamental raw material used by practically all paper and paperboard mills, so that its continued production and adequate supply is essential to the paper industry. Without this substance all paper would take on absorbent feathering and non-moisture resistant qualities.

Wood rosin size is produced from both wood and gum rosin, in a variety of grades, and a substantial part of the total production is turned out by the three large producers mentioned. One of these three makes the product called solros, and is said to be the only maker. Solros is a processed wood resin used in the manufacture of core oil, which, as its name suggests, is used in making "cores" for foundry molds.

There seems to be no satisfactory substitute for solros. Production of solros in 1943, it is stated, amounted to 16,000,000 pounds. The estimated 1944 requirement will total approximately 22,000,000 pounds, it is said.

Joint Products

Turpentine and dipentine are obtained with wood rosin as joint products from pine wood stumpage, using the solvent extraction and distillation process. Some of these wood naval stores are not sold directly at retail without further processing. Steam distilled turpentine in addition to direct use in industrial production is sold at retail as a thinner for oil paints.

The industry extends over parts of Mississippi, Louisiana, Florida, Georgia, Alabama, and South Carolina, with industry interests in Delaware, New York, and other eastern states. An allied industry is concerned with pine tar production, used industrially in reclaiming and compounding rubber, for treatment of rope used aboard sea-going vessels, and as a protective coating for exposed machinery such as deck winches.

Should some remedial action be taken by WPB to meet war requirements of these various products, it would probably involve a curtailment by regulation, of rosin consumption, coupled with a move to reduce any abnormally large inventories which might be found to exist among industrial users. No such action has been taken, the Chemicals Bureau having reported that it still has the whole matter under consideration.

Involved in the above procedure, however, would probably be a canvass of inventories, of end uses to determine which are the most essential, and possibly after that, some allocation method which would incidentally limit the inventories permitted to be held.

The course of the war will of course influence any pending action. The war end would not necessarily terminate immediate demand for rosin either at home or abroad, but it would give a clue as to how much longer abnormally high demands might continue, and also as to how much manpower might be available.

Tanning Chemicals Still Tight

IN THE FACE of a continued demand for chestnut extract by tanners both in the United States and Canada, in excess of available supplies, allocation of this extract probably will be continued, as recommended recently by an industry advisory committee. During the past six months there has been a 40 per cent reduction in consumer inventories, with the curtailed supply being shared proportionately by customers in the United States and Canada.

During the first half of 1944, approximately 127,000,000 pounds of 25 per cent chestnut extract were produced, with the total for the year expected to be about 254,000,000 pounds, compared to the 1942 consumption of 392,000,000 pounds.

In a further effort to improve the general situation in tanning materials, the Office of Price Administration has now acted to provide that industrial users of chestnut oak, and hemlock barks pay no more for barks than they paid in a base period cited by the amendment in question, May 15, 1944, to July 15, 1944, inclusive. This base period is intended to cover the period in which most of the bark sales of the present peeling season will have been made, and to remedy a situation which froze prices of extractors, but left bark prices free. Bark prices are reported to have risen from $15 per ton, in March, 1942, to $20 per ton in 1944.

The Office of Price Administration has also amended its price regulation on quebracho extract imports to permit an increase of 5 per cent in present prices for warehouse deliveries of solid extract, covering a surcharge paid by importers since June 15 on ocean freight to U. S. ports; also to provide that sales made for boiler treatment and pharmaceutical purposes, amounting to about 3 per cent of imports, be removed from the regulation covering imported vegetable tanning materials, and placed under GMPR.

NEW PRODUCTS & PROCESSES

New Line of Aliphatic Derivatives

New aliphatic compounds consisting of the even-numbered normal hydrocarbons from C_8 through C_{18} and the corresponding olefins, alcohols, ethers, mercaptans, thioethers, disulfides, and sulfonic acids have been developed by the Chemical Division of The Connecticut Hard Rubber Co., New Haven, as a result of their research work in the synthetic rubber field. Most of these new chemicals are available in commercial quantities and are supplied in various grades from technical to "fine chemical".

The saturated *n*-alkanes are suggested for use as organic intermediates, laboratory solvents, and as standard hydrocarbons. The olefins, with the double bond at the first carbon, are interesting in organic synthesis, particularly as a starting material for dispersing agents, resins, oil additives, pharmaceuticals, and insecticides. Certain branch chain olefins, isomeric with the *n*-compounds of this series are available for laboratory research. The alcohols are also suggested as intermediates for chemical synthesis and for use in cosmetic preparations. The aliphatic ethers are an interesting series which can be used at plasticizers, impregnating agents, solvents, heat transfer liquids, as well as in the cosmetic field.

The high-purity aliphatic mercaptans present possibilities as polymerization conditioners, intermediates for synthesis, corrosion inhibitors, oil additives, insecticides, flotation agents, and alarm odorants. The thioethers and the disulfides are suggested for use as plasticizers, stabilizers, insecticides, oil additives, and flotation agents. The aliphatic sulfonic acids, available only in experimental quantities, are of interest as hydrogen soaps, and the salts as stabilizers, dispersing agents, wetting agents, and oil additives. The corresponding sulphones are available in limited amounts for experimental work.

Trichlorocumene in Pilot-Plant Quantities

Trichlorocumene (Isopropyl trichlorobenzene) $(CH_3)_2CHC_6H_2Cl_3$ is being produced in pilot-plant quantities by the Hooker Electrochemical Company, Niagara Falls, New York.

Obtained as a mixture of isomers, this chlorinated hydrocarbon is a colorless liquid with a mild aromatic odor. It is insoluble in water and soluble in alcohol, ether, and most common solvents. It is highly stable, being resistant to oxidation and hydrolysis, and has been found to be compatible with the following types of plastics. The nature of the resultant material in indicated as soft (S), rubbery (R), tough (T), and brittle (B).

Modified phenolic resin (S)
Benzyl cellulose (T) (B)
Chlorinated piccolyte (S)
Phenol-formaldehyde (S)
Ester gum (S)
Rosin (S)
Natural asphalt (S)
Methacrylate interpolymer (T) (R)
Polyterpene resin (S)
Piccoumaron (S)
Polyvinyl chloride (R)
Polystyrene (R)
Chlorinated rubber (R)

The makers have suggested many possible uses for the new chemical: hydraulic fluid, transformer, and dielectric fluids, anti-freeze additive for hydraulic, dielectric and heat transfer fluids; solvent for fats, oils, waxes, coal tar dyes, asphalts; solvent, diluent, and plasticizer for protective coating and insulating compositions; extractant for phenols, etc. from liquids such as waste waters; ingredient of insecticidal compositions, paint and varnish removers, paints, solvents and plastic compositions.

Physical Data:

Molecular Weight (Pure Trichlorocumene)	223.5
Freezing Rane, °C	–30 to –45
Boiling Range, °C	245 to 265
Refractive Index, n20/D	1.535 to 1.560
Specific Gravity 15.5°/15.5°C.	1.26 to 1.32

Water-Soluble Plastics Dye

A water-soluble dyestuff for acrylic and cellulose acetate plastics is offered by the Krieger Color & Chemical Company. Marketed as "Kriegr-O-Dip W," it is applied in a vat maintained at 160-170 degrees F. Suitable for molded, fabricated and extruded parts, it is non-inflammable and can be reused. The manufacturers stress the fact that the dye comes as a powder, affording economies in packaging and shipping.

Dimethyl Phthalate as Insect Repellent

Dimethyl phthalate—used for years as a plasticizer—has found widespread use as an insect repellent, the Du Pont Company has announced. The clear, nearly colorless and entirely inoffensive liquid is for some unknown reason highly unpleasant to mosquitoes, flies, fleas, gnats, sandflies and chiggers. It is partially effective against ticks.

Instructions for use recommend that clothing be sprayed with two or three ounces every five days. Applied to the skin, the repellent provides protection for one to six hours. Clothing may be sprayed while worn, although the eyes and mouth should be covered to avoid discomfort from a stinging sensation.

Military demands, amounting to several thousands of gallons monthly, have put the material on allocation, accounting for its scarcity for use in synthetic resin enamels. Described by the Army as vastly more effective than peacetime "fly dopes", it promises to be a post-war boon to civilians as well.

Water-Resistant Protective Cream

A new water-resisting hand protective cream for workers whose jobs bring them into contact with water-soluble cutting oils, dilute acids, alkalies and other water-chemical mixtures, has been announced by the Du Pont Company.

Known as "Pro-Tek No. 2" hand-protective cream, the new cream is intended for operations where water is present.

Applied to the hands and arms before starting work, it forms a flexible, slightly greasy film which acts like an invisible glove. One application lasts from 3 to 4 hours and may be removed by using an industrial hand cleanser or washing in hot water with a mild soap. The new product is intended primarily for use in industry.

New Process for High Tenacity Polymers

Recent patents to the Celanese Corporation of America claim that polymers of high tenacity, suitable for filaments and bristles, can be made from polyvinyl esters or cellulose derivatives. The hot extruded filaments are cooled rapidly through a temperature drop of 50 to 200 degrees such that the final temperature is in the neighborhood of zero Centigrade. This treatment is said to improve the strength characteristics of the filaments.

Progress Reported on New Sulfonamide Drug

The anaerobic bacteria responsible for gas gangrene are suppressed by a new sulfonamide, "Sulfamylon", according to the Winthrop Chemical Company. A recently devised method for the determination of its concentration in blood will render possible an accurate clinical investigation, it is said, and hasten its development to a practical stage.

"Sulfamylon" is a derivative of *p*-benzylaminesulfonic acid instead of the more usual sulfanilic acid, and it differs from the latter group in that its bacteriostatic action is not inhibited by *p*-aminobenzoic acid.

Odor Neutralizer for Isopropyl Alcohol

A product to depress the objectionable odor of isopropanol without perfuming has been announced by the Magnus, Mabee & Reynard Research Laboratories. This oil

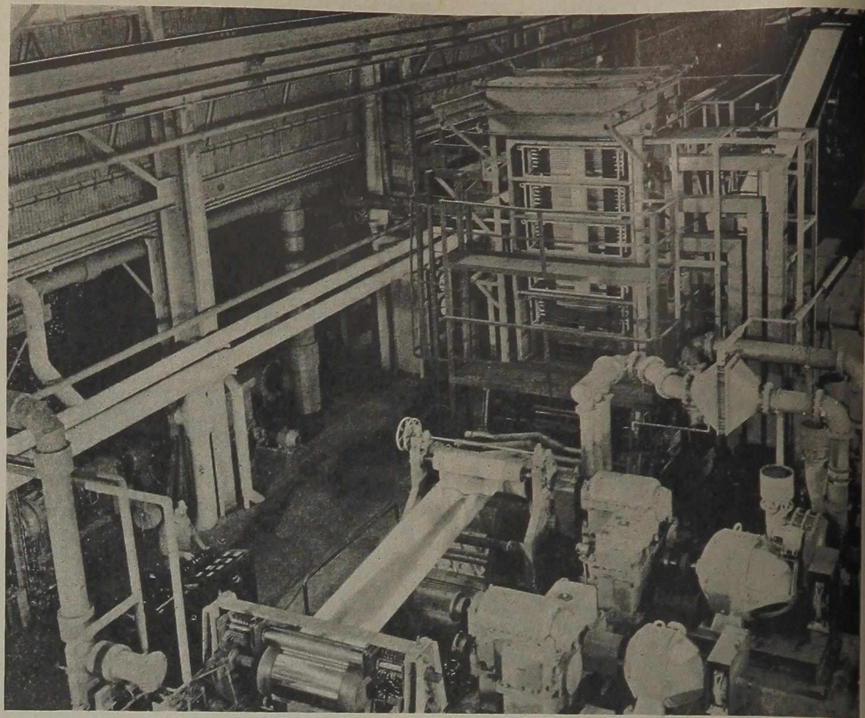
has lasting and powerful coverage properties, and causes no distortion of subsequent additions of perfuming ingredients. Tests have shown that the use of this economical neutralizer makes possible a reduction in the amount of the perfume oil required to provide the odor identity common to the product.

It has been termed "Neutralizer 1A No. 1 MM&R" by the manufacturer.

Organic Finishing of Copper Alloys

The Ebonol "C" process of the Enthone Company, New Haven, is said to produce a stable, adherent, non-reactive cupric oxide coating on copper alloys that gives high adhesion of lacquers, paints and enamels under severe weathering conditions. The finish obtained is nap-like in nature presenting a relatively absorbent base for the paint to be anchored. The process is suitable for treating copper alloys containing from 60-100% copper. The finish is applied by simple immersion of the work in a dilute solution of the salts operated near 210° F. The treating time is approximately 10 minutes.

Electrolytic Tinplate Brightened by Induction Melting



The tower in the center of the picture is where electrolytic tinplate is brightened at the rate of 1000 feet per minute. Six 200 kw, 17,000 V, 200,000 cycle Westinghouse oscillators supply high frequency power for inductively heating the tin coating until it melts and flows. The very narrow area wherein this transformation occurs can be seen in the picture as a concave line transverse to the strip midway between the guard rail of the lower platform and the bottom of the upper platform.

Fungus-Resistant Coating for Plastic Parts

A new fungus-resistant coating for phenolic parts of communications equipment to be used in tropical climates has been developed by Maas & Waldstein Company, Newark, N. J. It is designed for application on phenolic insulators, terminal blocks, junction blocks, and the fixed windings of motors, generators and dynamotors.

Marketed as Durad Fungus Resistant Coating No. 524, it is applied by spray, dip or brush. It has been successfully tested for dielectric strength, hardness, flexibility, and resistance to salt spray and thermal shock.

"Tropicalization" of communications equipment with fungus-resistant coatings is necessary because the high temperatures and humidity of tropical climates favor the growth of fungi. The growths cover the equipment and absorb moisture, causing short circuits and drifts.

Zinc Loss Prevented in Plating Baths

A new method of preventing the loss of metal from the zinc anodes in plating baths during off hours—by passing a weak current in a direction opposite to the plating current—has been developed in the research laboratory of E. I. du Pont de Nemours & Co.

A small counter current applied between a zinc anode (as cathode) and a steel plate in the bath (as anode) is highly effective in eliminating chemical attack of the zinc. For most installations only a two-volt storage battery, charged constantly with a small rectifier, suffices. The total current required for a 1,000 gallon still tank is approximately 1¼ amperes, and a 1,000 gallon barrel tank with more anodes requires about 2½ amperes. In effect, the counter current neutralizes the natural tendency of zinc—a highly active metal chemically—to dissolve.

Self-Curing Rubber Announced by Thiokol

A new liquid synthetic rubber that promises to open vast new fields of application for "rubberlike" materials has been announced by the Thiokol Corporation of Trenton, New Jersey. Designated Thiokol LP-2, the unique polymer is a low-polymer polysulfide of 100% solids, having no water or solvents present. It can be cured in controlled periods of from ten minutes to twenty-four hours without heat or pressure by the simple addition of vulcanizing agents, the most successful of which are metallic oxides and peroxides.

Combining the excellent low temperature flexibility and solvent, ozone, and aging resistance of other high grade synthetics, the new rubber is particularly noteworthy for its ability to set without shrinkage at room temperature, a feat impossible with any other known rubberlike material.

Application possibilities for this new material take advantage of this unique property. Because it does not shrink when set, LP-2 offers an excellent filling material in the isolation of parts against vibration or from one another, particularly in the electrical field. As a sealant and caulking compound for pressurized airplane cabins, integral wing fuel tanks, solvent containers and the like, LP-2 has already proved its effectiveness. In coating formulations, it offers an excellent gasket and paper or cloth container coating, particularly in building a heavy coating or where solvent resistance and low temperature flexibility are required. Printing rolls, valve seat discs, plaster molds and a broad variety of other objects can be formed from this liquid rubber. A wide number of post-war consumer uses for this revolutionary rubber is foreseen by the makers.

Synthetic Adhesive for Plywood Bonding

Announcement of a new synthetic resin, a low-temperature-curing adhesive of the phenol-formaldehyde type for bonding a wide variety of heavy lumber and timber constructions, is made by the Resinous Products & Chemical Company of Philadelphia. Known as Amberlite PR-75-B, this new resin is useful in the manufacture of oak ship keels and laminated

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structural members for columns, timbers, arches and trusses and is proving especially adapted to aircraft work, such as wing and fuselage assembly gluing, hollow spar construction and scarf jointing.

This new Amberlite is supplied as a viscous reddish-brown solution, which is infinitely dilutable with alcohol, and can also be diluted with water to any practical spreading consistency needed. Amberlite PR-75-B has a storage life of a year at room temperature. It is used with Catalyst P-79 which is added at the time of use to effect proper cure. The cured glue line exhibits a pH in the range 6-7 and meets the strength and durability requirements of Army-Navy Specification AN-NN-P-511b (Plywood, Aircraft, Flat Panel) as well as the strength, durability and acidity requirements of Bureau of Ships Specification 52-G-12 (Interim) (Glue, Phenol-Formaldehyde, Low Temperature Setting) and the new Army Air Force Specification 14124 (Glue; Low Temperature Setting).

Preparation of the glue is a relatively simple operation, requiring no special equipment nor unusual techniques. The resin solution is first weighed into a suitable container, the catalyst is then added, and the mixture is stirred until the catalyst is uniformly dispersed. Water at normal room temperature is added to the mixture, and after brief stirring the glue is ready for use.

After correct formulation, the glue contains approximately 70% solids and exhibits a viscosity which is suitable for spreading by brush or mechanical spreaders. Either water or alcohol is used as the diluent, and amounts can be varied to suit individual requirements. The working life of the glue shoud be considered as approximately four hours at 70° F. and the glue can be spread at any time throughout the period of its useful life.

Cyclohexylamine in Steam Heating Systems

A new phase of study aimed at paring the costs of combating corrosion in Government-operated steam-heating systems has been undertaken by the Bureau of Mines, it was revealed today when the Bureau announced publication of an interim report describing research in the use of cyclohexylamine, one of the principal chemicals employed in neutralizing destructive carbonic acid formed in the condensed steam.

Although this chemical (cyclohexylamine) does lessen corrosion, its cost has been excessive in many instances because it is extremely volatile and escapes from the steam system. Careful tests in a steam-heating system used at an Army camp showed that more than 75 per cent of the make-up amine (cyclohexylamine added to remove acidity) escaped at vents in the steam system and the deaerating heater, A. A. Berk, associate chemist in the Bureau, reported in the new publication, "Observations on the Use of Cyclohexylamine in Steam-Heating Systems."

"Corrosion has been reduced, but in some cases uneconomically large quantities of make-up amine were required," Berk observed. "It was found necessary to supply amine to neutralize all the carbon dioxide in the steam as well as that normally in the condensate. Condensate, returned to the boiler, recirculated carbon dioxide as well as amine. Carbonates and bicarbonates in the make-up water were a source of additional carbon dioxide in the steam, requiring make-up amine for its neutralization. This is true of any treatment that depends on volatile alkaline chemicals, of which cyclohexylamine is one."

Berk commented that, in tests on Army equipment, no cyclohexylamine was lost with the boiler blowdown water. He said that the amine which was added to the boiler water in batches tended to enter the steam mains very rapidly, causing high peak concentrations of the alkaline chemical followed by periods during which the condensed steam was acidic, or harmful to steam-heating equipment.

In the studies which are continuing the Bureau seeks either to cut the expense in using cyclohexylamine or find a suitable substitute which would lower the costs of treating boiler feedwater so the condensed steam will be less destructive.

A copy of the publication, "Observations on the Use of Cyclohexylamine in Steam-Heating Systems," Report of Investigations 3754, may be obtained without charge from the Publications Section, Office of Mineral Reports, Bureau of Mines, Department of the Interior, Washington 25, D. C.

Goodrich Announces Synthetic Adhesives

The B. F. Goodrich Company, Akron, has announced the development by its research staff of a new line of synthetic rubber adhesives.

One is for general "utility" use and is a type of adhesive which will adhere to almost any clean surface. It serves these purposes as well as natural rubber cements in the same field, the company says.

Synthetic cements are available for heat vulcanization, air curing or cold adhesions. The compounded synthetic cements are suitable for fabric, leather and synthetic adhesions, to themselves or to each other. These adhesives have a non-toxic solvent, and will give an excellent bond with a large variety of materials. They give the same bond when used with cured or uncured Neoprene that rubber cements give with natural rubber.

For metal adhesion, two special cements in what is known as the Plastilock 300 series have been developed. The first is used with vulcanized Neoprene when it is bonded to porcelain, metal, etc., while the second is used with uncured Neoprene for the same purpose.

Water Soluble Resin Emulsions

After extensive experimentation in practical use, a water soluble, coumarone-indene resin emulsion, Nevilloid C-55, has been perfected by The Neville Company, Pittsburgh, Pa.

Nevilloid C-55 is believed to be the first coumarone-indene emulsion offered commercially. It represents an improved product, having been offered experimentally to a number of manufacturers and embodying the results of their experiences and suggestions.

The new product will stand dilution with water, and exhibits resistance to break by freezing. It has been cooled to 10° F and heated to 77° F for three cycles without showing a break. Its film is continuous and cohesive and will withstand considerable flexing.

Nevilloid C-55 possesses valuable properties for use with latex. It can be incorporated with latices of natural rubber, GR-S or Hycar OR without prior dilution or without causing coagulation of the rubber by the addition of a 10% aqueous sodium hydroxide solution only, in an amount sufficient to give a pH of 10. A typical mix by volume is:

20 parts Nevilloid C-55
2 parts 10% aqueous sodium hydroxide
20 parts Latex
} —pH 10

Without the use of sodium hydroxide to pH10 it is possible to incorporate Nevilloid with latices only if the solids content of each emulsion is reduced to 10% by weight by dilution with water. Mixing undiluted latex and Nevilloid causes coagulation of the rubber.

Nevilloid C-55 blends with alkyd resin emulsions of various types without pretreatment, uniform although somewhat opaque films being obtained. It is usable with emulsions of paraffin wax, carnauba wax, and Hydrowax. Melamine resin emulsions, like Beckamine P-2, give clear films.

Dry pigments may be ground directly into Nevilloid C-55 on a pebble or three-roll mill, using those designed for water paints such as Cryptone; Surfex is satisfactory as an extender.

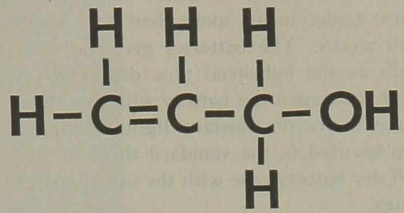
Nevilloid C-55 is compatible with Trimol, a water miscible drying oil; and can be used with sodium silicate solutions. In general, it is miscible with all oil-in-water type emulsions and would yield uniform films with emulsions of materials which are ordinarily compatible with coumarone-indene resins.

Emulsions of resins of lower melting point than that of Nevilloid C-55 are being produced where safer and more plastic compositions are required.

Carbide and Carbon Chemicals Corporation

Announces Commercial Production of

Allyl Alcohol



Useful Raw Material for Synthesis

Vitally needed for war production, Allyl Alcohol is now available in commercial quantities from Carbide and Carbon Chemicals Corporation at prices that make it an important intermediate in industrial chemical synthesis.

Although most of the production of Allyl Alcohol is for high-priority uses, it is expected that substantial amounts will now be available for new users and for expanded consumption by those already using this chemical.

PHYSICAL PROPERTIES	
Molecular Weight	58.05
Boiling Point	96.9°C. at 760 mm.
Vapor Pressure	17.3 mm. at 20°C.
Flash Point (open cup)	85°F.
Specific Gravity 20°/4°C.	0.8520
Weight per gal.	7.11 lb. at 20°C.
Water Solubility	Complete

Since it has both a reactive, unsaturated linkage and a hydroxyl group, it has unusual applications as a chemical raw material. It can be converted to acrolein, propionaldehyde, glycerin chlorhydrins, or glycerin itself.

Allyl Alcohol forms esters which can be polymerized alone or with other materials to form resins characterized by great clarity, surface hardness, and ease of fabrication at low pressures. Certain allyl esters are used in perfumes, flavors, and as pharmaceutical intermediates. Allyl halides made from Allyl Alcohol are used for introducing the allyl group into barbiturate sedatives. The halides are also intermediates in the synthesis of the anesthetic cyclopropane.

Write for samples and the latest information on the availability and uses of this versatile chemical.

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

Carbide and Carbon Chemicals Corporation

Unit of Union Carbide and Carbon Corporation

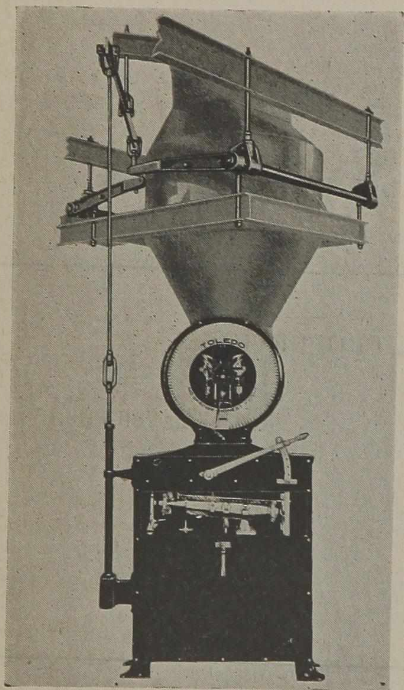
30 East 42nd Street UCC New York 17, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

NEW EQUIPMENT

Hopper Scales QC 442

Adaptability to a wide range of operating conditions is claimed by the Toledo Scale Company for its Model 2500, used in large-scale batching and compounding operations. The suspension hopper levers are built so they may form a rectangle of almost any size, and they may be installed around the sides of the hopper or tanks. This is a very flexible design and one which permits installation in a minimum of space without interfering with inlet and outlet connections, gates or similar equipment.



Several types of heads are available to adapt Toledo Suspension Hopper Scales to a variety of installation requirements. Also, for a recording of the weights of each ingredient going into a batch, there are available: (1) Printweigh records in strip or ticket form; (2) Graphic Records, showing the time and amount of each weighing. Where compounding is to be completely automatic, electric cut-off attachments with automatic dial indication permits a complete cycle of operations with the push of a button.

Overhead supports are regularly employed with scales of this class. The extension lever is similarly supported by a single suspended rod. The weigh hopper or tank is carried in turn by four load suspension rods connected to the four load pivots of the main levers.

Rechargeable Flashlight Battery QC 443

A rechargeable wet flashlight battery for industrial use built on the principle of the automobile wet storage battery, especially valuable for operations where long continued and steady usage of flashlights is necessary, is announced by the B. F. Goodrich Company.

The company claims that the wet storage batteries are more economical than dry cells when flashlight service is required in volume, or where batteries require replacements more than once every two weeks. The batteries give the same light as the industrial type dry cells. A freshly charged wet battery will give about three hours of constant light. Batteries can be used in the standard three or five cell dry battery case with the use of spacer plugs.

Substantial savings when the wet batteries replace the dry cells is one of the big advantages of the new type battery, which will outlast the life of 400 dry cells, the company claims.

Oil Clarifier QC 444

A new standard line of self-contained automatic recirculating clarifiers known as the DRU Series, has been announced by the Briggs Clarifier Company. This new line is designed to solve a specific oil filtration problem. It is a completely self-contained unit with electrically operated pumps and heaters which operate independently of the engine or lubrication system. The DRU Series is especially suited for the lubrication system of Diesel, gasoline or natural gas engines where operating temperatures are too low or pump capacities are inadequate for maximum filtration efficiency.

The DRU Series is composed of a standard by-pass clarifier, with dual rotary positive displacement pumps and electric heater installed in the base beneath the clarifier. If pumps stop operating, the heater is cut off—positive protection against overheating the oil. Recirculation of oil in the clarifier is independent of oil entering and leaving the unit. Maintaining correct temperature of the oil is accomplished by use of a bayonet type heater, the watt density of which is not sufficient to scorch the oil on the heater surface. However, as further protection, the element is installed so that a high velocity of oil is maintained around it.

Windup Machine QC 445

A constant-speed, constant-tension windup machine for wire, rubber, textile fabrics and other continuous materials is declared by the manufacturer, the Industrial Oven Engineering Company, to be the only one of its kind in existence.

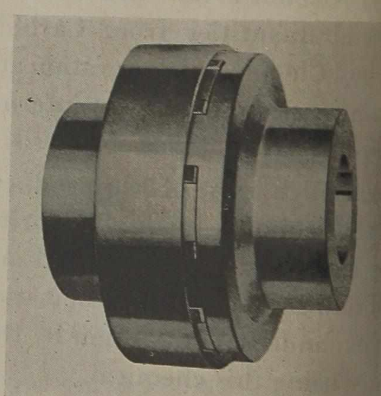
It consists of a single machine, complete with a self-contained power unit, drive rolls, demountable drum or reel shaft, and tension and speed adjusting mechanism. The winding is accomplished by hydraulic or electronic units, without the use of slip belts, clutches, friction pulleys or like devices. The speed can be varied during operation without changing the tension, and the tension can be varied independently from a few ounces to hundreds of pounds.

Shaft Coupling QC 446

Protection that secures operators against the catching of clothing, or incautious handling is embodied in the new L-R Type "C" shrouded flexible coupling announced by Lovejoy Flexible Coupling Company.

The essential feature of this new protection is the outside steel collar which holds the load cushions in place. An extension of this collar which encircles the coupling safeguards material and fingers from the heads of the bolts that secure the load cushion retainers. The boltheads are concealed, yet easily and conveniently reached when necessity arises.

This improvement effects more compact design with overall smoothness of external surface.



L-R Flexible Couplings of the Type "C" class are designed for heavy duty services from 4.60 to 806 h.p. at 100 r.p.m. Cushions of various materials adapted to the particular service on which the coupling is used are free to deform to every emergency—for correction of misalignment, protection from shock and vibration, and other transmission troubles which affect both drive and driven machinery.

Ethyl Cellulose Dipping Tank QC 447

An ethyl cellulose melting and dipping tank has been designed by the Youngstown Miller Company, Sandusky, Ohio. The machine shown below is now in operation and is being used to dip spark plugs at the rate of 4500 plugs per hour. This is Model 60 and has a capacity for 100 pounds of plastic per hour. Units are

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

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

AS WETTING AND SURFACE-ACTIVE AGENTS . . . in paints and printing inks, for coal and graphite wetting.

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

DRESINATES

FOR EMULSIFYING OILS . . . PAINTS . . . ASPHALTS

Low in cost . . . available in quantity . . . Hercules Dresinates* are finding important use in the production of permanent, uniform emulsions.

These neutral resinates dissolve quickly and completely in water. They emulsify with vegetable, animal and mineral oils, paints, and asphalts. They speed production of more stable cutting oils, drawing compounds, pine oil disinfectants, solvent cleaners, fat-liquoring compounds, furniture polishes, and paint, asphaltic, tar-acid, textile-oil emulsions.

To suit individual needs, Dresinates are available in several types—in powdered or liquid form. For information on the Dresinate most advantageous for your particular operations, mail in the coupon—today.

*Reg. U. S. Pat. Off.

HERCULES

★ CHEMICALS FOR INDUSTRY ★

Industrial Chemical Division
PAPERMAKERS' CHEMICAL DEPARTMENT
HERCULES POWDER COMPANY
INCORPORATED
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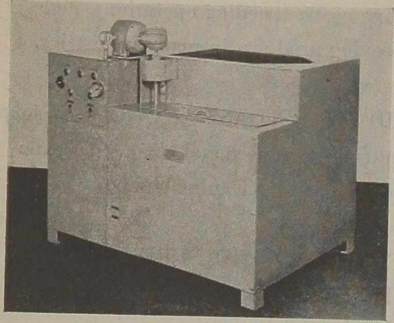
My problem is . . . .

Name . . . . Position . . . .

Firm . . . .

Address . . . . PD-41 available with smaller capacities and in larger sizes and with various dimensions of the dipping compartment.



Indirect heat is employed. Thermostatic control is maintained over both the heat exchange medium and the plastic to insure that neither rises over their maximum allowable temperature. Extremely close control and uniformity of temperature is achieved with remarkably low heating surface temperature. The plastic is circulated in such a way as to have constant level in the dipping tank and continual removal of the surface film that tends to form. The units are complete with all controls necessary to melt plastic and maintain it at the required dipping temperature.

Pressure Regulator QC 448

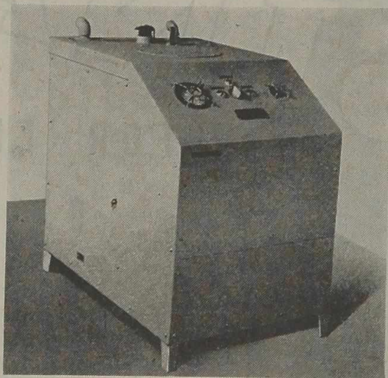
The Moore Products Company has developed a new regulator designed to hold air pressures constant regardless of changes in flow as well as variations in supply pressure. This regulator operates on the pneumatic "null" balance principle and may better be described as a pressure controller, since the main air valve is operated by a detecting nozzle. This nozzle operates with a constant differential pressure to hold the manual loading spring at essentially the same position, regardless of variations in flow or in supply pressure. An automatic bleed is provided, to operate when a reduced regulated pressure is required. The automatic bleed also serves to permit reverse flow when the regulator is used as a limit control on industrial instrument applications. These regulators are available in three standard ranges: 0-15 p.s.i.; 0-30 p.s.i.; 10-50 p.s.i.; and are suitable for use on supply pressures up to 150 p.s.i. Provision is made for panel or pipe mounting as required.

Oil Heater and Circulator QC 449

Youngstown Miller Company, Sandusky, Ohio, announces an oil-heating unit, Model S-12, to provide heat transfer oil to machines which require elevated temperatures.

A typical model or size has 12.8 KW of electric heaters applied externally to the heating portion of the tanks and capacity for 12 gallons of oil. It has three thermostats, each of which can be set for a desired temperature by the user. A simple selector switch enables changing the controlled temperature from one to another by putting either of the thermostats into the electric circuit. Thus the operating temperature can be readily changed according to the requirements from day to day without resetting the thermostats.

The heated oil is circulated by a rotary pump driven by ½ h.p. 1150 r.p.m. direct-connected motor, and the pump is so located that any drip from the stuffing box returns to the main circulating oil pool. A selector switch is also provided to enable operating with the circulating pump without heat; circulating pump with a portion of the heaters; or circulating pump with all of the heaters. Lighted jewels signal the setting which the operator is working with at any particular time. A float inside of the heating tank indicates visibly the level of oil. A thermometer shows the temperature. Provisions are made to minimize the contact of the oil with air so as to reduce the tendency for oxidation. By suitable adjustments of the thermostats any three temperatures can be pre-selected between 200° and 500°, inclusive.



Both larger and smaller units are available.

Porosity Tester QC 450

An apparatus which can determine the relative porosities of materials has been patented and assigned to the B. F. Goodrich Company. The porosity is tested by the degree of vacuum in a chamber which is an important part of the apparatus. Chief object of the invention is to provide the mechanism for determining the relative porosities of various materials by drawing air or gases through the material and indicating the rate of flow. The apparatus was originally designed for testing the porosity of various types of sponge rubber, but it has many other applications, the company believes.

So small and compact that it can be easily lifted and transported with one hand, the apparatus consists of a vacuum chamber placed in contact with the material to be tested, a constant speed power driven fan for evacuating air from the vacuum chamber, an outlet port for emitting the air, a pressure gauge to measure the degree of partial vacuum in the chamber and indicating this on a fixed scale. An arm connected with the manually operated switch which starts and stops the fan forces and holds the measuring indicator in position when the switch is turned off. The scale used with the apparatus is adhered to a piece of translucent plastic and is reproduced on a transparent piece of photographic film, with a lamp placed behind the printed scale so that the degree of porosity can be easily read. With highly porous material, the vacuum created by operation of the apparatus will be slight, and this vacuum increases as the porosity decreases. The scale used with the apparatus may be graduated in absolute units or have no units and be made to show the relative porosities of two or more pieces of material.

Plastic Tube Coupling QC 451

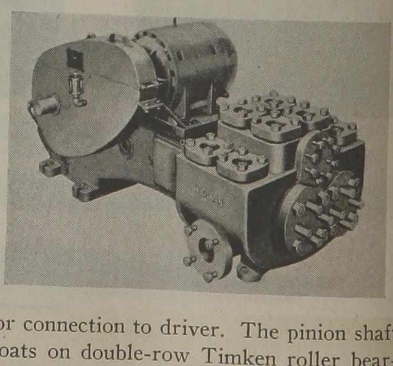
A self-flaring coupling for flexible plastic tubing has been announced by Packless Metal Products Corporation.

The members of the coupling are simply screwed together, forming a uniform-walled flare with no thinning at the end to weaken the tube. No flaring tools are required. It is claimed that the construction, by providing a union effect, eliminates twisting and distortion as well as split ends. Assembly may be made right at the job since only simple shop tools are required and the tubing is not preheated.

Made for tube sizes ¼" to ¾" O.D., the couplings may be reused indefinitely.

Heavy-Duty Pump for Oil Fields QC 452

A recent development of the McGowan Pump Division of The Leyman Manufacturing Corporation, Cincinnati, is a pump of heavy duty design, engineered for oil-field service. The power frame is heavily ribbed iron casting; the liquid end is made from very fine grained, controlled cast iron. Gears are continuous tooth herringbone, and the pinion is forged integrally with the shaft, which extends to both sides

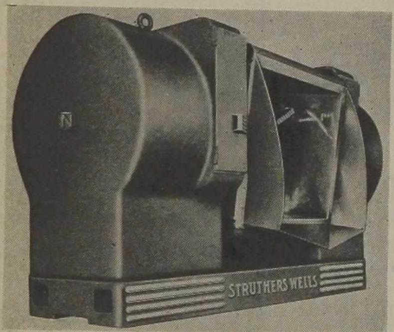


for connection to driver. The pinion shaft floats on double-row Timken roller bearings while the crankshaft also turns in Timken roller bearings. Crank bearings are adjustable by means of shims, and this cap does not support the weight of the bearings, the crankshaft and gear; these

are supported in a separate housing, purposely made larger for easy insertion of these moving parts. Consequently this pump is easily dismantled. The liquid end is a duplex side pot type with a suction on either side, available in commercial alloys depending upon requirements.

Shredding Machine QC 453

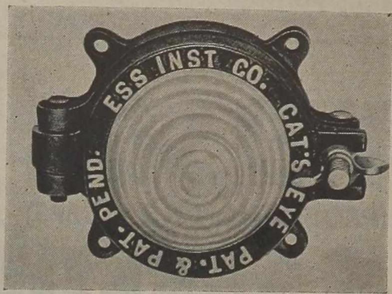
Several important advantages are claimed for the new batch type shredding and mixing machine, recently introduced by Struthers Wells Corporation. By the use of an entirely different form of mixing element a notable improvement is realized in the performance of this new machine, when shredding such products as alkali cellulose, paper, plastics and other fibrous materials.



The action of these improved mixing blades, in combination with a serrated saddle and specially constructed mixing chamber, is said to minimize the tendency for moistened pulp to collect in the corners of the trough above the blades and escape treatment. The use of corner irons or large fillets to prevent pocketing is generally unnecessary in the new machine, resulting in increased production and quality of product. There is also a substantial increase in jacket area through elimination of the large corner fillet formerly required. According to the manufacturer, the machines are constructed of any commercial metal or alloy, and are now available in sizes up to 4000 gallons working capacity.

Firebox Window QC 454

The "Cat's-Eye," announced by the Ess Instrument Company, Fort Lee, New Jersey, enables furnace- and boiler-room operators to see the flame characteristics in the firebox. The center of the "eye" is



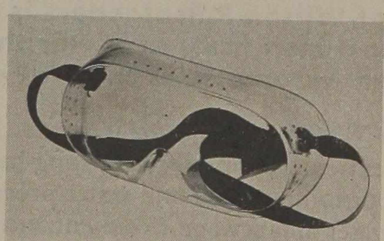
clear to show the flame in natural color, and the outer frosted portion is a shadow-screen reflecting changes in combustion. They are made in three models—external or internal lugs, or threaded for pipe extensions.

New Method for Study of Surfaces QC 455

"Faxfilm," a development by the R. D. McDill Laboratory, Cleveland, permits a three-dimensional study of various surfaces. By the use of a solvent, one surface of a transparent plastic film is softened enough to permit the making of a contact replica of any surface. This small impression is mounted in a cardboard frame which fits any standard projector, where it can be enlarged to 100 diameters or more.

Plastic Goggles QC 456

The "Saf-I-Shield" goggle of non-in-



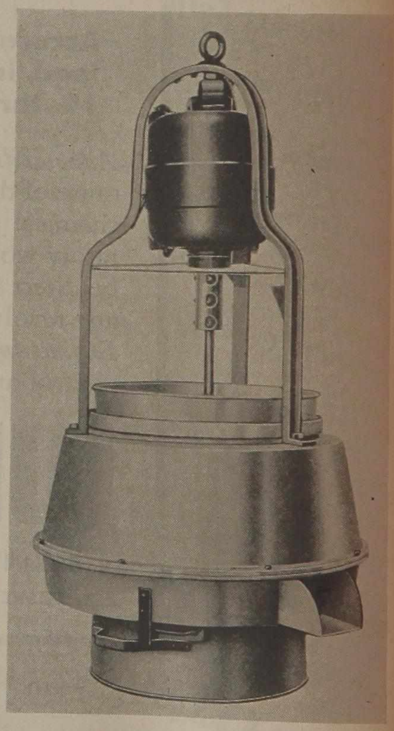
flammable plastic construction is manufactured by the U. S. Safety Service Co., Kansas City, Mo. It allows clear vision both to the front and sides and can be worn over glasses. Made in both Lucite and acetate, the goggle is treated with "No-Scratch" and is so constructed that lens does not touch surface when placed on table.

Voltage Breakdown Testing Device QC 457

An instrument offered by Industrial Instruments, Jersey City, is designed to test the breakdown voltages of various materials. Operating directly from a 110-130 volt 50/60 cycle A. C. line, the operating range of the machine is 0 to 10,000 volts D. C. or 0 to 8000 volts A. C. Breakdown is indicated by a red signal light, while a built-in meter indicates the direct-reading voltage. Current limiting resistors safeguard the equipment against shorts by limiting the current to about 50 milliamperes. Safety for the operator is provided by a drawer-switch fixture; the voltage is applied when the drawer, containing the material to be tested, is closed.

Rotary Strainer QC 458

A strainer made by the Rotospray Manufacturing Company, Chicago, features a vertical screen through which the liquid, broken into a fine spray by centrifugal action, is propelled at a rapid rate. The residue, trickling down the inside of the screen, is recirculated by a centrifugal pump until the residue tank is filled with rejected material only.



It is designed specifically for straining liquids carrying materials in suspension, and for this purpose it is said to assure high efficiency and low maintenance cost.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (9-4)

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

QC 442	QC 445	QC 448	QC 451	QC 454	QC 457
QC 443	QC 446	QC 449	QC 452	QC 455	QC 458
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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Many Packaging Substitutes Will Survive War

Many changes in the packaging of chemicals have taken place since the beginning of the war. Concerned with the future of packaging, we must take into consideration what we used prior to the war, what we have been forced to use lately, and what we will use when all materials are again available.

T. Pat Callahan

Prior to the war we used steel drums, boxed carboys, paper and textile bags, wooden and fibre barrels, fibre boxes, tin cans and glass bottles. There was also a multiplicity of individual packages for individual products. Many chemicals coming within the range of dangerous materials as defined by the Interstate Commerce Commission, were packaged in specification containers, and these containers, through cooperation with the Bureau of Explosives by the Manufacturing Chemists' Association, were the safest and best known for this class of products. But the chemical industry had become cognizant of the vast problem of packaging chemicals which were not regulated by the Interstate Commerce Commission and had laid important groundwork through the Manufacturing Chemists' Association to study the problem with regard to possible economies as well as to better packaging.

This program was abandoned as soon as the Containers Division of the War Production Board was established. It became obvious that the use of materials would have to be controlled; and what might ordinarily be best, might not be easily obtainable under war conditions. Although this program had to be postponed, the desire on the part of many chemical manufacturers to pursue it more strongly has been spurred by the vast amount of knowledge gained from the necessity of using substitutions during the past three years.

Many chemicals are not being packaged now in the containers which were used prior to the war. From the many substitutions have been learned lessons which will enable the shipper of chemicals to shape his future packaging policies. He has learned to his surprise that many substitutes were not only as good—but better; and not only as safe—but safer. He has learned that methods of manufacture, construction, application, handling and a lot of other things have been changed because of experience gained in shipping materials in huge quantities to the far continents of the world. He has learned that, while prior to the war he would never have thought of shipping for great distances a multiwall bag containing flour, for instance, or a solid fibre drum containing plastics, this is now being done—and the material is getting there safe and sound.

How many of these substitutes will survive the war? It is necessary to evaluate the ability of any chemical container to stand on its own feet by answering these questions: Is it safe? Does it protect the product sufficiently from all known hazards? Is it economical?—that is, does it deliver and store the goods as safely and in as good condition as the former more expensive one? If the answers are yes, it looks as if some of these substitutes will survive. We have learned a lot about handling, shipping and storing of materials during the war which will prove very helpful in the time to come.

Reuse of Steel Drums

Shortly before our entrance into the war it became apparent that steel would become a critical material. The chemical industry, like all others using steel drums, initiated a program of reuse which was, when the threatened shortage became a fact, the only recourse to provide a sufficient quantity of containers. As steel drums were needed more and more for the armed services, less became available for the chemical industry. This necessitated rigid control over the handling of steel drums, and it became necessary to demand their return. If a company failed to comply with the reuse program of the Containers Section of the War Production Board, it was refused further purchases of drums until compliance was obtained.

This program is still in effect, of course, but serious attention must be given to the time when steel is again readily available and the chemical industry returns to the use of single-trip drums. The standard 18-gauge 55-gallon drums, referred to as single-trip containers, have made as many as five or six trips successfully; and the argument might well be advanced that they are too good for a single trip.

But there are a great many other factors to be taken into account before any decisions are made: chief among these is the avoidance of contamination. Especially does this apply to chemicals, and it is significant that prior to the war many manufacturers shied away from second-hand or reused containers. Moreover, there are many expenses involved in using drums more than once; namely, return freight, washing, repainting and extra handling. If these items are properly considered, little if any saving will accrue to the shipper from the reuse of drums. Then, too, appearance—an increasingly important consideration in the post-war period—is definitely enhanced by the use of new containers.

Regulations of the Interstate Commerce Commission prescribe heavy steel drums for the movement of acids and other dangerous chemicals. These drums always have been, and always will be returnable; the high cost of their special construction makes that necessary. Aside from these, however, the question of reusing steel drums is still a moot one.

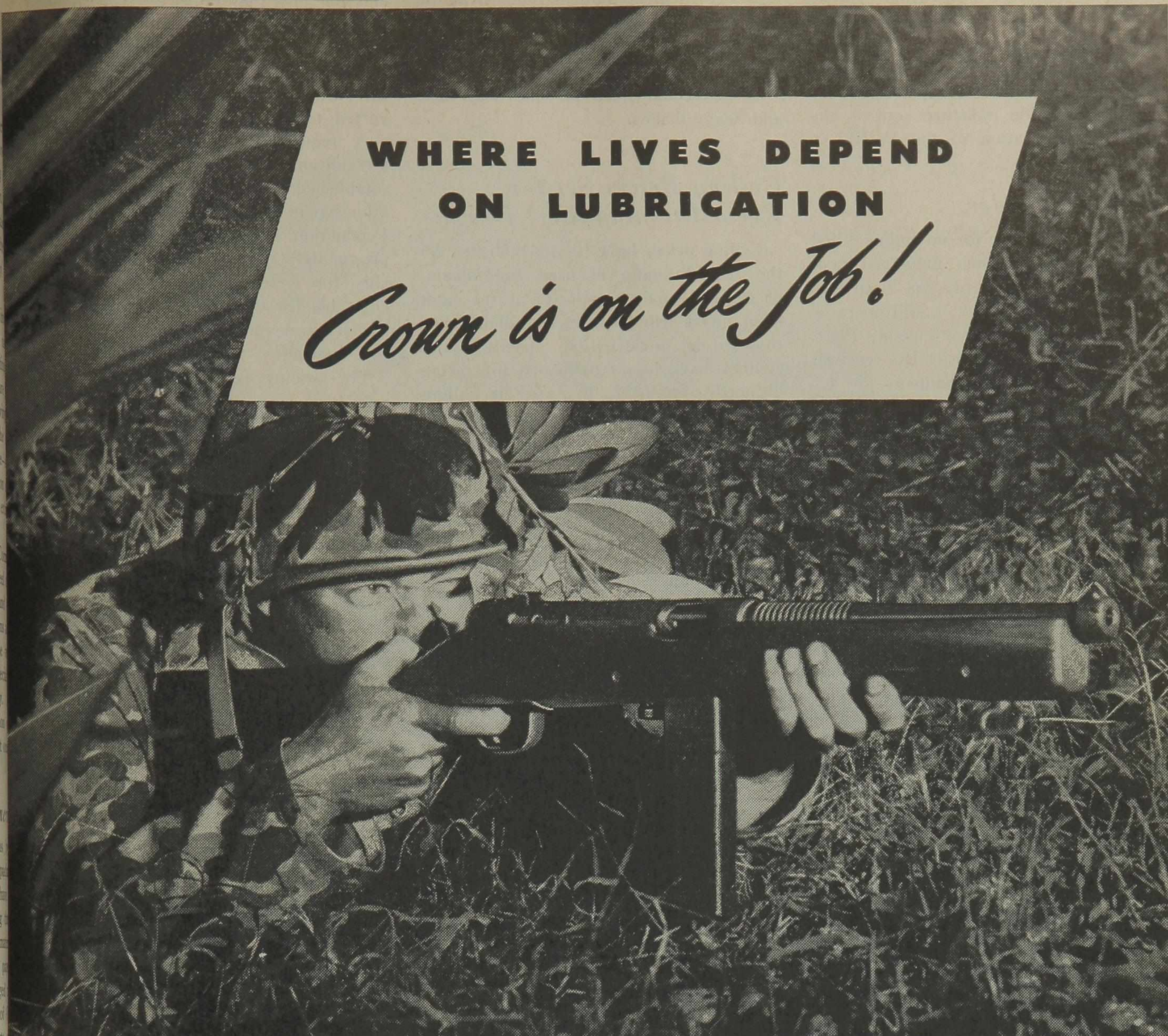
Limitations on Moistureproof Containers

The most serious restrictions by the War Production Board upon packaging during the past several weeks have been those restricting and regulating the use of paper and moisture-barrier materials; i.e., laminations or coatings on paper to insure protection to the packaged material. The recent amendment of Order L-279 lists the specific products which may be packed in paper shipping sacks, and Conservation Order M-380 of July 21, 1944, states that no manufacturer may deliver barrier materials in roll or sheet form except to converters or the Army and Navy; and no converter may deliver these materials in any form other than processed sheets except to the Army and Navy.

Moisture vapor-barrier material is defined by division officials of the War Production Board as any laminated or coated material composed of the following: paper laminated to metallic foil with or without a textile backing, the foil being coated with, or laminated to, a heat-sealing medium approved for Method II (dehydrated) packaging, such laminated or coated material having a maximum moisture vapor transmission rate of 0.25 grams per 100 square inches per 24 hours.

The entire production of these types of barrier materials is needed by the Army and Navy for dehydrated packaging.

Limitation Order L-279 definitely limits the products which may be packed in asphalt- or wax-impregnated paper



You can't coddle machine guns or airplanes in the field! Mud and sand . . . rain and snow . . . are the regular routine on the front line . . . and American lives depend on keeping them in action.

Lubricating Oil for machine guns and airplane instruments . . . packed by the Lehigh Chemical Products Co. of Ambler, Pennsylvania . . . travels right up to the battlefront in cans supplied by Crown.

Just one more example of the way in which Crown is bending every effort to provide containers for every need of our fighting men while keeping production on the highest possible level for the essential packaging requirements of the home front!

CROWN CAN

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

shipping sacks. Conservation Order M-380 also limits the products which may be packed in bags with metallic foil. These two orders prohibit the packaging of materials in multiwall paper bags fabricated to provide moisture control except under regulation of the WPB.

Drum Up-Ender

A simple appliance for up-ending filled steel drums—a common industrial task involving injury hazard—has been devised by Alvin H. Potter, a still operator in the Du Pont Company's Finishes Plant in Toledo, Ohio. Mr. Potter has received a cash award from the company for designing the Up-Ender.

The appliance fits over the metal runners of a Colson-type barrel truck, requiring only a few seconds to fix in position. Alterations can easily be made to adapt it to other types of hand trucks. The Up-Ender can be made from supplies usually to be found in a plant repair or machine shop, cost of labor and materials amounting to about $15 per unit.

One man employing the device can easily tip on end a 650-pound drum from a horizontal position and two men can easily up-end a 900-pound drum. The Du Pont Safety & Fire Protection Division believes that the Up-Ender greatly reduces the danger of physical strain from continued heavy lifting by hand.

The labor-saving device consists of two 12-inch lengths of 1½-inch steel pipe which fit over the metal runners of a Colson barrel truck. These two pipes are reinforced with a welded curved metal strip, cross-braced with each other. The curved metal strip is notched at the ends and these slide around the axle of the Colson truck as the device is slipped over the drum runners.

It is recommended for use with light and heavy drums.

Ceiling Prices Set for Reconditioning Steel Drums

Ceiling prices have been established for the reconditioning of used steel drums of 29 to 58 gallon capacity at the same level previously set for reconditioning those of 50 to 58 gallon capacity. Also ceilings have been established for reconditioned containers of 7 to 20 gallons and larger than 20 gallons.

The action was taken when industry members reported that the shortage of steel shipping containers had led to increasing numbers of drums smaller than the 50-58 gallon size, which normally predominates, coming into the market for reconditioning.

It has also been necessary to allow for special types, especially those used for chemicals. Examples are drums with special heads, tin-lined drums, or drums with a bilge and lever-locked head, designed for special products. Price changes are designed to channel such drums back into the industries where they are in most demand.

Another development is the discovery that the armed services and other government agencies have surplus quantities of used tight-head drums which are now available for civilian consumption. Due to the immediate demand, however, for open-head drums for chemicals and paints and the fact that the critical steel sheet supply does not permit allocation of any of this for new open-head drums, the suggestion has been made that some of the surplus tight-head containers be converted to the open-head type.

A request by representatives of the reconditioning industry for a price to be established to cover this conversion operation has now been acted upon. The War Production Board has reported that approximately 1,000,000 drums may be available for conversion, and it is deemed advisable for the agencies concerned that this job be expedited in view of the current shortage.

The pricing regulations covering this field have been amended in a number of respects as a further stimulus to increasing the supply and to cover industry requirements; omission of charges for painting where this is not needed, for instance, and inclusion of the 6-gallon pail in the 5½-gallon capacity regulation—the two are considered interchangeable. The regulation more closely defines certain types, differentiating those used for dyestuff, carbide, caustic soda, powder and other materials.

New Prices

The reconditioning service ceilings for 29 to 58-gallon drums are 90 cents and $1.40 per drum for "basic" and "total" reconditioning respectively. These ceilings are country-wide except in Washington, Oregon and California, where, because of higher costs, the ceilings are $1.10 and $1.65 per drum for "basic" and "total" reconditioning, respectively.

Reconditioners are required to submit their prices for conversion of tight- to open-head drums to the OPA Iron and Steel Branch, Washington, D. C., for advance approval. As this operation is new to the industry, no cost data are available to OPA upon which it can establish a uniform dollars-and-cents ceiling price.

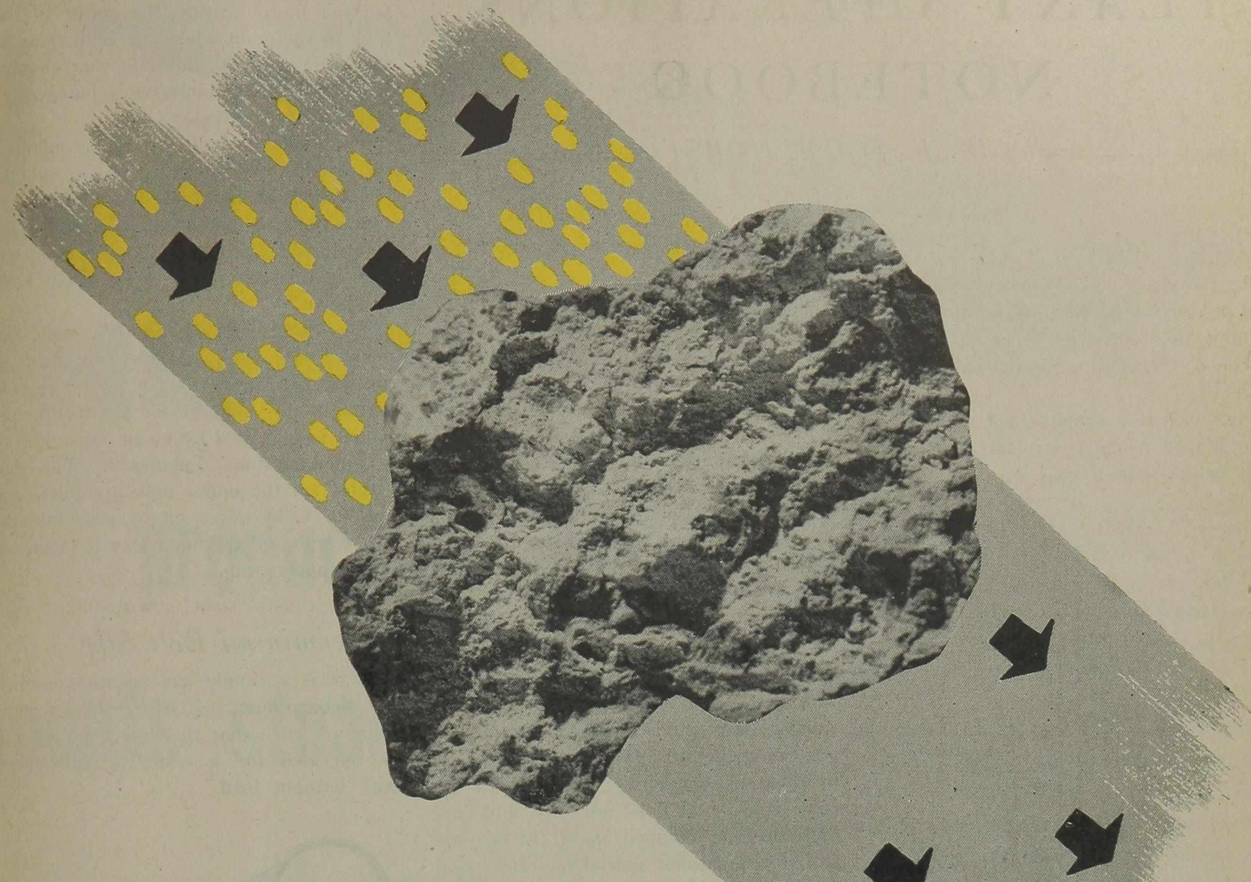
Ceilings are established for the sale of used and reconditioned containers in two size categories—of 7 to 20 gallons capacity inclusive and of more than 20 gallons—as follows:

Maximum prices (per container)	7-20 gals. incl.	Over 20 gals.
Raw used containers:		
When sold by emptier	15c	25c
When sold by reseller	25c	35c
Reconditioned containers:		
Basically reconditioned	40c	50c
Totally reconditioned	65c	75c

These prices, said OPA, reflect as nearly as possible the average prices and the business practices of the industry during March, 1942, the base period upon which prices were formerly established.

Incorporated in the regulation is an official interpretation holding that raw used drums shall be deemed to have been delivered when loaded on railroad cars for delivery to the purchaser. The purchaser may pay the transportation costs in accordance with Section 12 of this regulation.

Alvin H. Potter, who devised the drum up-ender shown here, demonstrates the labor-saving device at the du Pont Toledo Finishes Plant.



POROCEL says STOP!

to organic sulphur in the *FLOW STREAM*

POROCEL activated bauxite makes catalytic desulphurization a simple, efficient and economical process. You will be interested in this hard granular material that is not easily damaged or deteriorated in use.

Desulphurization with POROCEL takes place at moderate temperatures and low pressure. The feed is vaporized and the vapors passed through the POROCEL bed. In contact with POROCEL, the organic sulphur compounds are decomposed and the sulphur converted to hydrogen sulphide, which is removed by conventional means to complete the process.

POROCEL is used for the catalytic desulphurization of various hydrocarbons, liquids and gases — such as liquefied petroleum gases, casing head, natural, straight-run, cracked and polymer gasolines, and specification naphthas.

POROCEL is also used to produce elemental sulphur from hydrogen sulphide and sulphur dioxide.

In our specialized catalytic laboratory we have studied the use of this versatile catalyst for the decomposition of alkyl sulphides and disulphides, mercaptans and other organic sulphur compounds. This background, together with field service experience, is available without obligation.

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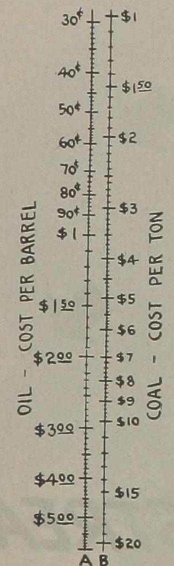
PLANT OPERATIONS NOTEBOOK

by W. F. SCHAPHORST

Oil vs. Coal

As the years roll along and conditions and prices change, the old question keeps bobbing up, "Shall we burn oil in place of coal? Or, shall we burn coal in place of oil?"

Herewith is a simple chart that shows at a glance which costs less as regards heat values—oil or coal.



Let us suppose that oil in your vicinity costs $1 per barrel. Find $1.00 per barrel in column A and glance across to column B, which shows that the equivalent is $3.50 per ton of coal. In other words if oil costs $1.00 per barrel and coal costs $3.50 per ton, it would very likely be uneconomical to switch from one to the other—of your own volition. But if coal costs more than $3.50 per ton, and you are now burning coal, it might pay to make a change. At least the cost of making the change and the advantages of oil burning over coal and vice versa should be worth investigating.

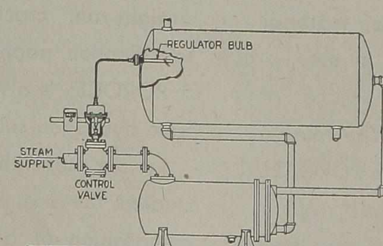
Before making a change it is always wise to consider the other factors that are involved in addition to the first cost of fuel. Thus, what will the oil burning equipment cost? Storage tanks? Piping? You can obtain such costs from the manufacturers of the equipment. Is it likely that oil or coal prices will continue at present levels? What is the approximate life of oil burning equipment? In other words, depreciation and interest on the investment should be carefully considered.

Oil burning possesses several advantages over coal, among which are these: less time is required to start the fire; oil can be shut off instantly; oil fires need not be pulled nor banked; no ashes to remove or handle; no investment in ash handling equipment; oil is fired mechanically, reducing the cost of labor considerably; oil pumps are simpler and smaller in volume than stokers, ash handling machinery, etc.; oil burning boilers are more efficient than coal burning boilers; and oil properly burned is smokeless.

More or less counterbalancing the advantages of oil burning we have unreasonable laws and stringent ordinances governing the storage and burning of oil in some of our cities; it costs less to store coal; coal does not leak and can, therefore, be dumped upon the ground and stored without special facilities; coal can be hauled in almost any vehicle; coal does not evaporate; coal need not be preheated before being pumped and burned; coal purchasing contracts can usually be extended over a longer period of time; and there is less danger of explosion with coal burning.

Hot Water Supply

The question of maintaining a constant supply of steam heated water is a common one despite the many hot systems in existence today. The diagram



herewith shows an exceptionally simple "hook up" for a self-regulating system of dependable hot water supply. The upper tank is a storage tank in which a "Regulator Bulb" is shown. This bulb maintains the desired temperature in the storage tank by operating the "Control Valve," which admits steam into the hot water heater below the storage tank.

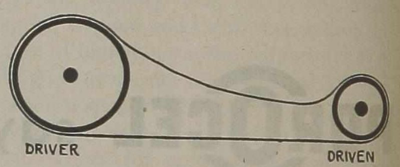
For instance when the temperature of the water in the storage tank becomes fractionally low the regulator bulb causes the control valve to open and admit steam into the heater. The hotter water in the heater then circulates upward into the storage tank, heating the water in that tank to the point where the bulb shuts off the steam supply through the control valve. It is a simple, comparatively inexpensive, and positive method.

The lower tank, by the way, contains a set of coils. When steam passes into the lower tank it surrounds those coils. The connections to this set of coils are on the right-hand side of the lower tank and they in turn are piped to the upper tank, as shown.

The steam entering the lower tank condenses, of course, and the condensate is piped out of the bottom of the lower tank through the connection at the bottom which is indicated by means of a stub of a pipe pointing downward. The two "stubs" on the upper tank are inlets and outlets. Cold water supply goes into the lower stub and the hot water is taken out of the upper stub.

Determining Belt Slip

Here is a simple and accurate method for determining belt slip where conditions are such that the driven pulley can be operated for a while at full speed but "without load."

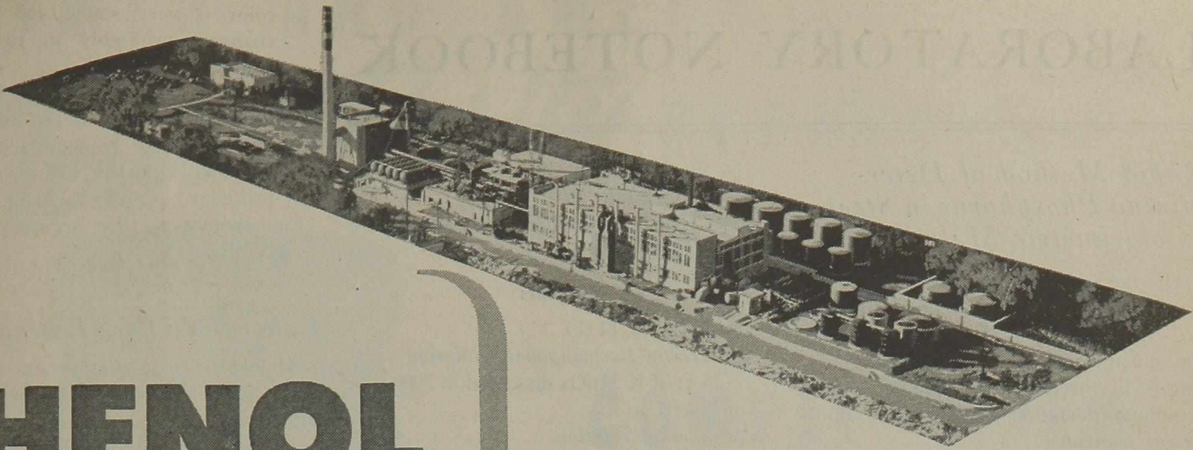


The method is based on the logical assumption that when no power is being transmitted through the belt there is no belt slip. The driven pulley, then, will rotate as many times per minute as it is possible for it to rotate. When the belt is transmitting full load, however, there is bound to be some loss due to belt creep and possibly some slip. The driven pulley will not rotate as many r.p.m. as when "unloaded." The difference in r.p.m. of the driven pulley, then, divided by its r.p.m. made "unloaded" multiplied by 100, gives the percentage of slip.

For example, in the accompanying sketch is shown a typical drive. Let us say that the driver pulley runs 200 r.p.m. while the driven pulley runs 340 r.p.m. in an unloaded state. When the belt carries full load, though, the driven pulley makes only 320 r.p.m. What is the percentage of belt slip?

Using the above rule we find the answer to be 5.9 per cent slip.

Belt slip is always an important item because each per cent of slip virtually means a loss of one per cent of the yearly fuel bill. If the above slip can be reduced to two per cent (and it usually can) the yearly saving on fuel expenditure would be about 4 per cent.



PHENOL production mounts steadily at new RCI plant

The new RCI phenol plant at Tuscaloosa, Alabama —built to alleviate the critical shortage of this essential basic chemical—is already achieving its purpose. Production of U.S.P. Standard Phenol has now attained considerable volume, and output continues to climb.

This successful project—vital to so many industries —rounds out an RCI Victory Program which includes contributions to every field of war. It also holds abundant promise for peacetime industries— for it will help to assure an ample supply of the keystone product of the coming age of chemistry, at a price that will make possible the development and widespread use in scores and scores of eagerly awaited new products.

★***Remember—your Salvage Program is vital to Victory.* WATCH FOR WASTE. Save more than before.**

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LABORATORY NOTEBOOK

Rapid Method of Determining Phosphorus in Steel (Colorimetric Method)

The method described by J. Paul Ray and Lester R. Henry of Remington Arms Co., Inc., makes possible the completion of one quantitative determination of phosphorus in three to five minutes with a maximum deviation of ± .003% phosphorus content.

Present methods for analysis of phosphorus in iron and steel consist of gravimetric, volumetric and color methods. The inaccuracy and/or time consumed by the gravimetric methods make them impractical for rapid routine analysis of phosphorus in steel by laboratory assistants. Volumetric methods are based, in most cases, on the precipitation of phosphorus in some form, re-solution and titration. The length of these methods prohibit their use in rapid determinations although the accuracy is quite good. Color methods, in many cases, present similar difficulties since some elements must be removed before the method will work. The method described herein eliminates these difficulties since no precipitations are necessary and no interference due to high percentages of carbon, manganese, sulfur, silicon, molybdenum, chromium, nickel, vanadium or tungsten has been noted.

The method has been checked against Bureau of Standards steel samples, 8f, 10d, 12d, 13d, 14c, 15c, 16c, 21c, 30d, 32c, 33b, 35a, 36, 50a, 72b, 129, 132, 134, and 135. Results from these determinations show a maximum deviation of less than .002% phosphorus content for steels of .010% to .060% phosphorus content and a maximum deviation of .003% for steels of .060% to .110% phosphorus content. 99.73 percent of the time the maximum deviation will be less than .003% (based on a statistical analysis by Quality Control of data from check analyses). The method has been under close inspection for the past eight months and results obtained have been entirely satisfactory.

Principle

The method is based on the reduction of the phosphomolybdate to phosphomolybdenum blue by stannous chloride. The large amount of iron present in the sample changes the color to greenish-blue but does not affect the accuracy of the results. The addition of acetone makes the color stable for twenty-four hours.

Apparatus

1—250 ml. Erlenmeyer flask, graduated at exactly 250 ml.

1—50 ml. graduated cylinder.

1—10 ml. graduated cylinder.

1—50 ml. Erlenmeyer flask—graduated at exactly 45 ml.

1—Fisher Electrophotometer and accessories or equivalent.

Reagents

Nitric Acid (1:1)

Potassium Permanganate Solution

35 g. of K MnO_4 dissolved in 2000 ml. of water.

Molybdate Solution

a. Dissolve 128 g. of ammonium molybdate in 1 liter of water.

b. Add 280 ml. of concentrated H_2SO_4 to 720 ml. of water.

c. Mix (a) and (b) after each has cooled.

Stannous Chloride Stock Solution

10 g. of $SnCl_2$ in 25 ml. of concentrated HCl. Place in stock bottle containing a small amount of tin metal.

Stannous Chloride Reagent

1 ml. of $SnCl_2$ stock solution in 200 ml. of water. Keep in bottle containing a small amount of tin metal. Make fresh each day.

Hydrogen Peroxide—3%

Hydrochloric Acid—concentrated.

Procedure

Place 1 g. of steel sample in graduated 250 ml. Erlenmeyer flask, add 25 ml. of 1:1 HNO_3 and heat gently until most of the NO_2 fumes have disappeared. Add 5 ml. of concentrated HCl and heat until NO_2 fumes have disappeared and sample is entirely in solution. Add 8 ml. of $KMnO_4$ solution and boil one minute. Remove from hot plate and add 5 ml. of 3% H_2O_2. Dilute sample to 250 ml. in Erlenmeyer flask, stopper flask and mix well.

Add 10 ml. of molybdate reagent and 5 ml. of acetone to the 50 ml. graduated Erlenmeyer flask. Add enough of sample (30 ml.) from 250 ml. flask to fill the 50 ml. flask to the graduated mark. Add 5 ml. of $SnCl_2$ reagent, stopper flask and mix well. Set aside for one minute or longer. (Note 1) Compare on electrophotometer using blue filter and B scale and calculate percent phosphorus from chart standardized with Bureau of Standard steels.

The color formed conforms to Beer's law so any electrophotometer may be used to measure the intensity of color. Using a Fisher electrophotometer which employs a logarithmic scale, the chart is a straight line when plotted on regular graph paper. Such a chart, however, must be standardized for each electrophotometer used.

Notes

1. The color does not stabilize for the first thirty seconds after the addition of the $SnCl_2$ but after one minute the color is very stable and does not change appreciably in twenty-four hours.
2. The use of burettes—particularly automatic burettes—in the addition of the molybdate reagent, acetone and stannous chloride will shorten the procedure considerably and add appreciably to the accuracy of the results.

Laboratory Fire Extinguisher

Almost every laboratory has some peculiar fire hazard which must be reckoned with in order to safeguard life and property, not to mention possible loss of valuable records or the interruption of laboratory work. A new CO_2 fire extinguisher, laboratory model, is particularly convenient and effective.

In many cases, incipient fires can be put out immediately by quick action with this handy Extinguisher and a more serious conflagration prevented. The new Laboratory Model Fire Extinguisher is a small-size hand operated type, weighing only 17 pounds. It is large enough to cope with small fires in the laboratory but not too heavy for quick operation or too bulky to be mounted at convenient points near the hood, workbench or sink. It has been approved by Underwriters' Laboratories, Inc., and other testing agencies.

Obvious advantages of the CO_2 type extinguisher for combating the flash fires most common in laboratories are the complete absence of water or chemical damage after the fire, as well as the smothering-freezing action which completely stops combustion. Laboratory fires, particularly, are more easily smothered than drowned.

The careful design of this extinguisher has incorporated many features which facilitate one-hand, split-second action without the need to push a horn into place, turn a valve or twist a hose. With one motion, the CO_2 extinguisher can be pulled from its wall bracket, aimed at the base of the fire and the discharge of gas begun by simply pressing a lever.

Other advantages of the CO_2 Extinguisher—as compared with liquid types—are the formation of atomized dry ice (snow) which covers and cools combustibles to below-ignition temperatures at the same time gaseous CO_2 is displacing oxygen in the vicinity of the fire. This cooling helps prevent "flash-backs," which sometimes occur after the fire is believed out. The value of this cooling action is especially high when the extinguisher may be used to deal with burning chemicals having low flash points.

Definite safety features of the extinguisher are the facts that it shields the operator from intense heat, the gas does not conduct electricity, and the discharge cannot harm persons or clothing.

INDUSTRY'S BOOKSHELF

Summary of Electrolytes

THE PHYSICAL CHEMISTRY OF ELECTROLYTIC SOLUTIONS, by *Herbert S. Harned and Benton B. Owen.* Reinhold Publishing Corp., N. Y., 1943; 611 pp., $10.00. Reviewed by *R. E. McNulty*, The Dow Chemical Company.

THIS American Chemical Society monograph provides an authoritative summary of the theory and properties of weak and strong electrolytes. The volume is divided into three sections: (a) Theoretical, (b) Experimental Methods, and (c) Properties of Electrolytes.

The presentation is based on the development of the Debye-Hückel theory in the first chapters, followed by a treatment of such properties as the thermodynamics of conducting solutions, viscosity, diffusion, conductance and field effects. The data are described and discussed in terms of the interionic attraction theory.

While the theoretical section is very complete, to this reviewer, the experimental section is the best in the volume. Though none of the techniques are presented in detail, it provides a very extended survey of experimental procedures in conductance, thermochemistry, transference, ion association, boiling and freezing points, galvanic cell and vapor pressure work. Sufficient discussion of the experimental method is included to stimulate the new investigator to review the original literature.

While one will not find electrode processes examined in the book, the omission is voluntary on the part of the authors, and valid, since all necessary discussion is included, as, for example, in the section on galvanic cells.

Finally, the reference value of the volume is enhanced by the thorough cross-referencing of the numerous tables, figures, and equations. The latter, it should be noted, are simplified to avoid a purely mathematical presentation. The tables will almost certainly prove of great aid to the experimental investigator in this field as well as others involving conducting solutions.

Statistical Methods

STATISTICAL ADJUSTMENT OF DATA, by *W. Edwards Deming,* John Wiley and Sons, Inc., N. Y., 1943; 261 pp., $3.50. Reviewed by *D. S. Davis,* Wyandotte Chemicals Corporation.

FOR THOSE already somewhat experienced in statistical methods, Dr. Deming of the Bureau of the Census and the Bureau of the Budget, Washington, D. C., has enriched and supplemented the important field of adjustment of data with excellent material not otherwise readily accessible. Intended both for reference and text purposes the book is firmly grounded on the author's extensive practical work and portions in mimeographed form entitled "Least Squares" which have stood the test in the Graduate School of the Department of Agriculture.

Part A: Some Simple Adjustments, covers two chapters on the meaning of adjustment and simple illustrations of curve fitting while Part B: The Least Squares Solution of More Complicated Problems, deals competently with the propagation of error and generalized least squares. Part C: Conditions Without Parameters, includes geometric conditions and their systematic computation as well as adjustment of sample frequencies in contrast to Part D: Conditions Containing Parameters, which is concerned with more complicated aspects of curve fitting and the application of least squares.

Part E: Exercises and Notes, will appeal most to the chemist and chemical engineer who has mastered the earlier chapters for it offers valuable guides and a useful compilation of results. The numerical illustrations of curve fitting in this part are particularly worthwhile. Similar illustrations introduced more frequently in the first nine chapters might have been welcome companions to the more abstract passages.

The material is well documented with recent references, there are sixty-five nicely distributed problems, and the style is lucid, unhurried, and exact. The book is adequately indexed and the mechanical work and choice of paper are excellent.

Trends in Packaging

PACKAGING CATALOG. Edited and Published by the *Packaging Catalog Corporation,* N. Y.; 750 pages, $2.50.

COLLECTING and presenting the best available information and thought about a field which is a cross section of American industries, the 1944 Packaging Catalog, reflects strongly the trend toward reconversion planning which mounts daily in importance.

Packaging for Government orders, however, will continue to be a vital subject for some time. The book contains an entire chapter of wholly new material which will serve as a reliable guide for countless firms engaged in supplying military and Lend-Lease goods. A chart, "Packaging Materials Under Government Control," revised and brought up to date, comprises a handy reference for control order numbers.

The entire first section of the catalog covers the subject of reconversion in all of its ramifications. An article by a WPB official, outlining a time-table for the reconversion of various materials to peacetime uses is of special importance.

Although the catalog contains only the basic reliable data upon which packagers can make definite plans, enough new material has been gathered during the past year to make at least 60% of the current issue completely different from anything that has appeared before.

Outstanding topics in the new material include: Eleven Articles on—Planning for Reconversion; Blue Print for the Packaging Department; Hazards Encountered by Packagers; Entire Chapter—Packaging for Government Orders; New Importance of Paper in Packaging; Specialty Flexible Containers; New Importance of Glass; Pictorial Review of Closures; Merchandising the Glass Package; Progress & Research in Can Manufacture; Entire Plastics Chapter.

Attractiveness in packaging warrants greater discussion in this issue than in that of recent years. Combined with this forecast of greater package beauty in the future is the promise of a new utility to make civilian packages perform a greater service to the consumer.

The mechanical details of binding, layout, photography and printing of the catalog are of excellent calibre.

Other Publications

THE TRADE INDEX, 1944 edition, of the Canadian Manufacturers' Association, recently published, carries information about Canadian products to prospective buyers abroad and in Canada. It is a veritable ambassador of trade for Canadian manufacturers for every year the overseas distribution has grown and become increasingly important. This year's edition gives special emphasis to information regarding the export of products, and includes a Portuguese index of products in all copies going to Brazil. Copies are available from The Canadian Manufacturers Association, 67 Yonge Street, Toronto 1, Ontario. Price $6.00.

THE NEW, FULLY REVISED 1944 edition of the MARKET GUIDE FOR LATIN AMERICA has just been distributed, according to the announcement of its publisher, American Foreign Credit Underwriters Corporation of 170 Broadway, New York. The MARKET GUIDE is available from the publisher on subscription basis with monthly supplements and auxiliary services which keep the contents revised. Annual subscription $75.00.

THE RUBBER PRODUCTS symposium developed for A. S. T. M. Committee D-11 by a special committee headed by Arthur W. Carpenter, meets the present need for authentic technical information on uses of various synthetic rubbers. The rapid increase in the use of synthetic rubbers in many fields, and the lack of a compilation of data on their efficiency and serviceability in these fields makes this publication timely and valuable. Some of the country's leading authorities have contributed technical papers and discussions on the subjects of the origin and development of synthetic rubbers; physical testing; physical properties; specifications; and evaluation of processing characteristics and the use of synthetic rubbers in the manufacture of extruded products.

A series of papers covers specific applications, including rubber tires and inner tubes; belting and hose; molded products; cellular rubbers; hard rubber products; use in the wire and cable industry; footwear; and adhesives.

Copies can be obtained from A. S. T. M., 260 S. Broad St., Philadelphia 2, Pa. at $1.75 (cloth binding) or $1.50 (paper binding).

BOOKLETS & CATALOGS

Chemicals

A661. Adhesives. A new booklet, "3-M Adhesive Data", helpful to anyone using adhesives or coating materials, impregnators, spray-on insulators and sound-deadening compounds, lists various formulae and shows in tabular form the viscosity, bonding range, method of application, etc. Minnesota Mining and Manufacturing Co.

A662. Adhesives. A new catalog section on adhesives and cements has been published giving the service requirements and classification of the various adhesives, and listing and discussing each type offered. In addition to the field of adhesives, the materials covered in the volume serve as fabric coatings, binders, sealers, etc. B. F. Goodrich Co.

A663. Cerium. A small brochure presents concisely facts about cerium and indicates applications. Cerium Metals Corporation.

A664. Amines. Covering 25 members of the amine group available in commercial quantities, a new booklet published contains names, formulas, physical and chemical properties, specifications, container and shipping data, applications, and uses of each chemical of the family. Graphs give data on freezing points, viscosities, boiling points, neutralization, vapor pressure, and hygroscopicity curves. Carbide and Carbon Chemical Corp.

A665. Anodes and Plating Chemicals. Bulletin AC-105 has been issued including data on anodes of nickel, brass, copper, zinc, cadmium, tin, lead, silver and anodes for chromium plating. Processes covered are: H-VW-M bright cobalt nickel; Mazic bright zinc; SB zinc; cadux cadmium; Protecto lead concentrates; B-H lead. Hanson-Van Winkle-Munning Co.

A666. Clorafin. A new technical booklet describes the properties of Clorafin 42, plasticizer, and Clorafin 70, resin, used in the production of fireproof, waterproof, and weatherproof coatings for fabrics. Hercules Powder Co.

A667. Geon Resins and Plastics. Technical Bulletin PM2 prepared for those concerned with the coating of fibrous materials in particular describes geon resins and plastics and tabulates important data on their physical and chemical properties. B. F. Goodrich Co.

A668. Luminescence. A lucid presentation of the characteristics, properties, limitations and applications of the inorganic luminescent pigments with a number of tables and charts included is made in a well-planned attractive booklet prepared by the New Jersey Zinc Co.

A669. Resin Adhesives. "The What, Where, Why, How of RESYN Adhesives" is an informative booklet tracing the development of synthetic resin adhesives, defining the trade terms associated with them, describing their unique properties, suggesting applications for them and outlining procedures for handling various types of resinous products. National Adhesives.

A670. Penicillin. The story of penicillin from its first discovery and early development to the modern mass production stage is told effectively with ample illustration in a booklet put out by Merck and Co.

A671. Petroleum in the War. With Adolph Dehn, American artist noted for his landscapes, to catch the beauty of industrial forms in watercolors and with Bruce Bliven, editor of The New Republic, to tell the exciting story of the petroleum industry's vital importance in the war effort, a truly original and artistic presentation has been made in "Baton Rouge," a booklet recently published by Standard Oil.

Equipment—Methods

F149. Cathode-Ray Tubes and Instruments. Bulletins which will bring up to date the Du Mont Reference Manual on cathode-ray tubes and instruments are available including several application notes. A. B. Du Mont Laboratories, Inc.

F150. Conductivity Measurements. A revised publication describing instruments for making precise conductivity measurements has been published of interest to anyone desiring the latest specifications on instruments, conductivity cells and accessories for plant or laboratory. Leeds and Northrup.

F151. Compressors. Diagrams and photographs add interest and clarity to a bulletin describing compressors in the fields of repressuring, pressure maintenance and oil conservation. Clark Bros. Co., Inc.

F152. Dryers. An illustrated folder describes tray and truck type dryers for the chemical and allied industries. Proctor and Schwartz, Inc.

F153. Drying. The technique of drying is dealt with in complete detail in a new catalog describing equipment and plants designed for that purpose. Blaw-Knox Co.

F154. Electronic Relay. A recently published pamphlet GEA-4214 describes in detail and illustrates with diagrams and photographs the structure and operation of the electronic relay applicable especially to signalling, testing materials, liquid level control, sorting small parts, maintaining constant temperature baths, and so on. General Electric.

F155. Expanders. Expanding equipment, the construction of units used in the extraction of many new products from minerals and liquids are covered in an attractive, illustrated booklet, Bulletin No. 21. Airetool Manufacturing Co.

F156. Eliminating Waste. A "must" for every foreman, a simply written booklet approaches the subject of waste from such angles as the waste of manpower, materials and supplies, machinery and equipment, work space, accidents, its causes and the waste resulting from noncooperation. Elliott Service Co.

F157. Hydraulic Press. Bulletin No. 370-A has been prepared covering a general purpose hydraulic press suitable for diversified utility work in the metal-forming ceramic or plastic industries. Detailed description of construction and equipment is given. Watson-Stillman Co.

F158. Industrial Glassware. Bulletin 838 describes the composition, manufacture, chemical stability, and physical properties, of Vycor brand industrial glassware for high temperature use with listings of the types that are available now. Corning Glass Works.

F159. Laboratory Equipment. A well-illustrated bulletin describes all types of metallurgical laboratory apparatus for rapid and accurate analyses of metals in industrial laboratories. Photographs of

Interested in catalytic reactions?

HERE ARE 4 FORMS OF Al_2O_3 AND SiC USEFUL AS CATALYSTS OR CATALYST CARRIERS

GRAIN

Silicon carbide grains or fused crystalline aluminum oxide grains. Available in a wide range of sizes and size combinations.

OUTSTANDING PROPERTIES

Extremely hard · **Inert** · **Non-porous** · **Highly refractory**

Especially useful where heat retention or heat transmission is needed.

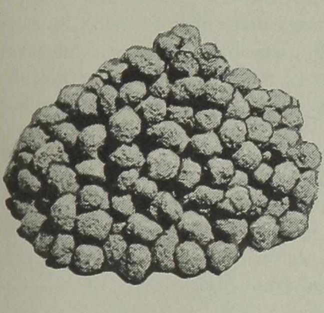
AGGREGATE

Ceramically bonded aluminum oxide or silicon carbide aggregates. Crushed and screened to the size range required for supporting catalysts.

OUTSTANDING PROPERTIES

Rugged · **Very porous** · **Acid resistant** · **Highly refractory** · **Rough, irregular surfaces**

Especially useful where repeated handling requires resistance to disintegration.



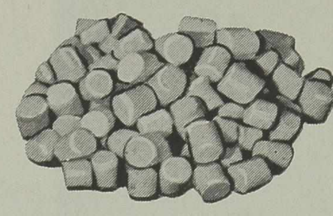
PELLETS

Pellets of ceramically bonded aluminum oxide or silicon carbide for supporting catalysts. Can be furnished in either *cylindrical* or *ovoid* form.

OUTSTANDING PROPERTIES

Very porous · **Highly refractory** · **Rugged** · **Acid resistant** · **Provide maximum void space**

Especially useful where a low pressure drop through the packing must be maintained and where ability to withstand repeated handling is essential.



WRITE for further data if you're interested in any form of aluminum oxide or silicon carbide for catalytic operations. We're always ready to discuss specific problems and adapt our manufacturing and product to your requirements.

"Carborundum" is the registered trade-mark of, and indicates manufacture by, The Carborundum Company.

THE CARBORUNDUM COMPANY
Refractories Division, Perth Amboy, N. J.

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh.

Distributors: McConnell Sales & Engineering Corp., Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles & San Francisco, California; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

***Catalytic Aids by* CARBORUNDUM**

TRADE MARK

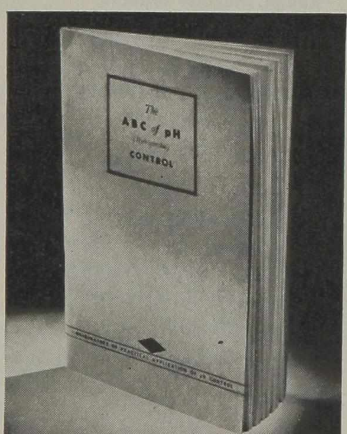
equipment, prices and complete descriptions are included. Central Scientific Co.

F160. Lubrication. An illustrated folder discusses the elimination of hazards due to the manual lubrication of high-up and hard-to-get-at bearings on presses, cranes and other "off the floor" types of equipment. Farval Corporation.

F161. Office Equipment. Supplies for business machines and types of modern office equipment are described in a small colorful booklet. Printing plates for addressograph, speedaumat, and dupligraph machines are featured. Am. Expansion Bolt and Mfg. Co.

F162. Packaging. An 8-page bulletin recently published describes the closure produced on small paper bags, after they have been filled. Installation pictures and users' reports give full information on this method of packaging. Union Special Machine Co.

F163. pH Control. A revised and enlarged 84-page anniversary edition of the handbook, "The A B C of pH Control," is available. The information described is of most value to those in the process industries; analysis of water, sewage, and industrial wastes; boiler feed water; electroplating; soil testing; and other fields requiring specialized controls. LaMotte Chemical Products Co.



F164. Pressure Vessels. A colorful, well-illustrated folder on steel boiler and pressure vessels shows the latest clear-surfaced welded types. Union Iron Works.

F165. Pyrex Piping Installation. A complete, simply written booklet gives information on how to install pyrex piping with clear easy to follow directions and helpful accompanying diagrams. Corning Glass Works.

F166. Pyrex Tubing. Bulletin 843 is a complete price list of pyrex brand tubing with carefully tabulated information to suit specific requirements. Corning Glass Works.

F167. Pulverizing Mills. Jar mills, both the roller type and standard, for the grinding and pulverizing of pigments, minerals, inks, colors, and chemicals are listed, illustrated, and described in a small attractive Bulletin No. 255. U. S. Stoneware Co.

F168. Rust Removing. A circular covering a new material, Rozene, for removing rust on all kinds of metals has been published. M. B. Price Associates.

F169. Safety in Welding. Evidence of the alertness and leadership of the welding and cutting industry in matters of safety is found in an attractive 32-page booklet entitled "Safety in Electric and Gas Welding and Cutting Operations." Linde Air Products Co.

F170. Truck Operating Instruction. An illustrated non-technical manual entitled "Lady, Will You Give a Lift?" has been published to instruct women in the operation of power industrial trucks. Elwell-Parker Electric Co.

F171. Ventilator. An interesting attractive folder deals with a new type power roof ventilator. Powermatic Ventilator Co.

F172. Vertical Injection Molding Machines. Bulletin 622-A describes operating features and lists specifications, with detail drawings, of 2 oz. and 4 oz. vertical injection molding machines. Watson-Stillman.

F173. Water Analyses. A 44-page booklet presents the various apparatus and chemicals used for industrial water analyses for plant control, featuring test sets required for such determinations as hardness, alkalinity, phosphate, sulfate, dissolved oxygen, pH value, silica, and others. In addition comparators, photometers, turbidimeters, etc., are shown. W. H. and L. D. Betz.

F174. Water Cooler. The theory and practice of water cooling engineering has been given thorough yet condensed treatment and illustration by photographs and diagrams in a colorful attractive booklet recently published. The selection, application, operation and maintenance of each type of water cooling equipment is discussed. The Marley Co., Inc.

F175. War Contract Terminations. A step by step, graphic presentation of how to compile the necessary facts and figures of war contract terminations so that claims could be presented and paid in the quickest possible time, without disrupting the flow of regular work in a busy organization, is made in a new booklet published entitled "How One Company Organized to Handle War Contract Terminations." A company executive organized procedures and personnel so that each termination was handled according to plan, with a time limit on each departmental operation. Lyon Metal Products.

F176. Wear. A variety of important and interesting facts concerning wear have been brought together to make a unique booklet on the subject of "Wear." Some of the headings include the mechanism of wear; wear and physical properties; molecular adhesion; surface melting; specific pressure; lubricants and wear; work hardening; chemical effects, etc. The Nitralloy Corporation.

F177. Wire Rope. A new G-15 Catalog published contains data on revised strength, weights, and grades of wire rope. It is an important reference book and may be obtained by request on company letterhead from Macwhyte Co.

F178. X-Ray Unit. An industrial x-ray unit providing quick accurate means for non-destructive examination of specimens for internal flaws, cracks or foreign matter, is described in a new folder. Photographs illustrate its use in x-ray examination of aluminum, steel, copper, hard rubber parts, plastics, die castings, small electrical parts, tubes, etc. North American Phillips Co., Inc.

Kellogram, a publication useful and interesting in the oil refining development field, will again be issued regularly after having been temporarily suspended from publication after U. S. entry into the war. Kellogram is published by M. W. Kellogg Co., Jersey City, N. J.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

Chemical Industries, 522 Fifth Ave., New York 18, N. Y. (9-4)
I would like to receive the following free booklets or catalogs.

A661	A666	F149	F154	F159	F164	F169	F174
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A664	A669	F152	F157	F162	F167	F172	F177
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CANADIAN NEWS

by W. A. JORDAN

Institute Seeks Special Legislation for Professionals

Representatives of the Chemical Institute of Canada met with officials of fourteen other technical associations in Ottawa last month and it was unanimously decided that representations be made to the Department of Labor to seek the granting of special legislation to exempt professional workers from the terms of Order in Council PC 1003, which is, broadly speaking, a counterpart of the American Wagner Act.

Early this year the National Labor Relations Board ruled that professional persons may be regarded as being employed in a "confidential capacity" and thereby are excluded from the collective bargaining stipulations of the labor code. Such a categorization was granted, however, only until Oct. 11, when, unless a worthy case for permanent exclusion were presented, chemists and chemical engineers would be forced to submit to the terms of the legislation.

Some 98 per cent of chemical men polled at meetings held within the past few months have been in favor of seeking to maintain minority rights, and individual choice of a bargaining unit. The present objective is to obtain special legislation for chemical men, of professional qualifications, with the elimination of the loose term "confidential capacity."

Although, perforce, it would be a Federal War Measure it is probable that such an Act would be adopted in essence by most of the labor-legislating Provincial governments, as has been the case with PC 1003.

Salt Production Up

Production of common salt in Canada during 1943 totaled 687,686 short tons valued at $4.4 million, compared with 653,672 tons worth $3.8 million in 1942, according to a recent release of the Bureau of Statistics. The quantity and value of output during the year was the greatest ever realized by the Canadian salt industry.

Although the mineral is produced commercially in Nova Scotia, Ontario, Alberta and Manitoba, the Ontario output amounts to 86.5 per cent of the total. Statistics of production represent the recovery of salt from brine well operations, with the exception of Nova Scotia, where the output comes entirely from higher-cost underground mining of rock salt deposits.

Of the total salt produced in Canada there were 346,145 short tons, or fifty per cent, consumed directly in the manufacture of caustic soda and other chemicals. Slightly less than 100,000 tons was of table and dairy grades, with 167,000 tons of common fine, and 70,000 tons of common coarse constituting the two other major categories.

Potato Starch Draws Interest

Considerable interest is being displayed currently in potato starch and glucose by Canadian industrialists, with developments mooted in both British Columbia and Prince Edward Island.

On Canada's western coast Delta Glucose Refinery Ltd., has been incorporated for the manufacture of both these products to meet western Canadian needs, and plans have been drafted by another group for the construction of a potato starch-glucose unit, capable of handling 150,000 pounds of potatoes daily, on Prince Edward Island.

At present there are six potato starch producers in the Dominion—all in the Maritimes—with output slightly less than 2,000 tons last year valued at $262,000.

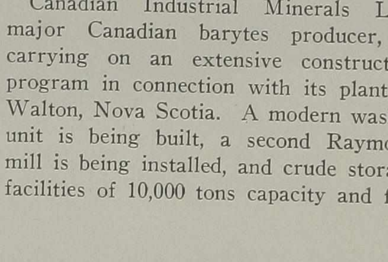
Barytes Facilities Expanded

Canadian Industrial Minerals Ltd., major Canadian barytes producer, is carrying on an extensive construction program in connection with its plant at Walton, Nova Scotia. A modern washer unit is being built, a second Raymond mill is being installed, and crude storage facilities of 10,000 tons capacity and fine ore silos of 5,000 tons are being completed.

Officials state that the output of the plant this year, which, incidentally, only came into operation in 1940, will exceed 100,000 tons of barytes, the bulk of which is being supplied to the United States, Trinidad, and Venezuela markets.

CANADIAN CHEMICAL ACTIVITY

(1937 = 100)



NOTE: The Chemicals Index does not include government plants making explosives, etc. It does include representative plants from the following groups: fertilizers, inks, pharmaceuticals, paints, pigments, soaps, insecticides, and other miscellaneous.

Source: Canadian Bank of Commerce

New Rubber Chemical Unit

H. L. Blachford Ltd., Montreal, has just completed construction of a unit for the manufacture of zinc diethyl dithiocarbamate, output of which will be capable of accommodating total Canadian demand for this hitherto-imported GR-S rubber accelerator.

Ink Plant Established

Frederick H. Levey (Canada) Ltd., affiliate of the American organization of the same name, has entered the Canadian market with the establishment of a plant for the manufacture of printing inks in Montreal.

Canada to Get Titanium Pigment Plant

Canadian Titanium Pigments Ltd., affiliate of National Lead Company and Canadian Industries Ltd., contemplates the postwar construction of a plant for the manufacture of titanium pigments.

When this organization was originally formed in 1937, a site was acquired at Cap de la Madelein, Quebec, but market and latterly war, conditions deferred the creation of manufacturing facilities and the company has confined its activities to the distribution of titania imported from the parent National Lead Company.

Although there are numerous ilmenite deposits in Canada, none is regarded as commercially workable, and officials state that the proposed plant will probably be supplied with ore imported direct from India.

The capacity of the unit, in which National Lead processes will be employed, will be set at a minimum of some 14 million pounds of pigments per annum. This will be capable of accommodating current Canadian demand.

Farm Chemistry Council Formed

Plans have been announced for formation this fall of an Ontario Farm Chemistry Council, to be supported by the Provincial government for the purpose of bringing to Ontario farmers the benefits of latest developments in agricultural science. The body will be made up of scientists, farmers and manufacturers who will cooperate with the Ontario Research Foundation and other independent and university research groups. Findings of the Council will be disseminated through existing county agricultural committees.

NEWS OF THE MONTH

Alcohol Group Faces Anti-Trust Suit

Charge states wood alcohol pool formed to control output, fix prices, eliminate competition. Twenty-five producers indicted.

SEEKING to restrain a group of business concerns and individuals from urther alleged violations of the Sherman Anti-Trust Act in its operations in the wood alcohol industry, the Government iled a civil complaint in Federal Court on August 29, through Assistant United States Attorney General Irving B. Glickield. The complaint asserted that the lefendants control 95 per cent of the wood alcohol produced and sold in the Jnited States. The wood alcohol industry accounts for about 4 to 5 per cent of he total output of methanol in the Jnited States.

Among the defendants was the Ford company, which operates the nation's argest wood alcohol distilling plant. Other companies included were William S. Gray & Co., a New York sales agency; Wood Distillers Corporation, a Pennsylvania sales agency; the Wood Chemcal Institute, a Pennsylvania trade asociation; 25 wood alcohol producers and 2 officers and employes.

The complaint charged that under a plan developed in 1932 by the Gray company and the institute, virtually every producer in the United States pooled his wood alcohol resources and that sales were permitted only through the Gray company.

Prices, the Government charged, were ixed by agreement between Gray and a committee of the institute, with producion quotas assigned to each producer. While three producers were permitted o sell certain grades of wood alcohol lirectly, the complaint said, these sales were made only at prices previously greed upon.

A criminal indictment was returned ast April charging all the defendants except Ford Motor Co. with illegally ixing prices, curbing production and eliminating competition, in violation of he anti-trust law. The complaint filed eeks to restrain the defendants from ngaging in practices complained of in he indictment.

The complaint alleges that the Gray company admitted the purpose of the plan was "to eliminate competition within the industry * * * and to secure as high a price as possible"; that the Gray company and certain other defendants knew the plan was illegal and requested each other to destroy correspondence about it; and that the Gray company and the Crossett Chemical Co. were advised by their attorneys in 1941 that the plan was illegal but continued to operate it.

Glickfield said 1943 wood alcohol production totaled 4,750,000 gallons, valued at $3,192,500 and substantially all produced by the defendants.

Those named in the complaint: Antrim Iron Co., Grand Rapids, Mich., and Jackman Palmatier, vice president; Bradford (Pa.) Wood Products Co. and Katherine McCullough, president; Clawson Chemical Co., Ridgway, Pa., R. M. Cartwright, president, and R. E. Cartwright, vice president; Cliffs Dow Chemical Co., Marquette, Mich.; Crossett (Ark.) Chemical Co. and Edward C. Crossett, president; Custer City (Pa.) Chemical Co., William J. Merwin, president, and William R. Leipold, treasurer; Delta Chemical & Iron Co., Wells, Mich., and G. C. Craver, treasurer; Ford Motor Co., Dearborn, Mich.; Forest Products Chemical Co., Memphis, Tenn., and William H. Matthews, president; Genesee (Pa.) Chemical Co., and J. R. Lavens, president; Goodman Lumber Co., Marinette, Wis., and Robert B. Goodman, president; Gray Chemical Co., Roulette, Pa., Robert R. Lyman, president, and C. C. Valentine, vice president; William S. Gray & Co., New York city, William S. Gray, Jr., president; Clifford G. Dixon, vice president, and William F. Henchen, treasurer; Thomas Keery Co., Inc., Hancock, N. Y., and George C. Rees, treasurer; Kinzua Valley Chemical Co., Sergeant, Pa.; W. L. Heim, president, and James H. Heim, treasurer; Maryland Wood Products Co., Bradford, Pa.; Mayburg Chemical Co., Endeavor, Pa., S. H. Cohn, vice president, and W. F. Swanson, treasurer; Morris Chemical Co., East Smethport, Pa.; R. W. Hilton, president, and John M. Hilton, vice president; Newberry (Mich.) Lumber & Chemical Co. and Philip S. Hamilton, vice president; Otto Chemical Co., Sergeant, Pa.; Tennessee Products Corp., Nashville, Tenn., and Carl McFarlin, president; Wood Chemical Institute, Inc., East Smethport, Pa., and Clyde A. Saunders, president; Wood Distillers Corporation, East Smethport, Pa., and Joseph A. McCormack, treasurer; Chester L. Burst and W. H. Gallup, Crosby, Pa., doing business as Crosby Chemical Co.; George Victor Treyz, Cook Falls, N. Y., doing business as G. I. Treyz Estate; Miss Beatrice A. Treyz, Binghamton, N. Y., doing business as G. H. Treyz & Co.; and R. M. Hancock, West Line, Pa., doing business as United Charcoal Co., Pennsylvania.

Heyden Export Head Leaves For South America

Otto N. Frankfurter, director of exports for the Heyden Chemical Corporation, New York, began a tour of Latin America on August 25. He planned to go by air, stopping at various places from Puerto Rico to Argentina and planned to be gone for 3 months.

Synthetic Rubber Will Pay for Self, Says Newman

Predicting that America's war-born $750,000,000 synthetic rubber plant may "pay for itself" within four years after Far East rubber plantations resume normal operations, James J. Newman of Akron, O., vice president of the B. F. Goodrich Company, has declared that consistently lower rubber prices—for either synthetic or natural varieties, or both—conceivably could save this country $190,000,000 a year, which in four years would compensate fully for wartime outlay with continuing "plus" savings thereafter. The annual saving is computed, he said, on the basis of a raw material cost 10 cents a pound lower than it would be without the influence of synthetic, and on an average annual consumption of 850,000 tons.

Whether synthetic or natural becomes the "dominant" postwar rubber, Newman explained, the "ceiling effect" of the continuing existence of synthetic facilities should guarantee that Americans—who use as much rubber as all the rest of the world combined—will not have to pay excessively high prices such as have marked earlier periods in the rubber industry's history.

The Akron executive pointed to "the widespread potential benefits of more and better products, and more employment opportunities," that low-cost raw materials could bring in the postwar period. He rated this factor as second only to that of national security in determining policy with respect to the synthetic rubber producing facilities which he called "the only workable means of assuring our country an adequate, 'warproof' supply of this indispensable raw material." He said it was impossible to forecast now whether synthetic or natural would dominate the world rubber picture in the future, saying "maybe neither will really dominate."

Newman warned that the current "truly critical" national situation in truck and bus tires is likely to necessitate a curtailment of bus travel. He pointed out that 88 per cent of big-tire production for the July-August-September quarter is going to the military, and that the mere 12 per cent left for essential civilian use is less than half as large as the share of production that civilian trucks and buses got in the preceding period.

Lack of Chemists Foreseen

As a result of Selective Service regulations, a serious post-war shortage of chemists in industry is foreseen by faculties of universities, colleges and technical schools, whose views were reported recently by the committee on professional training of chemists of the American Chemical Society.

Industry must expect at least a five-year gap in new blood among chemists, a gap which will be felt in the lack of trained men for the top executive positions, the committee declared in a summary of opinions expressed in reply to a questionnaire sent to chairmen of chemistry departments in 133 institutions. "New processes and developments in chemical industry will be retarded," the committee said.

Aluminum Cutback Effected

Aluminum metal production will be terminated at plants in Riverbank, Calif., and Burlington, N. J., and reduced by one-third at the Torrance plant in Los Angeles, Calif., because of an increasing ingot surplus, the War Production Board has announced. The total cutback represents the shutting down of four potlines having a monthly capacity of 12,000,000 pounds. The three plants, all owned by the Defense Plant Corporation, are operated by the Aluminum Company of America.

Dept. of Agriculture Erects Guayule Rubber Plant

A guayule rubber plant, consisting of extraction plant, laboratory, warehouse, office and boiler room, will be erected in Bakersfield, Calif., at a cost of $350,000, for the U. S. Department of Agriculture.

Investigation on Alcohol Supply Resumed

The senate subcommittee on farm crop utilization which, during the past two years has conducted extensive studies in the field of synthetic rubber and alcohol production, has resumed its investigations to inquire into the condition of the alcohol stockpile and prospective production, and also into reported contemplated changes in alcohol purchase price schedules.

Senator Gillette of Iowa said that the drop in alcohol stockpiles to less than 40,000,000 gallons by September 1 makes the stocks 60,000,000 gallons below what had always been considered necessary for national safety. He said that his committee would consider the advisability of establishing a commission to study locations and prepare plants for construction of 50,000,000 gallons of new capacity from grain.

Safety Pamphlet for Small Plants Published

A pamphlet, aimed primarily at the smaller war plants which can rarely employ trained safety engineers, has been published by the Department of Labor to stem further depletion of the manpower reserve through guarding against industrial accidents. This pamphlet, "Safety Through Management Leadership," cites the actual experience plants of varying sizes have had in organizing for safety.

Copies may be secured free while they last from the Division of Labor Standards, U. S. Department of Labor, Washington 25, D. C.

Activities of the U. S. Conciliation Service in The Chemical Industry

Data from U. S. Dept. of Labor

Situations Handled	1944 July	1944 June	1943 July
Total	74	90	67
Labor Disputes			
Strikes	11		
Threatened Strikes.	11		
Lockouts	..		
Controversies	46		
Other Situations			
Arbitrations	3		
Technical Services.	..		
Special Services ..	3		
Disputes certified to National War Labor Board	20		

Nitrogen Supply Low

The army's enlarged munitions program has made inroads in the nitrogen supply to the extent that supplies of nitrogen compounds to meet the needs of manufacturing and agriculture have shrunk to a very low point. Unless arrangements can be made to import from Chile a greater quantity of nitrate of soda than has been provided for, no relief can be expected.

WPB's announcement giving the dates when further shipments of nitric acid, anhydrous ammonia, and ammonium nitrate to industry would be halted made the outlook on available supplies for the chemical industry worse.

Three Nations Agree on Rubber-Control Study

The United States, Great Britain, and the Netherlands have reached an agreement for study of post-war world rubber production and requirements as a preliminary to development of an international rubber-control program, the Department of State has announced.

A recent conference in London, to which American representatives were sent, prepared a first program of studies, and arrangements for carrying out these studies are being made.

Exposition Emphasizes Transition Period

The contribution of the chemical industry to the war effort and its effect on the immediate post-war period will be emphasized at the third National Chemical Exposition and National Industrial Chemical Conference to be held Nov. 15 to 19 at the Coliseum in Chicago under the sponsorship of the Chicago Section of the American Chemical Society.

"The show and conference will have a new significance," said M. H. Arveson, chairman of the exposition committee. "It will depict the science of chemistry in many of its phases and its application to industry and the needs of mankind in peace as well as wartime."

Invitations have been sent to well-known authorities on practically every phase of applied chemistry who have been asked to address and lead discussions on important topics at the National Industrial Chemical Conference. The commodious second floor of the Coliseum Annex will house the conference. It may be reached directly from the exposition hall.

The show and conference advisory committee is composed of the following:

Allen Abrams, Vice-President, Marathon Paper Mills; George Granger Brown, President, American Institute of Chemical Engineers; J. V. N. Dorr, President, The Dorr Company, Inc.; Willard H. Dow, President, Dow Chemical Company; Gustav Egloff, Director of Research, Universal Oil Products Co.; Otto Eisenschiml, Manager, Scientific Oil Compounding Co.; Per K. Frolich, Director of Chemical Division, Esso Laboratories, Standard Oil Development Co.; Frank Baldwin Jewett, Chairman, Bell Telephone Laboratories, Inc.; C. F. Kettering, Vice-President, General Motors Corporation; S. D. Kirkpatrick, Editor, *Chemical & Metallurgical Engineering;* C. S. Marvel, President-Elect, American Chemical Society; C. E. K. Mees, Vice-President in Charge of Research, Eastman Kodak Company; Thomas Midgley, Jr., President, American Chemical Society; C. S. Miner, Director, Miner Laboratories; Walter J. Murphy, Editor, *Industrial Engineering Chemistry;* R. C. Newton, Vice-President, Swift & Company; Charles L. Parsons, Secretary, American Chemical Society; Holman D. Pettibone, President, Chicago Association of Commerce; Edgar M. Queeny, Chairman of the Board, Monsanto Chemical Company; N. A. Shepard, Chemical Director, American Cyanamid Company; Robert Taylor, Editor, CHEMICAL INDUSTRIES; E. R. Weidlein, Director, Mellon Institute of Industrial Research, and Frank C. Whitmore, Dean of School of Chemistry & Physics, Pennsylvania State College.

Marcus W. Hinson, Manager of the Exposition, maintains headquarters at 330 South Wells Street, Chicago.

Sugar Research Awards Announced

Research awards totaling more than $250,000 to various colleges and universities for scientific investigations of the chemistry of sugar and its role in the diet were recently announced by Dr. Robert C. Hockett of New York, scientific director of the Sugar Research Foundation, sponsored by leading members of the beet and cane sugar industry. New industrial uses for sugar that will aid the post-war market for the product are being discussed by Dr. Hockett at a series of conferences at nine Western universities this week. Among the institutions being visited by Dr. Hockett are Ohio State University, University of Denver, the Universities of Colorado, Utah, Wyoming, Idaho, Oregon and California, and the State College of Washington.

CALENDAR OF EVENTS

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS, Annual Convention, Claridge Hotel, Atlantic City, N. J., Oct. 12.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, Annual Convention, Hotel Jefferson, St. Louis, Missouri, November 19-21.

AMERICAN SOCIETY FOR METALS, Nation Metal Congress and War Conference Display, Cleveland, Ohio, Oct. 16-20.

AMERICAN WELDING SOCIETY, 25th Annual Meeting, Hotel Cleveland, Cleveland, O., Oct. 16-19.

ELECTROCHEMICAL SOCIETY, INC., Fall Convention, Buffalo, N. Y., Oct. 11.

INDUSTRIAL HYGIENE FOUNDATION, Ninth Annual Meeting, Mellon Institute, Pittsburgh, Pa., Nov. 15, 16.

NATIONAL ELECTRICAL MANUFACTURERS ASSOC., Annual Meeting, Waldorf-Astoria Hotel, N. Y., Oct. 23-27.

NATIONAL SAFETY CONGRESS OF NATIONAL SAFETY COUNCIL, Sherman, Morrison and LaSalle Hotels, Chicago, Ill., Oct. 3-5.

SOCIETY OF THE PLASTICS INDUSTRY, INC., Waldorf-Astoria Hotel, N. Y., November 13, 14.

TANNERS COUNCIL OF AMERICA, Annual Meeting, Waldorf-Astoria Hotel, N. Y., Oct. 12-13.

DDT Exempt From Ceiling

Dichlore - diphenyl - trichloroethane (DDT), an insecticide used solely by the armed forces, has been exempted from price control, the Office of Price Administration has announced.

This action, effective September 4, 1944, was taken because the constant change in specifications used in preparing this insecticide precludes any immediate and accurate determination of prices, OPA said.

DDT is still in an experimental stage. When its final processing specifications are determined, OPA will issue a regulation that will control the price of the product, the agency said.

Polyethylene Glycol Prices Lowered

Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation, announces a reduction of five (5) cents a pound in the price of certain polyethylene glycols and the "Carbowax" compounds, effective June 15, 1944. The prices for polyethylene glycols 200, 300, 400, and 600, and for "Carbowax" compounds 1000, 1500, 1540, 4000, and 6000 become 30 cents a pound in drum quantities, and 29 cents a pound in carloads or combination carload quantities packed in drums.

These unique water-soluble compounds are now being employed in many diverse applications. They are so versatile that they are already well established in industry as binders, spreaders, ointment bases, coupling agents, dispersants, plasticizers, humectants, solvents, intermediates, sizing materials and special lubricants.

Magnus Establishes Research Scholarship

Magnus, Mabee & Reynard, Inc., through Percy C. Magnus, President, and the Philadelphia College of Pharmacy and Science, through its president, Dr. Ivor Griffith, announce the creation of a fellowship in volatile oil research at the latter institution. This research has been assigned to the Department of Pharmacy and it will be conducted by Dr. Austin A. Dodge, assistant professor of pharmacy.

Dr. Dodge, who spent several years in close association with the late Dr. Edward Kremers, brings into his assignment a fine background of training in this special field.

Work is already under way and Magnus, Mabee & Reynard, Inc., and the College, will publish, in proper time, much of the results of this long-range program of research.

The fellowship was instituted in memory of the founder of Magnus, Mabee & Reynard, Inc., the late Percy Cecil Magnus.

Lewis Appointed Patent Contracts Chairman

James E. Markham, Alien Property Custodian, has appointed Ben W. Lewis chairman of the patent contracts committee of the Office of Alien Property Custodian. One of the committee's main functions, the custodian said, will be to eliminate restrictive provisions from patent contracts entered into between American concerns and foreign owners of patents or interests in patent agreements, which have now been seized by his office.

Leaders to Speak at Chemical Conference

Noted authorities will discuss the role of industrial engineering in petroleum, synthetic rubber and other industries at the National Industrial Chemical Conference to be held in conjunction with the third biennial National Chemical Exposition at the Coliseum in Chicago, Nov. 15 to 19.

Sponsored by the Chicago section of the American Chemical Society, the show and conference will be the most important of its kind ever held because of its war-time significance and also because of the vital part the industry is taking in helping to speed Allied victory.

Invitations have been extended to leading authorities in many phases of the chemical industry to present their views at the conference and to lead the discussions.

In a symposium on "The Future of Metals in Post War," Dr. L. B. Grant of the Dow Chemical Company, Midland, Michigan, will talk on magnesium; Dr. J. V. Faragher of the Aluminum Company of America, Pittsburgh, Pa., will discuss aluminum, and Mr. John Mitchell, metallurgical engineer of the Carnegie-Illinois Steel Company, Pittsburgh, Pa., will speak on new steel alloys.

INDUSTRY ADVISORY COMMITTEES

WPB Asks Graphite Industry Stockpile Adjustment

The War Production Board has informed the newly-organized Graphite Industry Advisory Committee that stockpiled quantities of Ceylon graphites must be adjusted wherever possible before any further import purchases are considered.

Since restrictions exist on imports of Ceylon and Madagascar graphites, WPB will ask plants in the graphite industry to specify which of twenty-six particular grades and what quantities they will require for 1945 deliveries. These particular grades are not considered sufficiently essential by the Government to justify stocking through regular purchases. Use of domestic dusts is encouraged because some Ceylon graphites now available are higher priced.

Members of the new Graphite Industry Advisory Committee are: Fred L. Wolf, Ross-Tacony Crucible Co., Philadelphia; M. B. Joyce, Superior Flake Graphite Co., Chicago; J. W. Cummings, Cummings Moore Graphite Co., Detroit; H. E. Beckman, Springfield Facing Co., Springfield, Mass.; H. M. Riddle, Asbury Graphite Mills, Inc., Asbury, N. J.; Charles Pettinos, Charles Pettinos, New York City, and E. M. Cabaniss, Joseph Dixon Crucible Co., Jersey City, N. J.

New Rosin Committee Members Named

Named from Jacksonville, Fla., to serve on a new 14-member Southeastern industry advisory committee under OPA auspices, are A. L. Brogden of Turpentine and Rosin Factors, Inc., and E. W. Colledge of Nelio Resin Processing Corporation. The committee is to meet with Federal representatives shortly for discussion of proposed price regulation, to fix permanent ceilings. Prices are now frozen under a temporary 60-day regulation in effect since June 28, according to the Atlanta, Ga., office of OPA.

Arsenical Insecticide Manufacturers Meet

The Industry Advisory Committee organized for the arsenical insecticides manufacturers includes the following members: H. Boyd, Commercial Chemical Co., Memphis, Tenn.; J. B. Cary, Niagara Sprayer and Co., Inc., Middleport, N. Y.; J. A. Cavanagh, The Dow Chemical Co., Midland, Mich.; H. C. Davies, Calif. Spray Chemical Corp., Richmond, Calif.; J. M. Fountain, Cotton Poisons, Inc., Bryan, Texas; J. J. Haprov, Los Angeles Chemical Co., Los Angeles, Calif.; C. B. Melander, Pittsburgh Plate Glass Co., Milwaukee, Wisconsin; H. M. Rosencrans, E. I. duPont de Nemours & Co., Inc., Wilmington, Delaware; M. L. Somerville, Sherwin-Williams Co., Bound Brook, N. J.; W. Steinschneider, Ansbacher Siegle Corp., N. Y.; D. I. Trainer, General Chemical Co., N. Y.; B. P. Webster, Chipman Chemical Co., Inc., Bound Brook, N. J.; A. B. Young, Jr., Woolfolk Chemical Works, Ltd., Fort Valley, Georgia.

The Arsenical Insecticides Manufacturers Industry Advisory Committee met on July 20, 1944, to discuss supply-requirements for WFA; suggestions regarding the scheduled FEA arsenical program; availability of arsenic for the production of arsenicals during the balance of 1944 and for 1945; report of the task committee on containers; and other problems. John A. Rodda of the Chemicals Bureau, WPB, served as Government presiding officer.

Stuart St. Clair, chief of the smelting section of the Mining Division of WPB, indicated that supplies of arsenic would be adequate for the remainder of 1944 (largely as a result of decreased requirements for Chemical Warfare) but that a deficit of approximately 10,000 or 15,000 ions appeared likely for 1945 unless importation can be resumed. St. Clair explained in considerable detail that neither Metals Reserve nor the Mining Division of the WPB favors the building of a Government stock pile of arsenic. Members of the committee were of the opinion that a Government stock pile may not be needed; however, the Government should provide some storage space (at the Gold Hill, Utah, mine in particular) to assure continued production during the period in which industry may not be purchasing the arsenic. It was the consensus that cancellation by Metals Reserve of the present contracts covering Gold Hill operations would be disastrous.

Superphosphate Producers Industry Advisory Committee

The Industry Advisory Committee of Superphosphate Producers includes the following members: H. B. Baylor, International Minerals and Chemical Corp., Chicago, Illinois; R. P. Benedict, Darling and Co., Chicago, Illinois; L. E. Britton, Consolidated Rendering Co., Boston, Mass.; I. H. Carter, The American Agricultural Chemical Co., N. Y.; A. H. Case, Tennessee Corp., N. Y.; F. R. Dulany, Southern States Phosphate and Fertilizer Co., Savannah, Georgia; R. A. Jones, Anaconda Copper Mining Co., Anaconda, Montana; R. I. King, Georgia Fertilizer Co., Valdosta, Georgia; A. F. Miller, Swift and Co., Chicago, Ill.; S. L. Nevins, Arkansas Fertilizer Co., Little Rock, Arkansas; W. T. Wright, F. S. Royster Guano Co., Norfolk, Virginia.

Dale C. Kieffer of the Chemical Bureau is the Government presiding officer. At the organization meeting on July 27, the following recommendations were made:

1. The Gopher Ordnance Works should be operated by the Government within the near future.

2. Government should assist in the completion of sulfuric acid plants now under construction and higher priorities should be assigned to permit the prompt repair of existing plants.

The committee recommended that the domestic production of phosphate rock be increased, and if the War Production Board or the War Food Administration should decide that additional production of superphosphate is necessary for the prosecution of the war, private industry should provide the increase.

COMPANIES

DPC Plant Facilities Go To Davison Chemicals

The Defense Plant Corporation has authorized execution of a contract with the Davison Chemical Corporation, Baltimore, Md., to provide equipment to a plant in Baltimore at a cost of approximately $65,000, Jesse Jones, Secretary of Commerce, has announced. The Davison Chemical Corporation will operate these facilities, title remaining in Defense Plant Corporation.

Quaker Oats Organizes Chemicals Department

The Quaker Oats Company, sole producer of furfural and allied chemicals for many years, has announced the formation of a Chemicals Department. This step is expected not only to facilitate continued handling of war orders, but to develop an improved organization with which to enter the post-war period. This department will integrate the functions of sales, research, and production heretofore carried out by several divisions of the company. The furfural and technical divisions become merged in the chemicals department under the new plan, and their former designations discontinued.

Principal peace time uses of furfural which became essential war requirements include petroleum refining, synthetic rubber, rosin purification, various synthetic resins, and manufacture of grinding wheels. Furfural was placed under allocation by General Preference Order M-224 dated October 1, 1942. It is not anticipated that any of the current uses for furfural will be discontinued with the ending of hostilities, although a few may be curtailed. New developments, delayed by war time conditions, are expected to more than offset reductions.

Since the introduction of furfural as an industrial chemical, several derivatives have also been placed on the market. This group includes furfuryl alcohol, tetrahydrofurfuryl alcohol and hydrofuramide. Many others are in the laboratory and development stage.

L. B. Hitchcock

The Quaker Oats Company at the same time announces the appointment of Dr. Lauren B. Hitchcock as manager of the chemicals department, located at the general offices, 1900 Board of Trade Building, Chicago 4, Illinois. For the past nine years he has been with the Hooker Electrochemical Company, Niagara Falls, New York, in both research and sales departments, lately as manager of sales development. Formerly Professor of Chemical Engineering at the University of Virginia, he received his training at the Massachusetts Institute of Technology.

Larger Thanite Plant In Operation

A new and larger plant for the manufacture of Thanite has been placed in operation at Brunswick, Ga., it was announced today by Hercules Powder Company.

The construction of the Thanite plant was made necessary by the increased demand by insecticide manufacturers for an efficient, economical toxic agent, and is a part of a long-range expansion program set up by Hercules' Naval Stores Department.

"With the larger plant now in full production, an adequate supply to meet present day demands is assured, and ample quantities for testing programs are available to insecticide manufacturers who are testing new spray formulas for the 1945 season," according to G. H. Hogg, director of sales of the Naval Stores Department.

"Biological and chemical testing and control of Thanite will be made at our new insecticide laboratory at Brunswick to insure the potency, uniformity, and efficiency of all Thanite produced at the new plant," Mr. Hogg added.

Barrett Builds Naphthalene Units

The Barrett Division of the Allied Chemical & Dye Corporation plans to construct at least one and perhaps two naphthalene refining plants in the Midwest, it has been learned.

Plans have been completed for the construction of a plant in Detroit and work will get under way soon, it was learned. Another plant may be built at Ironton, Ohio, as part of a related project, but plans have not been completed as yet.

Henderson Appointed To Wm. Warner

Ralph W. Henderson, formerly vice-president of Frederick Stearns & Co., pharmaceutical manufacturer, Detroit, has been appointed vice-president of William R. Warner & Co., pharmaceutical manufacturer, New York, in charge of plant operations development. Mr. Henderson directed domestic and foreign plant operations of Frederick Stearns & Co. for several years, prior to which he had served as factory manager in Detroit and as plant manager at the Windsor, Ontario, branch.

Gas Research Institute Builds New Laboratory

A new gasification research laboratory is being built for the Institute of Gas Technology at Illinois Institute of Technology, it has been announced by John I. Yellott, director of the Gas Institute.

The new laboratory, ready September 1, adds 30 percent to the space available for gas industry research. Though the structure will be used primarily for gasification research, a portion will be utilized as an addition to the Gas Institute library.

Being constructed and equipped at an approximate cost of $10,000, the new laboratory bridges the space between the two present buildings of the Gas Institute, making one unit of the entire Institute. The new building is a one-story brick structure.

For the duration, the Gas Institute is devoting its activities exclusively to research. A change in selective service regulations has brought about a suspenion of the educational program of the Institute for the duration. The program, leading to advanced degrees in gas technology, will be resumed after the war.

General Chemical Acquires DPC Plant Equipment

Execution of a contract with General Chemical Co., New York, for equipment at a plant in El Segundo, Calif., at a cost of about $250,000, has been announced by the Defense Plant Corporation.

The same company received a contract for equipment at a plant in Hegewisch, Ill., to cost approximately $250,000.

Metalsalts Corporation Expands

The Metalsalts Corporation of Paterson, New Jersey, producers of redistilled mercury and mercurials, has just acquired the tract of river fronting land adjoining its present plant. The additional property is to be used for expansion purposes in the post-war schedule of the company. The plans for new products, additional employment, and expanded selling efforts have already been drawn, it has been announced by William Stieh, president of the Metalsalts Corporation.

Wellman Joins Greeff and Co., Inc.

Dr. Victor E. Wellman is now associated with R. W. Greeff and Company, Inc., as a technical sales executive. Until his recent resignation from the B. F. Goodrich Co., he was director of purchases of the Chemical Division. Prior to his assignment to the procurement and purchasing division of the latter company, Dr. Wellman was manager of the general laboratory.

Oil Industry Predicted Entering Plastics Field

H. D. Collier, president of the Standard Oil Co. of California, predicted the post-war expansion of the petroleum industry into the production of plastics, medicines and possibly textiles at a meeting in Seattle, Washington, at which he presided at the first meeting of the company's directorate held in the Pacific Northwest.

Company Notes

Mann Fine Chemicals, Inc., manufacturers of medicinal chemicals, have opened offices in New York City at 136 Liberty Street.

The Standard Coated Products Corporation has become a division of Interchemical Corporation. It will be known as Standard Coated Production division of Interchemical Corporation. There will be no change in operations or in personnel.

The General Chemical Co. has disclosed that construction work on a chemical plant to cost in excess of $1,000,000 will get underway soon at Front Royal, Va. The Defense Plant Corporation facility and its production units will occupy a 77-acre farm adjoining the property of the American Viscose Corporation's Rayon plant. It will produce sulphuric acid. Most of the new plant's production will go to the nearby viscose plant for the manufacture of rayon for parachutes, tire cord and other war products.

The Taylor Chemical Corp. with plant located at Penn Yan, N. Y., is now completely owned by J. T. Baker Chemical Co., Phillipsburg, N. J. The only item that the Taylor Chemical Corporation manufactures is carbon bisulfide. There will be no change in operating personnel.

The Monsanto Chemical Company opened a general sales office in Seattle on September 1 with C. F. Trombley

Arthur D. Little, Inc. Adds to Staff

H. W. Christoffers, L. T. Dupree and R. B. Schneider have recently joined the staff of Arthur D. Little, Inc., Cambridge, Mass., industrial research organization. The addition of these men to the Arthur D. Little, Inc., staff indicates the firm's increased activities in the field of technical-economic evaluations and investigations. Mr. Christoffers was previously with Commercial Filters Corp., Mr. Dupree with Servel, Inc. and Mr. Schneider with the central development group of Allied Chemical & Dye Corp.

serving as branch manager and representing the company in all lines other than those of its recently-acquired I. F. Laucks properties.

The Delton Products Corporation is the name of a new company formed by Percy Nadel, formerly manager of the chemical department of Gunning and Gunning. He will maintain offices at 489 Fifth Avenue and will distribute a wide line of heavy and fine chemicals.

Tennessee Eastman Corporation, a subsidiary of Eastman Kodak Company, announces that effective September 1, 1944, sales of their Manganese Sulphate will be made directly by them from their offices at Kingsport, Tennessee. For a number of years, Eastman's Manganese Sulphate has been distributed by Harshaw Chemical Company of Cleveland, Ohio.

The Border States Distributing Co. announces that their offices and plant have been moved to a new location at 7341 Avenue B, Houston, Texas. The firm is engaged in the manufacture of drug and cosmetic products, as well as chemical specialties in the protective coating field.

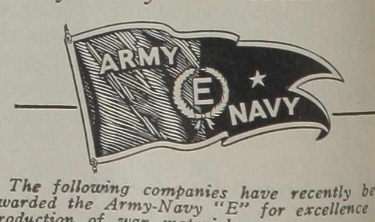
Air Reduction Launches Post War Financing Plan

Air Reduction Company, Inc., announced recently the sale of $25,000,000 of 20-year 2¾% sinking fund debentures, due August 1, 1964.

The entire issue has been sold privately to four life insurance companies, namely, The Mutual Life Insurance Company of New York, Metropolitan Life Insurance Company, Prudential Insurance Company of America and the New York Life Insurance Company.

The Company states that the proceeds of this sale insure adequate funds for the financing of post war expansion plans. The new issue will represent the only indebtedness of the Company except current bills payable.

Army-Navy "E" Awards



The following companies have recently been awarded the Army-Navy "E" for excellence in production of war materials.

Heyden Chemical Corporation, Cherokee Ordnance Works, Danville, Pa. Star added.

Resinous Products and Chemical Co., Philadelphia, Pa. Second star added.

Texas Gulf Sulphur Co., N. Y. Third star added.

ASSOCIATIONS

American Ceramic Society Meets

The American Ceramic Society, Inc., which held its annual meeting September 15 and 16 at the Summit Hotel, Uniontown, Pennsylvania, included a number of papers by leading authorities in the field, among them the following:

"The Effect of the Substitution of Strontium Carbonate for Calcium and Barium Carbonates in a Commercial Cone 5 Glaze" by Forrest E. Burnham, Barium Reduction Corp., Fellow, New York State College of Ceramics, Alfred, N. Y.; "Control of Raw Material for Steatite Manufacture" by F. R. Staley, F. W. Prescott, and R. E. Long, Stupakoff Ceramic & Mfg. Company, Latrobe, Pa.; "The Properties of Some Natural Organic Binders for Ceramic Use" by E. P. McNamara and J. E. Comeforo, Dept. of Ceramics, Rutgers University, New Brunswick, N. J.; "An Evaluation of the Plasticizers, Lubricants and Binders used by the Whiteware Industry" by J. W. Whittemore, Dept. of Ceramic Engineering, Virginia Polytechnic Institute, Blacksburg, Va.

Industrial Hygiene Foundation to Meet

The ninth annual meeting of members of Industrial Hygiene Foundation, an association of industries for the maintenance of healthful working conditions, will be held at Mellon Institute, Pittsburgh, the Foundation's headquarters, on Nov. 15 and 16.

More than 260 of the nation's leading industrial concerns, all of them producing for war, are affiliated with the Foundation and will be represented at the sessions. Others are admitted by invitation.

The program, geared for management, will consider sickness in industry and problems connected with sick absenteeism which call for postwar solutions.

The panel on "Putting the Disabled Veteran Back to Work," which the Foundation pioneered at its 1943 meeting, will be continued and will report on helpful experiences which companies are now gaining in fitting the returning soldier to the right job.

A. A. T. C. C. Convention Highlights Disclosed

The coming annual meeting of the American Association of Textile Chemists and Colorists at Atlantic City on October 12-14 has already broken the record in number of "firsts." It will be our first annual meeting after a lapse of three years;—the first award of the Olney Medal will be made; the first trial of a National Personnel Service; and finally, the first exhibit of Alien patents selected for their application to textiles.

N. P. V. L. A. Plans "Convention At Home"

The "Convention at Home" of the National Paint, Varnish and Lacquer Association, which was authorized by the executive committee to take the place of a regular convention which had been tentatively planned, but was cancelled because of wartime transportation and hotel conditions, has been scheduled for October 25, 26 and 27, 1944—the same dates as had been scheduled for a regular annual meeting in New York.

Suggestions for subjects or questions which might be of general interest and answered on the convention program are solicited by President Ernest T. Trigg of the National Association, and may be sent to him at National Headquarters, 1500 Rhode Island Avenue, N. W., Washington 5, D. C.

Textile Chemists to Have Patents Exhibit

The first exhibit of alien patents selected for their application to textiles will be held October 12 to October 14 at the annual meeting of the American Association of Textile Chemists and Colorists at Atlantic City.

This patent exhibit is largely due to the efforts of Chester North of the Washington office of the Alien Property Custodian. He has arranged to have the patents on display properly indexed and will supply an attendant familiar with the exhibit.

An index of all enemy patents both textile and otherwise, has already been published and is available. The selected textile patents may be seen at Atlantic City so that those of particular interest to any American companies or individuals may be obtained and used under a non-exclusive license from the Alien Property Custodian.

A. C. S. Honors Food Chemist

Science and industry united in a Harvey W. Wiley Memorial Symposium at the 108th meeting of the American Chemical Society, held in New York City September 11-15. The symposium commemorated the 100th anniversary of the birth of Harvey W. Wiley, "Father of American Food Chemistry," who was born on October 18, 1844.

The event was sponsored by the Society's Division of Agricultural and Food Chemistry, with Dr. N. B. Guerrant of Pennsylvania State College, chairman of

U.S.I. CHEMICAL NEWS

September ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1944

Postwar Cosmetics Seen as Big Users of U.S.I. Chemicals

Indalone and BK-5 as well as standbys like ethanol expected to find many new applications

Just about the first postwar idea in every cosmetic manufacturer's mind is to get back to *prewar* raw materials. Substitutes for ethyl alcohol and other cosmetic ingredients have rendered indispensible service in extending the available supplies of these war-scarce chemicals. But the inherent advantages of ethyl alcohol, for example, will make the return of unlimited supplies a significant event to the industry. In addition, of course, many manufacturers have new products ready, waiting for ethyl alcohol and other chemicals to produce them.

New Products Coming

Among the more interesting new products now in prospect, are modifications of the suntan lotions and insect repellents which made such rapid strides just before the war. Precisely what these products are, manufacturers naturally do not reveal. In the field of insect repellents, however, it is certain that wide use will be made of the knowledge gained in developing insectifuges for our armed forces. The government's new all-purpose repellent, in which U.S.I.'s Indalone is a vital ingredi-

(Continued on next page)

New Solvent Blend Gives Better Primer Adhesion

According to a leading process engineer, a mixture of hydrocarbon solvents, such as toluene and xylene, with alcohol in the ratio of two parts to one is most efficient in cleaning surfaces prior to the application of the zinc chromate primer coat. This mixture flashes off the surface quickly and leaves no residue, while the alcohol content is great enough to remove any moisture.

He also states that this mixture has an added application in cleaning the primer coat before the final finishing coat is applied. While it will not remove the primer without abnormal rubbing, it softens it sufficiently to imp[illegible]

New Foam Insulation Saves Space, Weight

A new, phenol-resin foam plastic insulating material, which weighs only two pounds per cubic foot, is lighter and lower in heat conductivity than rock wool, glass fibre or cork. Its present war uses are secret, but it promises to have many peace time applications because of its self-raising and self-curing properties. The new foam plastic should find special favor with designers of modern prefabricated houses, refrigerators, automobiles and other products, where low-weight, high-efficiency heat insulation is desired.

The director of the laboratory which developed the new insulation explained, "It just grows all by itself. It will foam to 30 times its own size, that is, a quart can of the mixture will expand sufficiently to fill a 7 to 8 gallon receptacle in about 10 minutes. What little heat is required is generated by the mixture itself."

The new product, which resembles molasses in appearance, will begin to foam and expand within a maximum of five minutes after the mixing stops. It cures itself without application of heat or any further attention.

Longer-lived Catalysts For Nitrile Production

In producing nitriles from primary alcohols and ammonia, copper catalysts rapidly lose their effectiveness. Yields range from 80 down to 40 per cent. Two newly patented processes are claimed to increase yield by boosting the activity and stability of the catalyst.

The new processes involve the use, as catalyst, of either reduced silver, reduced copper or, better, a mixture of the two deposited on a partially dehydrated amorphous oxide of aluminum, zirconium, thorium, or other rare earth metal. The latter serves as a dehydrating agent.

While the new catalysts lose effectiveness, they do so much less rapidly than copper alone. Further, they may be reactivated readily by passing air over the catalyst at the temperature of reaction. This is followed by treatment with hydrogen to restore the oxides to the metallic form.

Among the alcohols readily converted to nitriles by this process are n-butanol and ethanol.

U.S.I. Expands Line of Modified Alkyd Specification Resins

New S&W War Resins Well Suited for Government Agency Coatings

Supplementing its announcement of Aroplaz 1375 in the August issue of CHEMICAL NEWS, U.S.I. now announces eight additional Aroplaz resins in which phthalic anhydride content has been adjusted to meet current War Production Board restrictions. The comparative specifications of all nine resins are shown in the box below.

All of these resin vehicles have been designed to help manufacturers to formulate government agency specification finishes at minimum raw-material cost, and with no sacrifice in quality.

Army specification 3-183 requires S&W Aroplaz 1365 blended with S&W Fused Congo No. 5, while Quartermaster Corps specification CQD-200A requires S&W Aroplaz 1205-H. Specification CQD-65B is met with S&W Aroplaz 1130 blended with either urea or melamine.

31.5% Phthalic Content Resins

S&W Aroplaz Resins 1323L, 1323D and/or 1333 will be found eminently satisfactory for producing coatings to meet Army specifications 3-177, 3-178, 3-181 and 3-187, Engineer Corps specification T-1760, and Federal specification TT-E-485.

24% Phthalic Content Resins

A maximum phthalic anhydride content of 24 per cent has been set up for Bureau of Ships specification 52R13 and Maritime Commission specification 52MC21—both for alkyd-resin solutions. These government specifications are met by S&W Aroplaz 1240 and 1244 respectively.

16% Phthalic Content Resin

Use of Aroplaz 1375 in the Army and Navy replacement specifications where alkyd resins not exceeding 16 per cent phthalic anhydride content are permitted, was discussed in detail in the August issue of CHEMICAL NEWS.

RESIN SPECIFICATIONS

S&W AROPLAZ	Solution	Visc. G. H.	Acid Value of Solids	Color (GH 1933)	Lbs./Gal. at 20°C.	Phthalic Anhydride Content	Oil Content
1130	60% in Xylol	Z3-Z5	4-6	5-8	8.5	38	40.5
1205H	50% in HSN	Z4-Z5	6-12	7-10	8.0	30-31.5	37
1240	70% in MS	Z-Z1	6-10	6-8	8.0	23-24	64
1244	70% in MS	Y-Z1	6-10	7-12	8.0	23-24	65
1323 Lt.	50% in MS	Z-Z2	5-10	5-10	7.65	30-31.5	54.5
1323 Dk.	50% in MS	Z3-Z4	5-10	16-18	7.70	30-31.5	54
1333	50% in MS	U-W	5-10	5-10	7.65	30-31.5	54.5
1365	60% in Xylol	Z-Z2	18-25	6-9	8.5	38.5	45.5
1375	50% in MS	S-V	12-18	16-18	7.65	15-16	56

September ★

U.S.I. CHEMICAL NEWS

★ 1944

Ups Color Fastness of Printed Textiles

Claimed to be resistant to dry cleaning solvents and other detergents, a new pigmented lacquer-in-water emulsion printing paste has been patented for use in the printing of textiles.

The new product employs a lacquer-in-water emulsion containing a pigmented base. The base includes a urea-formaldehyde resin in a solvent consisting of xylol and butanol, resins, and pine oil. Before use, paste is dispersed in a neutral base made from water, resins, and methyl cellulose.

Stabilizes Halogenated Compounds with Acetone

According to a recent patent, halogenated ketones, such as iodoacetone and bromoacetone, can be stabilized with a water-miscible solvent so that the halogen is retained until the compound comes in contact with water. Among the solvents mentioned for this use are acetone and ethyl acetate. It is claimed that this stabilization increases the utility of these halogen compounds as germicides, fungicides, etc. One use suggested for them is the treatment of ships hulls to prevent fouling.

Citrus Pectate Pulp Solves A Synthetic Rubber Problem

Unlike natural rubber, the synthetic product has a decided tendency to adhere to paper and to flow. As it is shipped from manufacturing to process plants in paperboard boxes, or multi-wall paper bags, this tendency to stick to paper greatly complicates its packaging and handling.

A film of citrus pectate pulp in an aqueous dispersion containing some sodium phosphate applied to the paper container, is reported to solve this problem. The film adheres lightly to paper, strongly to synthetic rubber. When package is emptied, the film pulls cleanly from the paper, and carries through with the rubber as a minute, and entirely innocuous constituent.

Postwar Cosmetics

(Continued from preceding page)

ent, provides one excellent example.

In the field of sun-tan lotions it is equally certain that wide use will be made of BK-5, U.S.I.'s light-screening compound. Bright prospects, too, are envisioned for combination suntan-insect repellent products utilizing Indalone's dual properties as a light screening agent and insect repellent.

Wider Usage of Ethanol

There are many reasons why the perfume and cosmetic industry has, since the earliest days, been a heavy user of ethanol. Perhaps first is its wide-range solvent power. However, its astringent action on the skin, its antiseptic power, and its rapid evaporation rate which leaves a pleasant, cool sensation are factors of equal importance.

Still another prominent advantage of ethanol is its pleasant, neutral odor, which entails no camouflaging.

Medicated lotions, shaving lotions, hair lotions and the rest of the strongly alcoholic products may safely be expected to be on the market in ever increasing variety just as soon as conditions permit. The same applies to the mildly alcoholic lotions—skin fresheners, cleaners, deodorants, hair wavers, bleaches and the rest—and to ethanol-containing shampoos, liquid shaving soaps, dentrifices. Yes, even bubble-bath preparations!

Other U.S.I. Products

Among the other U.S.I. products destined to find widening use in postwar cosmetics are urethan (as a patented fixative for hair dyes), amyl acetate (for perfuming and flavoring lipstick), ethyl acetate, amyl acetate and ethyl phthalate (as perfume ingredients), nitrocellulose solutions (for nail enamels), ethyl, butyl, and amyl acetates and dibutyl phthalate as plasticizers in lacquer and as nail polish removers.

Alkyd Resin Used in Wound Coverings

Rayon, impregnated with an alkyd resin, has been accepted by the British Pharmaceutical Codex as a substitute for oiled silk to be used in covering wet dressings to inhibit drying.

TECHNICAL DEVELOPMENTS

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

Four new adhesives are offered by their manufacturers for the following applications: **(No. 847)** for back and face of container labels; adhesive is claimed to dry immediately to clear film that resists water, weather, oil, brine: **(No. 848)** for sealing waterproof boxboard containers; adhesive comes as a dry, stable powder: **(No. 849)** for laminating structural wood parts; this resin adhesive is claimed to cure in one hour at 180° F and to have a working life of four hours at 70° F: **(No. 850)** for bonding aluminum to aluminum, iron to iron, or either metal to non-metals; consisting of resin base and curing agent, adhesive acts at 300° F.

U S I

A new synthetic insecticide is offered for replacing scarce natural products in the control of aphids, leafhoppers, and other pests. In killing certain sucking insects, the product is claimed to equal nicotine, rotenone, and pyrethrum. **(No. 851)**

U S I

Continuous dehydration of compressed air or gas is said to be feasible with a new device comprising two ceramic tubes, one water-repellent, the other water-permeable but impervious to air. Designed to protect air tools, gas generators, etc., the device is inserted in the line. The second tube acts as a wick continuously drawing out water without allowing gas to escape. **(No. 852)**

U S I

A new neutralizer perfume is claimed not only to have the hiding power to cover the heavy odors of toxic agents, but in addition to impart a light refreshing fragrance. **(No. 853)**

U S I

A new hot-forming plastic comes in laminated sheets which can be bent, formed or drawn, upon heating to 275° F, according to a recent announcement. Products so formed are said to have high tensile, flexural, and compressive strengths. **(No. 854)**

U S I

Mildew proofing, of cotton, jute, sisal, linen and hemp, is said to be effected with a new product. The product comes as a solution which is compatible with standard water repellents. **(No. 855)**

U S I

Higher adhesion of paints, lacquers, and enamel to surfaces of copper, brass, or bronze is said to be obtained when the surface is first treated with a new product which produces a stable, adherent cupric oxide coating. **(No. 856)**

U S I

A new stearate, claimed to prevent water absorption by edible hydroscopic powders, is also offered for use in edible oil emulsions, shortenings, etc. Other uses include emulsification of waxes, oils, and polishes, and as a pour-point depressant for lubricating oils. Dispersible in hot water, product is soluble in alcohols and hot hydrocarbons. **(No. 857)**

U S I

A molasses replacement for use as a binder in foundry work, briquetting, thickening agents and similar applications, is reported to be available in quantity, without allocation limitations. **(No. 858)**

the division, presiding. Food quality, to attain which Wiley finally secured in 1906 the passage by Congress of the Food and Drugs Act, was the major theme of a dozen addresses by food experts.

T. M. Rector of New York, vice president of General Foods Corporation, spoke on "Quality in Fruits and Vegetables." E. C. Thompson of New York, director of the laboratories of the Borden Company, discussed "Quality in Dairy Products."

"Visual Aspects of Quality Control and Quality Research with Beverages and Foods" was the topic of a paper by D. Foster, E. C. Ziegler, and E. H. Scofield, of Joseph E. Seagram and Sons, Inc., of Louisville, Ky. A paper on "Coffee Flavor and Retention vs. Temperature and Type of Container" was read by L. B. Sjostrom and E. C. Crocker of A. D. Little, Inc., Cambridge, Mass., and H. W. Schultz, of Swift and Company, Chicago.

A. L. Winton of Winton Laboratories, Wilton, Conn., a former associate of Wiley, presented a paper on "Harvey W. Wiley, the Father of American Food Chemistry." "Quality in Meat and Meat Products" was the subject of O. G. Hankins, U. S. Department of Agriculture, Washington, D. C. E. C. Crocker of A. D. Little, Inc., Cambridge, Mass., described "Volatility in Food Flavors."

Another session of the Division of Agricultural and Food Chemistry was devoted to the vitamin content of food. Food processors and food technologists from all over the country will participate in the divisional sessions, which are a part of a five-day program at which hundreds of papers and addresses were delivered before 7,000 scientists and industrialists and representatives of allied fields.

The convention was sponsored by the North Jersey section of the Society. The general chairman was Dr. Horace E. Riley of the research division of the Bakelite Corp., Bloomfield, N. J., and head of the North Jersey Section. Dr. August Merz, advisory executive of the Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J., was honorary chairman.

A. A. T. C. C. Establishes Personnel Service

A new personnel service, free to all corporate, individual and student members of the American Association of Textile Chemists and Colorists will be inaugurated at the annual meeting to be held in Atlantic City, N. J., October 12th, 13th and 14th, 1944. It is an important addition to the increasing program of the Association promoting the technical, scientific and professional interests of its members.

The A. A. T. C. C. personnel service will be patterned after the highly successful employment clearing house of the American Chemical Society, with appropriate modificatins to meet the needs of the A. A. T. C. C. members.

Plastics Convention Plans Made

The annual fall convention of The Society of the Plastics Industry is to be held this year on November 13 and 14 in New York City. As has been the case with all national meetings of the Society since the war, the major objective of the gathering is to promote the interchange of information among industry members and others interested in war and essential civilian uses of plastics products.

Many new plastic materials and manufacturing techniques are being developed to meet war-time demands, and these will be discussed in papers delivered before the meeting by outstanding authorities. In addition to the leading molders, extruders, laminators, material and equipment manufacturers from the United States and Canada, many representatives of government and other industries are expected to attend. Present expanded output of plastics for war use assures an ample peace-time supply and many new civilian applications are in prospect which take in such important fields as textiles, building, packaging, surface coatings and many others.

The speaking programs and other arrangements for the meeting are being handled by a committee of local plastics men under the chairmanship of C. S. Shoemaker of The Dow Chemical Co. Other members of the committee include Chris Groos, Boonton Molding Company; Charles S. Lawrence, American Plastics Corp.; J. D. Herlands, Button Corporation of America; R. D. Werner, R. D. Werner Co., Inc.; Herman B. Lermer, Celluplastic Corp.; Bernard Schiller, R. D. Werner Co., Inc.; Sidney Lewis, Advance Molding Corp.; A. C. Manovill, Plastics Manufacturers, Inc.; William Scott, Allied Plastics Co.; C. W. Marsellus, Universal Plastics Corp. and Truman Handy, Celanese-Celluloid Corp.

One of the features of the conference is to be a large exhibit which will include hundreds of plastics items which have contributed so much toward the superiority of allied arms and equipment.

American Welding Society To Meet

Seventeen technical sessions embracing more than sixty papers on welding subjects will feature the 25th annual meeting of the American Welding Society to be held in Cleveland, Ohio, from October 16 to 19. The meeting is being held, as in past years, in conjunction with the National Metal Congress.

Three talks emphasizing the importance of welding in meeting the wartime production needs of the nation will be delivered at the opening session on the morning of October 16. Admiral H. L. Vickery, U. S. Maritime Commission, will speak concerning the use of welding in shipbuilding; Colonel S. B. Ritchie, U. S. Army, of its use in the fabrication of ordnance equipment; and W. B. Stout, Consolidated Vultee Aircraft Corporation, of welding in aircraft production. The work of the American Welding Society in promoting the production of needed ordnance equipment will be recognized by the presentation of the Ordnance Distinguished Service Award at this session. According to the chief of ordnance, United States War Department, the award is being made as a recognition of the "outstanding contributions" of the society and because of its scientific and engineering achievements during the war years.

The technical papers to be presented cover the entire range of application of welding and applied processes, emphasizing wartime applications.

PERSONNEL

Blum Awarded Acheson Medal

The board of directors of The Electrochemical Society, an international organization, has announced the award of the eighth Edward Goodrich Acheson Medal and thousand dollar prize to Dr. William Blum, chief of the section of electrochemistry, U. S. Bureau of Standards.

Dr. Blum is to a very large measure responsible for the standardization of electroplating methods and of plating formulas. He has been with the Bureau since 1909 and for a number of years he was closely associated with Dr. W. F. Hillebrand, former Chief Chemist of the Bureau.

The formal presentation of the Gold Medal and $1000 prize will take place at the fall convention of The Electrochemical Society at Buffalo, New York, October 13, 1944.

Du Pont Explosives Dept. Promotions Made

E. I. du Pont de Nemours & Company has announced four promotions in the Explosives Department which follow the advancement of Edward B. Yancey from the general managership to a vice-presidency and membership on the executive committee of the company.

H. F. Brown, general superintendent of the department since April 1, 1942, becomes assistant general manager, succeeding W. H. Ward who took Mr. Yancey's place. P. J. Kimball, manager of the explosives division for almost four years, becomes general superintendent. F. R. Wilson moves up from director of production of high explosives to manager of the explosives division. J. H. Wellford, who was general assistant to management in the explosives department, will be associated with Mr. Yancey.

Nopco Personnel Shifts

Perc S. Brown, vice president in charge

of Nopoc's vitamin division, has announced personnel changes and promotions designed to gear up this division's operations with the changing requirements of current and post-war business. Sales departments, production departments, and laboratories are involved in these changes, which are as follows:

In the sales department, Leslie M. Brown, has been transferred from manager of the agricultural department and assigned to special duties, directly responsible to Perc S. Brown. Franklin Fader, newly appointed director of advertising and promotion is to continue present activities as director of market research.

In the production department, Robert W. Davis has been promoted to chief chemical engineer of all vitamin production units. The technical department is a newly created department to be headed by Andre E. Bried, Charles E. Dryden has been promoted to a new position as head of the vitamin process development; Loran O. Buxton becomes head of the new products laboratory.

In the vitamin laboratories, Dr. Kenneth Morgareidge has been promoted to director of Nopco vitamin laboratories, and Dr. John R. Foy is head of Nopco Bio-Assay Laboratories.

Junior Chemical Engineers Organize

The Junior Chemical Engineers of New York City have elected officers for the coming year. They are Andrew E. Chute, Foster-Wheeler Corp., president; Randall D. Sheeline, Picatinny Arsenal, vice-president; W. B. Hudson, Foster-Wheeler Corporation, secretary-treasurer; and Donald P. Heath, Socony-Vacuum Oil Co., Inc., assistant secretary-treasurer.

Maurice R. Lyons, M. W. Kellogg Co., Gilbert Fox, Davis Engineering Co., Howard C. E. Johnson, CHEMICAL INDUSTRIES, and Alfred C. Faatz, Jr., Kellex Corporation, will head the program, membership, publicity and luncheon committees respectively.

A series of monthly meetings has been arranged, the first of which will be held on Thursday, September 28, at Child's Restaurant, 109 W. 42nd St., and will feature a talk by Zola G. Deutsch, who recently announced his partnership with Alfred C. Loonam in the firm of Deutsch and Loonam, consulting chemical engineers and metallurgists. The subject of Mr. Deutsch's address will be "Collective Bargaining Related to Chemical Engineers."

Bell Accepts Hycar Post

Frank E. Bell has been appointed technical service engineer for Hycar Chemical Co., largest independent producer of synthetic rubber from butadiene, it was announced today by Frank M. Andrews, general sales manager for the company.

Mr. Bell, who has had 13 years' experience in the rubber industry, comes to Hycar from the Barrett division of Allied Chemical and Dye where he was employed four years as technical service representative. Prior to that time he was with the Bolta Corp., Johnson Rubber Co., and Aetna Rubber Co.

Personnel Notes

M. M. GRUBER and W. A. WEISMANN were made sales manager and assistant sales manager of Resins respectively, effective June 1, 1944, at the U. S. Industrial Chemicals, Inc.

JOHN E. MCMILLAN has been appointed to the technical staff of Battelle Institute,

Columbus, Ohio, where he will be engaged in research in the field of organic chemistry.

MISS JEAN WYNKOOP recently was appointed to the Los Angeles Organic Research Staff of Turco Products, Inc., of Los Angeles, Chicago, and Houston, according to S. G. Thornbury, president and technical director.

WALTER P. KONRAD has been promoted from the phosphate sales department in St. Louis to branch manager of the phosphate division sales department in Chicago, it was announced by Robert S. Weatherly, general manager of sales of the phosphate division of the Monsanto Chemical Co.

CLARK B. KINGERY, assistant manager of Hercules Powder Company's Parlin, N. J., chemical plant, has been named manager of the cellulose products department plant just established at Hopewell, Va.

SAMUEL LEVY, formerly manager of the plastic division of the Arnel Co., Inc., has been elected president and managing director of the newly organized Greentree Products, Inc., 1140 Broadway, New York.

AUGUST HEUSER, who rose from a messenger to control manager of the Electrochemicals Department of E. I. du Pont de Nemours & Co., retired September 1 after 40 years service.

OBITUARIES

Walter S. Landis

Walter S. Landis, vice president and director of the American Cyanamid and Chemical Corp., died suddenly of a heart attack at his home in Old Greenwich, Conn., on Sept. 15. An outstanding figure in the chemical industry for many years, Dr. Landis was a director of Southern Alkali Corp., Southern Minerals Corp., Southern Pipeline Corp., Southern Condensate Corp., and J. G. White Engineering Corp.

He was a member of the advisory board of CHEMICAL INDUSTRIES.

WAR REGULATIONS SUMMARY

AGAR—Order M-96 revoked, removing all restrictions on use of agar.

ALCOHOL DENATURANTS — Acetaldol, St-115, Dehydrol-O, G.C.-78, and Pyronate removed from allocation control August 24.

ANILINE — Allocation control transferred from Order M-184 to Order M-300, Schedule 42. Prior to this action a customer use certificate was required for purchases of less than 5,000 lbs. except for quantities falling within limits of the small-order exemption. These certificates are now replaced by Form WPB-2945 for all purposes of more than 450 lbs. The change also removes aniline salt from direct allocation. Its use is now controlled on the producer's level by application for the allocation of aniline for manufacture of the salt.

ASCORBIC ACID — Allocation control transferred from Order M-269, which is revoked, to Order M-300. Under the new order ascorbic acid may be purchased in quantities as large as 30 kilograms without an application to WPB, thus eliminating the previous maximum of 3 kilograms.

BEESWAX—Importers of pure crude beeswax from parts of the world other than the Western hemisphere or Africa must submit proposed maximum purchase and selling prices for approval by OPA.

BUTADIENE—Removed from allocation control August 25 by revoking Order M-178.

CASEIN—Domestic processors are now permitted to import one lb. of acid casein for each lb. of Rennet casein they produced at WPB's request by partial diversion of their normal acid casein facilities during the first half of 1944.

FERRO- AND FERRI-CYANIDES — Small order exemption for potassium ferrocyanide raised from 100 lbs. to 370 lbs. and for potassium sodium ferri-cyanide from 370 to 400 lbs. Both chemicals are controlled by Schedule 40 of Order M-300.

FLUORSPAR—All restrictions governing purchase and sale of metallurgical fluorspar were lifted last month. The material is now free for all purposes, including use in the metal industry.

LACTIC ACID—Placed under allocation control, effective September 1, through addition of Schedule 43 to Order M-300.

METHYL BROMIDE—Removed from allocation control August 24.

NAPHTHENIC ACID—With the exception of a few highly essential civilian requirements, naphthenic acid will be denied for virtually all civilian uses beginning this month.

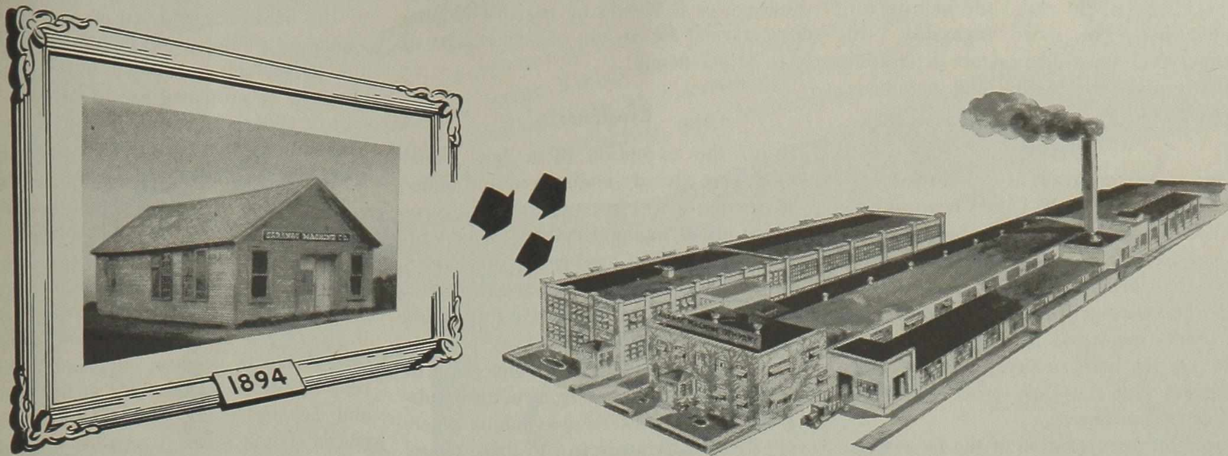
NITRIC ACID—Shipments of nitric acid produced in ordnance plants to nitrogenous fertilizer producers will be discontinued October 1.

REAGENT CHEMICALS—WPB has lifted the dollar quota restriction from the purchase of chemicals for laboratory use by amending Order P-135. Preference ratings will still apply, however.

SORBITOL—Commercial grade non-crystalline isomeric mixtures removed from allocation control. These mixtures were used chiefly as glycerine substitutes, but the improved glycerine supply makes their control no longer necessary.

STYRENE—Styrene and dichlorostyrene removed from allocation control August 25 by amendments to Schedule 18, Order M-300.

From This Humble Beginning 50 Years Ago



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BETA NAPHTHYL BENZOATE, N. N. R.
CALCIUM BENZYL PHTHALATE, pure
BENZYL DISULFIDE
CALCIUM IODOBEHENATE, U. S. P.
CALCIUM LEVULINATE, pure
CAMPHOSULFONATES
CAMPHORIC ACID, C. P.
ETHYL CHAULMOOGRATE, U. S. P.
HELMITOL, N. N. R.
HEXAMETHYL — DIAMINO-ISOPROPANOL-DI-IODIDE Quaternary Ammonium Compound (chemical name for Endoiodin and Iodisan)

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Rubber Costs

(*Continued from page 379*)

Carbon process resulting in a higher yield of butadiene would make the picture for alcohol butadiene more favorable. In addition, there may be a certain geographical advantage to the alcohol butadiene plants.

Styrene

The styrene program as established was built largely around the Dow Chemical Co. process which had been in successful commercial operation for several years. In addition, the Carbide and Carbon Chemicals Corporation used their own process and two plants employed modified Dow systems. On the basis of present experience, it appears that the Dow process will be the low cost producer.

Based on the operation of the Dow type plants over the past several months, the styrene costs, exclusive of feed stocks, are listed in Table III.

Based on present yields, a nomograph for the cost of styrene is given in Figure 3 as a function of benzene and ethylene prices.

At present ethylene is charged to the low cost styrene plants at 6¢ per pound and benzene at about 16¢ per gallon, resulting in a styrene cost of approximately 6.6¢ per pound. Certain other plants obtain their ethylene by the dehydration of alcohol. This results in an ethylene cost of approximately 30¢ per pound which with 16¢ per gallon benzene produces styrene costing 14¢ per pound. In the postwar picture it has been estimated that ethylene will be available at 2¢ to 3¢ per pound and benezene at 8¢ to 12¢ per gallon. Based on these prices it should be possible to produce styrene for an out-of-pocket cost of 4¢ to 5¢ per pound.

Copolymer

With the exception of a few plants which were already engineered and under construction before the expanded Government program was undertaken, the copolymer plants for the production of Buna-S from butadiene and styrene are primarily of a standard design. In order to provide as nearly a uniform product as possible during the period when the conversion of manufacturing facilities from natural rubber to Buna S (GR-S) was taking place, every effort was made to run these plants by a standard operating procedure. As a result, the operating costs for the plants once they have attained a full scale operation are quite uniform.

A breakdown of these basic operating costs is presented in Table III, together with an estimate of their probable postwar levels. These costs exclude the cost of the principal monomers, butadiene and styrene. It will be noted that the postwar estimate is approxmately 0.4¢ per pound less than the present average. This is largely because of a reduction in the cost of chemicals other than monomers which enter into the polymerization formula. The remainder represents estimated possible savings in operating labor, i.e., changes in the packaging end of the plants, and other minor cost reductions.

The cost of the Buna S as a function of the butadiene and styrene cost is presented as a nomograph in Figure 4. From the nomograph it can be seen that Buna S can now be produced for an out-of-pocket cost of about 12.2¢ per pound with styrene and butadiene at 7¢ and 8¢ per pound, respectively. (These are the approximate out-of-pocket charges for the present low cost monomer producers.) If the butadiene is made from alcohol at present prices, the out-of-pocket cost for Buna S is approximately 37¢ per pound. On a postwar basis it has been indicated above that it should be possible to produce butadiene and styrene at out-of-pocket costs of not over 7¢ and 5¢ per pound, respectively. These prices should make it possible to produce Buna S at an out-of-pocket cost of 10.7¢ per pound. Even if the butadiene cost were 9¢ per pound, as might be realized by the alcohol process, the direct cost of Buna S would be only 12.1¢ per pound.

In all of the above costs, nominal management fees and royalties as listed only are included. The additional selling expenses, provisions for profit, interest charges on the use of private operating capital, increased royalties and market risks may well increase the cost of both the monomers and the Buna S itself by several cents a pound, probably not less than 2¢ per pound nor more than 4¢ per pound.

Shell Oil to Build Agricultural Laboratory

Shell Oil Co., Inc., in cooperation with Shell Development Co. and Shell Chemical Division of Shell Union Oil Corp., will establish a $599,000 142-acre agricultural laboratory at Salida, Calif., R. Belither, chairman, announced.

It will be the first of its kind in the West. Dr. T. R. Hansberry, former associate research professor of the New York State College of Agriculture at Cornell, will head the staff.

Experiments will be made in spray oils, fertilizers, insecticides, fungicides, soil and grain fumigants and plant hormones.

Shell Development has, at Emeryville, Calif., the largest petroleum research laboratory on the Pacific Coast.

WPB Gives Warning on Anti-Freeze

Chemical Bureau officials warned that because manufacturers are now well advanced in making up the nation's winter supply of anti-freezes on the basis of allocations of alcohols made several months ago, there can be no variation later in the percentages of the various grades that will be available to the public, the War Production Board reported today.

Heavy military and agricultural demands for ammonia, which interfere with the production of methyl alcohol, the basic raw material, have forced a reduction in the amount of methanol-based anti-freezes being produced for use this winter, officials said. The ammonia is needed for the production of explosives and fertilizer.

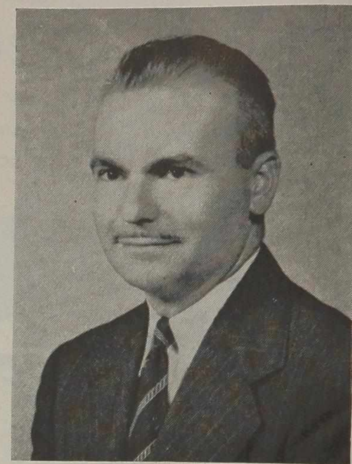
As a result, the great bulk of the anti-freezes that will be marketed this year will be based on ethyl and isopropyl alcohols. However, the over-all supply of anti-freeze will be ample for all expected demands, WPB officials said.

Wax Fertilizer Developed

A factory established in Australia for production of sugar cane wax has overcome early technical difficulties and is now making progress, according to trade reports reaching the Department of Commerce.

Cane wax, used there as a fertilizer, may be spread by machines normally used for other types of fertilizers.

Gemmell Accepts American Cyanamid Post



Louis G. Gemmell has accepted employment as entomologist with the American Cyanamid & Chemical Corporation. Dr. Gemmell's headquarters will be at the New York offices, 30 Rockefeller Plaza. Dr. Gemmell's duties in the Insecticide Department will include the development of new insecticides and fungicides for the agricultural and household fields. He will continue to maintain his contacts with the State Agricultural Experiment Stations.

Heyden Develops Cold Cream Base

Of particular interest to the various cosmetic manufacturers is the recent announcement by the Heyden Chemical Corporation of the development of a New Base for Cold Creams. This new compound which is introduced under the name Pentamull 126-S is a derivative of pentaerythritol. Pentamull 126-S is supplied as a semi-solid, amber colored jelly.

It is possible to use the Pentamull 126-S in recognized cold cream formulations such as the following:

10 parts Pentamull 126-S
20 parts Ceresin
20 parts Petrolatum
80 parts Mineral Oil
70 parts Water

The fatty components are melted together on a steam bath and then cooled to 55° C. The water, which is at 57° C., is then added and the mixture cooled to 45° C. and homogenized.

The resulting product is a cold cream of excellent quality having a smooth and pleasant texture.

It is also possible to make absorption base cold creams using Pentamull 126-S to replace the now critical lanolin. The following formulation was used:

30 parts Absorption Base
20 parts Pentamull 126-S
20 parts Mineral Oil
50 parts Petrolatum
72 parts Water
4 parts Zinc Stearate

The fatty components are melted together and brought to a temperature of 55° C. Water at 57° C. and Zinc Stearate in 3 grams of absorption base is then added to the fatty components. The mass is cooled to 45° C. and homogenized.

The absorption base mentioned above is prepared by melting and blending the following:

37 parts Mineral Oil
44 parts Petrolatum
19 parts Paraffin
10 parts Pentamull 126-S

This formulation results in a stiff white absorption base cold cream which has very satisfactory emollient properties.

Petroleum By-Products Useful to Soap, Perfume Manufacturer

Naphthenic acids produced in the refining of petroleum have definite value in soap production, and the esters may be of interest in perfume compounding. The many available materials suitable for masking the unpleasant odor remove that factor as an obstacle.

In the impure state, naphthenic acids form an almost black, viscose liquid with a pungent odor. The most useful of these acids for soap production are those with an acid number of 200-275 with a boiling point of 240-300 degrees, number 0-12, and an unsaponifiable content of approximately 10%. The lower the acid number, the better are the acids.

Fire-Retarding Paint Developed

The Navy has a new fire-retarding paint. It came out of research directed by Rear Admiral Edward L. Cochrane for the Bureau of Ships. Active fire-retarding ingredients, such as antimony oxide, explain most of the paint's properties. Fire-retardant paints popular on land, such as those with casein admixed, are not suitable for use at sea, because they do not resist mildew and repeated washing. No paint is absolutely fireproof in the sense that it will not be damaged if heated intensely long enough.

New Glues Developed

Two new glues have recently been developed in South Africa, according to a recent article in *Chemical Age*. One is a "60-minute" powdered glue of interest to furniture manufacturers. In the past, pressing flat or bent members required from 3 to 6 hours, but with this glue it can be done in an hour in the case of cold pressing and in two to four minutes when hot pressing is available. The other line is a liquid glue with high initial tackiness and strong bonding power. It is ready for use, obviating soaking and heating. At the moment it is packed in bulk, but it is hoped later to market it in retail packings.

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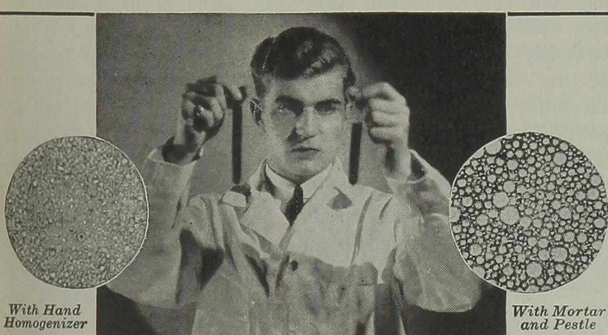

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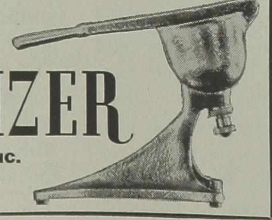

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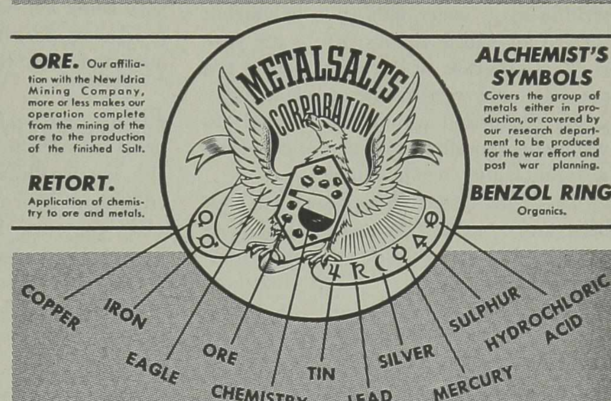
RETORT. Application of chemistry to ore and metals.

ALCHEMIST'S SYMBOLS Covers the group of metals either in production, or covered by our research department to be produced for the war effort and post war planning.

BENZOL RING Organics.



The trade mark was primarily designed to cover our field of activity. We hope in the not too distant future to have a complete coverage of all products derived from these metals.

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MARKETS IN REVIEW

More control trimming in chemicals
"Hex" and formaldehyde prices slashed
Better outlook for the drug makers
Re-evaluation of the polyhydric alcohols
Sulphuric acid demand keeps ahead of capacity
The future prospect for industrial gases
Heavy Chemicals, Fine Chemicals, Coal Tar Products and Paint Materials markets reviewed

CHEMICAL controls were relaxed or withdrawn on a somewhat broader scale during August, and this event coupled with some cutbacks in production gave rise to predictions that chemical outputs had reached their peak for the war period and might conceivably recede from this point on.

There appears to be more wishful thinking (from industries anxious to begin reconversion tasks) than actual cancellations of orders to explain these expectations. As the war in Europe at this writing gives every indication of moving toward an Allied victory before the year ends, a program of carefully considered cutbacks and readjustments in military goods production would be preferable to wholesale cancellations and the economic dislocation that would follow.

The War Production Board has not been tardy or hesitant in easing and removing supply controls when the situation justifies. Among those relaxed or removed as the result of enlarged production or lessened requirements are those on styrene, butadiene, fatty acids, methyl bromide, laboratory reagent chemicals, potassium ferrocyanide, potassium and sodium ferricyanides, aniline salt, sperm, neatsfoot and distilled red oils, sorbitol isomeric compounds, synthetic solvents, metallurgical fluorspar, polyfiber producted from polystyrene and polydichlorostyrene, propylene glycol and diethylene glycol.

The list is imposing, but actually represents only a small percentage of chemical production; and the distortion it creates in the general picture must be realigned by considering the large number of chemical controls which remain for essential, large-tonnage products of the industry. Factors in this policy are the likelihood that the war in the Pacific may run two years beyond the cessation of hostilities in Europe and the continued advocacy of stockpiling by the armed forces because of manpower difficulties. We can expect, then, a trimming of allocations and other control orders for the time being instead of wholesale relaxation of Government regulations.

Expanded manufacturing capacity meanwhile is being reflected by further reductions in prices. The new group to be subjected to slashes are hexamethylenetetramine, formaldehyde and paraformaldehyde, all of vital importance to the synthetic resins industry. The price cut in formaldehyde is the second to be effected this year, a previous cut having been announced in May. This time formaldehyde is lowered 4¢ per 100 lbs. in tank cars or tank truck quantities, and 3¢ for carload amounts. This brings the pound quotation for tank cars to 3.20¢, the lowest level ever attained.

Paraformaldehyde is now 21¢ per lb., lowered from 23¢; and the technical grade of hexamethylenetetramine 24¢ instead of 27¢. The competition factor, of course, is not absent in these price reductions for formaldehyde and "hex," but they could not have been effected had not producing facilities been expanded nor manufacturing techniques improved.

Drug manufacturers are far from being emancipated from supply stringencies, but the situation has undergone some additional improvement. The fiber and glass container headaches have been alleviated, and controls have been eased in the matter of some essential processing materials. Stocks of iodine in this country are in excess of a million lbs., and its classification by WPB has been altered so as to make it available as a substitute for other scarcer materials. Various developments point to an improved position in glycerin. Producers state that there is enough on hand to take care of domestic needs over the final 1944 quarter, and the allocation controls have been removed from sorbitol isomer and some of the glycols which have been employed as substitutes. The alcohol situation has not been bettered for the proprietary and cosmetic manufacturer even though war requirements have not been increased. There has been an improvement in methyl salicylate but the amounts of sodium salicylate and of acetylsalicylic acid, at least in the open market, are by no means plentiful. Aside from the fish-liver oils and the oil-soluble materials, the vitamins are in ample supply, and the same might be said for the sulfa compounds. The ascorbic acid allocation order has been revoked and the vitamin has been bunched with many other materials under the control order M-300.

The paint, lacquer and synthetic coatings lines are still faced with a wide assortment of war difficulties including manpower, containers, and raw materials. The situation in rosin also has been rendered highly uncertain by delayed OPA action on price ceilings. There are some in the industry who look for a price rollback to a basis of $5.61 per 100 lbs. for the K grade, as compared with $6.05 under the temporary ceilings. Many fear that a rollback would adversely affect production of rosin in the South. Carbon black supplies, both furnace and channel types, are probably ample for both the paint and rubber trades, and it has been estimated that channel carbon black production will attain the high rate of 600 million lbs. annually by March 1945.

Techniques have undergone important changes during the war for the manufacturer of finishes which might conceivably affect the status of his former raw materials when activities in this field are returned to normal. Those in the chemical industry who produce some of the polyhydric alcohols, for example, tell us that as far as the coatings industry is concerned, the polyalcohol group has experienced what they term a complete re-evaluation. The glycols, glycerin and cellulose have been the leading members of this chemical group from a volume standpoint, possibly, in the finishes industry, but war shortages appear to have stimulated considerable research in mannitol and sorbitol, the hexitol members of the polyhydric alcohol group. Derivatives and isomeric forms of these two products are being utilized to modify the tung and linseed drying oils.

Sulphuric acid consumption has been running far above anything estimated at the beginning of the war, and even the present national capacity, which has been greatly expanded over 1940, is not adequate for military, fertilizer and general chemical requirements. Spent acid from ordnance plants has proved an uncertain and inadequate sulphuric supply for the wartime fertilizer industry. The amount of spent acid available to the superphosphate manufacturers was estimated at only 8,000 tons for the month of August, basis 100 per cent H_2SO_4—a considerable reduction from the 30,000

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CHEMICAL ECONOMICS & STATISTICS

Coke and the Chemical Industry

In 1943, the second full year of United States participation in World War II, the coke industry contributed coke and byproducts—all indispensable for war—in quantities never equaled before. According to final reports received by the Bureau of Mines, U. S. Department of the Interior, the combined production of byproduct and beehive coke was 71,676,063 tons—63,742,676 tons (89 per cent) byproduct and 7,933,387 tons (11 per cent beehive—an increase of 2 per cent over the previous record output in 1942. This increase resulted entirely from the gain in byproduct coke output, which more than offset the decline of 4 per cent in beehive coke. The record was the more remarkable as it was accomplished in the face of mine shutdowns and the unavoidable drain of manpower into the armed forces.

The increased activity in the byproduct industry during 1943, which saw all furnace plants operating toward maximum output of coke, had a marked effect on the production of ammonia and crude tar. Although yields of gas, tar, and ammonia per ton of coal carbonized decreased when compared with 1942, a total output of gas increased 2 per cent and reached 960,454,518 M cubic feet, but crude tar output dropped 2,008,651 gallons to 738,166,968 and ammonium sulfate or equivalent declined 9,639,714 pounds to 1,795,386,007. Data on crude light oil and its derivatives are withheld in accordance with Governmental wartime regulations. The total value of all coke, breeze, and tar produced and other byproducts sold in 1943 increased 9 per cent over 1942 and amounted to $686,428,948, a new record.

Post-War Outlook

The carbonization of coal in byproduct ovens faces an encouraging outlook in our national economy after hostilities cease. The contribution of metallurgical fuel by the beehive industry in our war program has been noteworthy; however, the economy of byproduct ovens will doubtless entirely displace the beehive ovens as a source of metallurgical fuel in future, except for emergencies. Although the future outlook for the byproduct industry is favorable, the present high production rate will not be maintained because old ovens will fail and the demands for steel will diminish. It is generally agreed that civilian requirements of steel products will not equal the present wartime demands, and this will doubtless lower the requirements of furnace coke. However, the displacement of beehive coke, the reestablishment of domestic coke markets to pre-war levels, and the increasing demands for light oil and coal-tar products point toward active markets for the byproduct industry. The potential scope of application of the light oil and coal-tar chemicals is virtually limitless, and present-day uses will increase. The rapidly expanding plastic, synthetic rubber, aviation gasoline, pharmaceutical, and dyestuffs industries are some of the more important outlets for increasing quantities of benzol, cresols, cresylic acid, phenol, pyridine, and other products derived mainly from byproduct coking.

Byproducts in 1943

Byproduct coke ovens are sources of vital raw materials for many industries, including chemical, dyestuff, explosive, fertilizer, paint, pharmaceutical, plastic, petroleum, synthetic rubber, and wood-preserving. The increased military and civilian requirements for the various coke byproducts stimulated recovery in 1943, and several coke plants installed additional facilities for processing crude tar and crude light oil. The statistics in the following tables are confined to four general groups, some of which are subdivided. They are: (1) crude tar and its derivatives, (2) ammonia, (3) gas, the most valuable, and (4) miscellaneous byproducts.

The total sales value of all byproducts sold (excluding the value of tar used by producers and of the breeze produced) increased 3 per cent over the 1942 figure to $181,929,705 and amounted to 43 per cent of the value of the byproduct coke produced.

The quantity of crude tar processed (topped or refined) by coke-oven operators in 1943 increased 5 per cent over 1942 and was equivalent to 28 per cent of the total output. The volume of crude tar sold by producers to other purchasers for refining decreased slightly in the same period and amounted to 57 per cent of the total production. The increase in open-hearth operations and the scarcity of fuel oil during 1943 resulted in a 4 per cent increase in the quantity of crude tar sold and used for fuel.

The production of creosote, the most valuable derivative obtained in tar distillation, increased 3 per cent over 1942 and totaled 43,552,772 gallons; value of sales amounted to 52 per cent of the total realization of all tar derivative sold in 1943. The heavy tars and pitches obtained as a residue from the distillation of crude tar constitutes 50 to 80 per cent of the original tar. In 1943 the quantity of pitch of tar recovered increased slightly and totaled 667,254 tons—369,015 tons of soft pitch and 298,239 tons of hard. The marketing of pitch produced at byproduct-coke plants has not been developed extensively and in 1943 approximately 96 per cent of the total output was used by producers as fuel.

Data on production of other tar derivatives, among which are cresols, cresylic acid, road tar, and other miscellaneous derivatives, cannot be shown without disclosing individual operations, and only their total sales value is given. Figures on phenol cannot be shown in accordance with Governmental wartime regulations.

Production of ammonium sulfate decreased 11,068,274 pounds, but ammonia liquor (NH_3 content) increased 357,140 pounds in 1943 compared with 1942; however, sales of both sulfate and ammonia liquor increased and resulted in a gain of 3 per cent for sulfate and 1 per cent for ammonia liquor. The average unit value of ammonium sulfate in 1943 remained the same as for 1942 at $0.013 per pound; the value of ammonia liquor increased slightly and averaged $0.037 per pound.

The increased demands and the stimulus of higher prices resulted in substantial production of miscellaneous byproducts. When compared with the major byproducts in terms of quantity and value, they are small, nevertheless, they are a significant item in coking operations. Crude naphthalene at byproduct coke plants is recovered from refining either crude light oil or tar. About 50 per cent of the crude naphthalene produced at byproduct-coke plants, mainly from light oil refining, is sold to large tar refineries for further processing. The quantity of crude naphthalene produced in 1943 amounted to 98,096,899 pounds, a gain of 3 per cent over 1942; value of sales increased 8 per cent and totaled $2,088,829. Pyridine production in recent years has increased sharply; the recovery of sulfur from coke-oven gas is being more widely practiced; and the salvage of phenol from ammonium-still wastes has steadily increased and all of the foregoing have assumed an importance in the war economy which will not vanish with the return of peacetime conditions.

Byproducts obtained from coke-oven operations in the United States in 1943[1]

(Exclusive of screenings or breeze)

Product		Production	Sales: Quantity	Sales: Value: Total	Sales: Value: Average	On hand December 31
Tar	gallons	738,166,968	455,638,846	$24,569,762	$0.054	37,146,107
Tar derivatives:						
Cresote oil, distillate as such	do	31,701,675	31,706,196	4,087,042	.129	581,046
Cresote oil in coal-tar solution	do	11,851,097	8,914,394	1,093,611	.123	825,596
Tar acid oil	do	15,165,320	15,160,304	1,990,232	.131	468,813
Pitch of tar:						
Soft[2]	net tons	369,015	20,526	350,789	17,090	23,713
Hard[3]	do	298,239	10,880	68,316	6.279	1,097
Other tar derivatives		....	....	2,332,952	....	....
Ammonia:						
Sulfate	pounds	1,522,539,911	1,549,629,066	20,211,666	.013	56,794,743
Liquor (NH_3 content)	do	68,211,524	64,654,062	2,407,450	.037	1,982,763
		....	....	22,619,116	....	....
Sulfate equivalent of all forms	do	1,795,386,007	1,808,245,314	....	....	64,725,795
NH_3 equivalent of all forms	do	448,846,502	452,061,329	....	....	16,181,449
Gas:						
Used under boilers, etc.	M cubic feet	[4]960,454,518	39,870,361	3,049,567	.076	....
Used in steel or affiliated plants	do		345,418,565	35,683,766	.103	....
Distributed through city mains	do		169,788,941	44,594,210	.263	....
Sold for industrial use	do		37,197,507	5,292,642	.142	....
		[4]960,454,518	592,275,374	88,620,185	.150	....
Light oil and derivatives		[5]	[5]	32,686,154	[5]	[5]
Napthalene	pounds	98,096,899	98,031,058	2,088,829	.021	2,760,267
Pyridine:						
Crude	gallons	475,027	388,509	300,283	.773	70,539
Refined	do	111,390	111,714	392,121	3,510	4,346
Other byproducts[6]		....	....	730,313	....	....
Value of all byproducts sold		....	....	[7]181,929,705	....	....

[1] Includes products of tar distillation conducted by coke-oven operators under same corporate name. [2] Softening point less than 110° F. [3] Softening point over 160° F. Includes some medium pitch of tar reported by one producer. [4] Includes gas wasted and gas used for heating ovens. [5] Figures withheld in accordance with Government war-time regulations. [6] Ammonium thiocyanate, cyanogen sludge, dicyclopentadiene, phenol from sources other than tar distillation, picoline, residuals, sodium cyanide, sodium phenolate, sodium prussiate, sulfur, and vented vapors. [7] Exclusive of value of breeze production, which was $12,206,564 in 1943.

Magnesium in 1943

Production of primary magnesium in the United States in 1943 was nearly four times that in 1942 and for the second straight year exceeded the combined domestic output since the founding of the industry in 1915, according to the Bureau of Mines, United States Department of the Interior. Output of primary metal in 1943 totaled 183,584 short tons compared with 48,963 tons in 1942.

Year	Production	Apparent Consumption[1]
1939	3,350	3,225
1940	6,261	5,577
1941	16,295	13,979
1942	48,963	43,375
1943	183,584	155,547

[1] Does not consider fluctuations in consumers' stocks and metal derived from scrap. Withdrawals from producers' stocks totaled 1,975 tons in 1939, and 150 tons in 1940; additions to producers' stocks totaled 767 tons in 1941; 1,543 tons in 1942; and 13,317 tons in 1943.

Companies using electrolytic processes for producing magnesium accounted for over 85 per cent of total output, and the ferrosilicon and carbothermic processes accounted for the remaining 15 per cent. Four new plants were put in operation during the year including Dow Magnesium Co., at Marysville, Mich., Amco Magnesium Co. at Wingdale, N. Y., Electro Metallurgical Co. at Spokane, Wash., and Mathieson Alkali Works, Inc., at Lake Charles, La., and all primary metal plants were virtually completed during 1943. The average annual rate of magnesium output rose from 125,000 tons in January 1943 to 236,000 tons in December, and reached a peak in January 1944 when metal was produced at a record rate of 246,000 tons a year. Following this peak, cutbacks were effected during the first half of 1944 totalling about 39 per cent of installed capacity. Thus, it is likely that the high point of magnesium production has arrived and passed and that an output rate comparable to that in January 1944 (about 84 per cent of total rated annual capacity) may not be reached again for at least a decade.

World production of magnesium in 1943 reached another all-time high mark of more than 269,000 metric tons—92 per cent more than the previous record of 140,000 tons set in 1942, and more than eight times the 1939 output. On the basis of estimates, it is thought that about 28 per cent of the output was under Axis control and 72 per cent under control of the United Nations. Production in 1944 will not greatly exceed that of 1943 inasmuch as all the major expansion programs of the various nations are thought to be virtually complete.

Sulfur Production Down

For widely varying reasons, world production of native sulfur decreased sharply in 1943, according to the Bureau of Mines, United States Department of the Interior. During the year Sicily was at the edge or at the center of a battle zone—a condition that reduced sulfur production to negligible proportions. In the United States past years of record-breaking output had accumulated such stock piles that in spite of an increase in consumption operators were able to throttle back production to a rate that would gradually reduce these stocks.

As the submarine menace was brought under control more bottoms were assigned to the transportation of sulfur. Consequently exports increased, relieving shortages in various Allied and neutral countries. This development tended to ease the search for domestic sources in many, but not all, importing countries. Notable exceptions are Argentina, which is turning to its native sulfur deposits, and Great Britain, which continued its investigation of coal byproducts.

The status of pyrites production in 1943 is clouded by lack of authentic information from Axis-dominated area. Output in Spain, Portugal, and Cyprus is curtailed in varying degree by shipping restrictions. Rumors indicate that Germany is suffering an acid shortage, but it is not clear that the cause is deficiency in raw materials. Although many countries that formerly purchased pyrites from Spain and other exporters have succeeded in finding alternative sources, total world production in 1943 probably was somewhat below a record level.

From the few official and unofficial statistics available only an estimate of total world production can be given for 1943—sulfur output probably did not exceed 3,200,000 long tons and pyrites 9,000,000 long tons (containing about 3,900,000 tons of sulfur).

In the United States prices of sulfur and acids were comparatively stable, and with minor exceptions the Office of Price Administration continued the General Maximum Price Regulation. Such an ample supply of sulfur was available that the War Production Board found allocation unnecessary. However, more difficulty was encountered in supplying the demand for sulfuric acid, and it was placed under allocation late in the year.

Antimony Production Increased

Primary antimony raw materials were consumed at plants which produce antimony metal, oxide, and sulfide and at manufacturers making finished metal and nonmetal products. Together these two groups used 23,505 tons (antimony content) of antimony ore in 1943, 7 per cent higher than 1942. More than 56 per cent (13,224 tons) of the antimony ore consumed in 1943 was mixed or oxide ore, virtually all of which originated in Mexico.

Flame-proofing of canvas for military uses such as tents, tarpaulins, camouflage netting, life preservers, etc., proved to be the largest end use for primary antimony. The total production was divided almost equally between metallic and nonmetallic end uses.

Zinc Sulfate Sales Increase

Zinc sulfate sales in 1943 were 18 percent below the peak rate established in 1941, but except for that year they were higher than ever before, according to the Bureau of Mines, United States Department of the Interior. The figures given are on the basis of the product as it is sold to the trade. They do not include zinc sulfate used in the manufacture of lithopone.

There were 15,847 tons of zinc sulfate produced in 1943, compared with 13,733 tons in 1942 and 19,975 tons in 1941. Sales, meanwhile, totaled 15,649, 14,331 and 19,201 tons, respectively.

The following table gives sales of zinc sulfate by uses in 1939-43:

Distribution of Zinc Sulfate Sales, 1939-43, by Industries

(in short tons)

Industry	*1939*	*1940*	*1941*	*1942*	*1943*
Rayon	3,897	3,649	5,170	3,149	4,537
Agriculture	2,168	2,366	3,038	4,123	3,329
Paints and varnish processing	583	1,509	1,422	1,917	2,439
Chemicals	1,309	2,151	5,555	2,595	1,642
Flotation reagent	266	241	312	355	1,282
Glue	172	320	1,203	750	635
Textile dyeing and printing	....	54	130	60	213
Electrogalvanizing	556	348	502	219	187
Other	1,206	1,299	1,869	1,163	1,385
Total	10,157	11,937	19,201	14,331	15,649

Rayon resumed its place as the leading use of zinc sulfate in 1943, having been supplanted by agriculture in 1942 and by chemicals in 1941. A further breakdown of the chemical classification, however, would probably add tonnages to several of the groups covered by this report. Rayon sales increased 44 percent in 1943 and had been exceeded only in 1941. The agriculture use has been taking increasing quantities of zinc sulfate, reaching a peak in 1942, from which it dropped 19 percent in 1943. The feature of sales in 1943 was the gain in the quantity for paint and varnish processing. This class gained 27 percent in 1943 to its second successive peak and represented 16 percent of total sales; in 1935 and 1937 it accounted for only 1 and 2 percent, respectively. The chemical class dropped 37 percent in 1943 following a severe decline in 1942. The decreases noted in sales of the chemical class probably indicate that a more precise breakdown in end-use information was possible in 1942 and 1943.

Zinc Industry Breaks Records

The ability of the zinc industry to continue to break the records established during the previous year was again demonstrated in 1943 for most phases, according to the Bureau of Mines, United States Department of the Interior. Continued Government regulatory measures helped an again expanded smelting industry to increase the output of slab zinc to 5 percent above the 1942 record, even though operations were less than capacity, and reach a level which may well be the all-time peak.

Although production from domestic ore was less, the 6-percent decline was more than offset by a substantial gain of 33 percent in output from foreign ore which also was sufficient to amply cover a 9-percent drop in secondary redistilled zinc production.

Requirements were fully met in 1943, with sufficient excess supply to build up smelter stocks to a record high point. A partial relaxation of conservation measures plus the increase in essential needs resulted in an over-all 12 percent gain in domestic consumption, yet consumers' stocks advanced 14 percent. Greater emphasis was placed on the use of high purity metal than ever before and the production of special and regular high grades continued to increase. This was accomplished largely through a rise in output of electrolytic zinc rather than by the redistillation of lower grade zinc which was somewhat less than in 1942. It should be noted, in this regard, that prime western and selected grades of zinc which received further treatment during the year to bring it up to high-grade standards is included as high-grade metal and excluded from the total of the lower grades.

The apparent supply of zinc made available for consumption (primary and redistilled secondary) in 1943 amounted to 854,574 short tons, an increase of 9 percent from the calculated 783,233 tons (revised) available in 1942. The manufacture of brass products consumed 31 percent more zinc than in 1942, and the limited relaxation in the control of zinc used in galvanized products was reflected in a 2-percent gain for the galvanizing group. The need for increased quantities of French process zinc oxide for military uses resulted in the allocation of more zinc for this purpose, consumption of which advanced markedly.

At the close of 1943 zinc-producing plants were operating at an indicated 91 percent of a reported 1,091,000-ton capacity. Primary smelters operated at 90 percent of a stated 709,000-ton capacity, electrolytic plants at 98 percent of a 338,000-ton capacity, and secondary smelters at 54 percent of a 44,000-ton capacity.

Secondary zinc recovered from purchased scrap in 1943 totaled 368,488 short tons with a value of $63,379,936 compared with 330,526 tons, valued at $57,511,524 recovered in 1942.

Lead Supply Declines

Lead, although an important member of the nonferrous metal group essential to the war program, did not show to advantage statistically during 1943 in comparison with the record-breaking levels attained by other major metals, according to the Bureau of Mines, United States Department of the Interior. Consumption of lead increased in 1943 due to partial relaxation of Government conservation and limitation orders, but a marked decrease in refinery production and a decline in imports resulted in an excess of requirements over supply. Consequently the large stock of lead built up by the Government in 1942 from heavy foreign purchases—which reached a maximum by the end of March 1943—was drawn upon to make up the deficit.

The production of refined primary lead from domestic ores and foreign ores decreased 21 percent in 1943, the over-all total from both sources being 116,998 short tons less than the 1942 output. Consumption of refined soft lead gained 11 percent in 1943 and was in excess of domestic production. Stocks of refined lead and antimonial lead held at primary refineries (reported to the Bureau for the first time) showed a decrease of 9 percent from beginning to end of 1943, whereas consumers' inventories held at 430 plants covered by the Bureau of Mines survey totaled 32 percent more by December 31, 1943.

Superphosphate Market Steady

Figures released by the U. S. Department of Commerce reveal that the production, shipments and inventory of superphosphate have remained fairly constant during the first six months of 1944.

A summary for 1943 discloses that stocks on hand declined from 1,008 thousand tons at the beginning of the year to 790 thousand tons at the end. Production, totaling 6,295 thousand tons, was well below the six-month average for 1944, averaging 526 thousand tons per month as against 587 thousand this year, an increase of 12 percent.

Synthetic Organic Chemicals: January-June 1944

(Preliminary)

(In pounds)

Item	*January*	*February*	*March*	*April*	*May*	*June*
Acetanilide (technical and U.S.P.):						
Production	439,148	599,572	699,295	643,396	367,342	[4]
Consumption	270,368	262,304	368,643	289,051	209,126	90,461
Stocks	757,278	796,064	737,310	917,388	802,667	834,008
Acetic acid (synthetic):[1]						
Production	25,234,708	23,835,226	27,719,588	24,471,598	25,185,075	22,994,169
Consumption	19,555,315	17,210,363	17,990,378	17,156,759	18,003,498	17,636,695
Stocks	9,436,835	8,004,120	9,192,322	9,263,196	9,438,528	7,954,401
Acetic acid (natural and from calcium acetate):[2]						
Production	3,512,324	3,338,767	3,289,140	3,448,145	3,478,309	3,308,389
Consumption	16,580	18,230	......	[4]	[4]	[4]
Stocks	1,529,208	1,509,517	1,279,686	1,060,371	1,292,042	1,201,607
Acetic anhydride:[3]						
Production	39,966,091	38,720,059	41,686,408	41,962,745	41,648,309	40,048,345
Consumption	29,550,413	29,373,446	32,184,310	31,204,166	32,519,325	30,235,442
Stocks	9,645,759	9,922,038	10,244,794	11,534,455	12,025,587	10,867,460
Acetylsalicylic acid (Aspirin):						
Production	753,887	764,005	829,951	676,095	819,287	744,251
Consumption	[4]	[4]	[4]	[4]	......	[4]
Stocks	749,336	814,695	881,272	596,025	960,934	1,012,263
n-Butyl acetate:						
Production	5,699,444	6,231,619	7,913,081	6,235,207	5,757,102	6,124,667
Consumption	149,275	[4]	[4]	[4]	164,011	196,128
Stocks	2,298,399	2,808,377	2,596,717	3,145,099	3,911,193	3,056,241
Creosote oil, tar distillers (gallons):[5]						
Production	11,305,961	11,233,805	11,633,703	10,869,901	10,408,347	10,156,706
Consumption	810,998	1,013,396	1,013,209	828,796	882,897	1,039,091
Stocks	19,155,075	23,969,329	25,724,682	26,522,738	26,632,177	24,846,244
Creosote oil, byproduct (gallons):[6]						
Production	2,965,392	3,236,392	2,983,970	3,562,500	3,590,622	3,568,836
Consumption	160,186	36,021	93,488	65,254	74,816	28,549
Stocks	1,380,822	1,711,595	1,516,362	1,955,584	1,674,474	1,515,015
Cresols, meta-para:						
Production	562,320	648,718	537,482	640,698	690,558	531,608
Consumption	[4]	[4]	147,562	[4]	[4]	[4]
Stocks	151,606	301,729	167,351	294,448	458,644	153,923
Cresols, ortho-meta-para:						
Production	584,661	758,389	971,533	655,213	861,868	866,565
Consumption	......	......	[4]	......	......	[4]
Stocks	304,561	325,759	211,190	[4]	[4]	[4]
Cresylic acid, crude:						
Production	1,965,334	2,237,695	2,014,785	2,141,226	2,010,930	1,951,678
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	1,306,714	1,600,825	1,265,794	1,438,474	1,491,916	1,079,905
Cresylic acid, refined:						
Production	2,723,855	3,747,714	3,737,173	3,342,989	3,782,406	3,257,439
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	1,982,414	2,107,819	2,365,739	2,154,511	2,016,307	2,229,757
Diethyl ether (all grades):						
Production	4,967,093	4,217,884	5,547,268	5,484,234	5,479,999	4,619,999
Consumption	[4]	[4]	[4]	[4]	495,282	353,610
Stocks	2,463,017	2,394,500	3,463,471	2,741,646	1,317,271	1,895,131
Ethyl acetate (85 per cent):						
Production	9,914,309	9,016,264	10,176,203	7,675,579	8,213,741	8,772,412
Consumption	1,513,656	1,304,683	1,585,029	1,201,397	1,344,163	1,135,158
Stocks	5,105,921	4,728,572	6,029,911	5,323,248	5,397,266	6,570,952
Lactic acid (edible):						
Production	427,944	288,344	304,732	381,579	368,974	[4]
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	345,584	369,851	334,257	307,900	371,275	267,098
Lactic acid (technical):						
Production	246,138	315,674	256,698	322,810	238,526	374,340
Consumption	10,009	15,655	18,788	21,863	21,584	15,359
Stocks	172,358	219,212	155,841	240,820	142,386	173,900
Methyl chloride (all grades):						
Production	1,291,121	1,317,988	1,990,710	2,136,340	1,936,596	2,001,151
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	1,078,377	934,583	700,022	718,323	871,972	709,295
Naphthalene, byproduct (less than 79° C.):						
Production	9,368,375	9,121,505	8,682,110	8,288,927	9,094,765	8,230,393
Consumption	......	......	......	......	......	......
Stocks	2,447,785	2,990,248	2,892,682	3,227,748	2,802,080	2,343,626
Naphthalene, tar distillers (less than 79° C.):						
Production	15,072,813	15,744,644	17,616,262	17,013,390	15,368,562	15,725,696
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	9,827,554	8,270,015	8,474,152	9,371,842	9,728,602	8,790,914
Naphthalene, refined (79° C. and over):						
Production	7,268,318	7,768,540	8,180,156	7,578,823	7,076,885	7,294,741
Consumption	4,061,657	4,163,541	4,543,373	4,423,257	4,575,096	4,738,623
Stocks	3,042,885	2,783,416	2,910,302	2,604,018	1,785,706	1,356,642
Oxalic acid (technical):						
Production	1,490,234	1,447,985	1,517,309	1,367,874	1,550,038	1,584,652
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	681,722	764,709	443,151	452,486	351,875	437,740
Phenobarbital and sodium salts:						
Production	22,484	25,361	20,797	21,283	24,683	20,171
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	66,415	72,870	46,380	52,325	51,342	56,424
Phthalic anhydride:						
Production	9,205,342	9,675,900	10,345,136	10,607,574	10,713,572	9,664,363
Consumption	2,570,729	2,621,906	2,546,644	2,537,067	2,441,743	3,138,638
Stocks	1,564,253	1,735,855	1,982,944	1,780,311	2,403,789	2,909,286
Riboflavin (for human use):						
Production	9,783	8,856	12,351	8,982	9,039	7,629
Consumption	[4]	[4]	[4]	[4]	[4]	[4]
Stocks	24,151	26,170	31,504	35,759	39,228	40,051
Sulfa drugs (total):						
Production	653,798	663,816	630,775	520,867	336,835	234,014
Consumption	198,104	237,139	124,205	91,671	38,781	[4]
Stocks	1,392,334	1,346,134	1,469,082	1,606,434	1,650,100	1,624,284

[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.

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.

(*Continued from page 452*)
tons per month sent previously.

Industrial gases, according to those who manufacture them from carbide or through air reduction processes, face a new era of expansion in the postwar period. Calcium carbide production during 1943 passed the 600,000-ton total, and the completion of additional capacity to meet wartime acetylene processes will probably enable the industry to surpass its carbide and acetylene gas production records set last year. Despite expansion in cutting and welding practices during the war, the greater part of acetylene production enters chemical synthesis. Anticipating additional oxy-acetylene requirements in the future, as well as expanding markets for neon, argon and other rare gases, a leading factory in this field is reported planning the expenditure of $20 million for new facilities.

Heavy Chemicals. Although midsummer is traditionally the dull period in fertilizer materials, the trade has been highlighted by growing seriousness in the nitrogen situation. Regardless of the fortunes of war, record fertilizer tonnages may be needed for the 1945 food and fiber crops. It was reported that an additional 100,000 tons of Chilean nitrate of soda had been booked for August-September to alleviate the situation. Ammonia for nitrogen solutions and for ammonium nitrate is being curtailed by Ordnance plants in order to meet enlarged powder and explosives schedules. An unusually extended hot summer also led to increased consumption of anhydrous ammonia for refrigeration and food freezing, and chlorine requirements ran somewhat larger than expected for water-treatment. The fact that cotton consumption has recently fallen below 1943 levels gave rise to expectations of some loosening in the tight caustic situation. More interest is also being shown in export outlets for both caustic and soda ash. Agricultural demand having passed its peak, supplies have increased in copper sulphate and certain other fungicide and insecticide materials.

Fine Chemicals. Sizable quantities of citric acid and ascorbic acid (Vitamin C) will be required to meet new "lemon mix" requirements of the Quartermaster Corps. The ascorbic needs are said to amount to ¾ lb. for each 100 lbs. of the mix. The mercurials are marked by a steadier tone, reflecting an improvement in mercury metal. The supply position has tightened to some extent in synthetic methanol even in face of materially increased production. Some producers believe it will prove temporary. Unlooked for large war needs in acetone and butyl alcohol have strengthened the market for both solvents.

Coal Tar Products. The most recent allocations schedules show that the uses for toluene and xylene for protective coatings, dyes and intermediates remain restricted. Aniline oil became a greater supply problem last month, and WPB was not able to set aside a sufficient amount of benzol for conversion to aniline owing to heavy demands upon benzol for other war purposes. August requirements for rubber chemicals, dyes and intermediates and stabilizers for explosives were met by drawing upon inventories. Pyridine needs remain fairly heavy for the manufacture of sulfa drugs and synthetic vitamins. Both crude and refined naphthalene continue in a strong position. Phthalic anhydride has become one of the war's most important coal-tar intermediates on account of its urgent and growing need for plasticizers, synthetic coatings, insect repellent and other uses.

Paint Materials. Containers are still the industry's major problem. According to the scientific section of the National Paint, Varnish & Lacquer Association, the tin shortage may stay around for some time after the war. For that reason, electrolytic tin containers, having a small amount of tin as compared with the hot-dip process, may have to be employed on an increasing scale. The paint industry has asked that its steel drum quota be figured quarterly against 1940-1941 instead of the present 1943 base.

Chemical Exports

(*Continued from page 375*)

capitulation of normal exports by commodities to each of the areas and countries, but some of the more significant are presented. In Latin America, United States chemical exports to Chile, Peru, and Colombia, have advanced along with the improved industrialization picture in those countries. Preliminary figures for 1943 showed total chemical imports by Chile of more than $17,000,000. The United States has been a major supplier in Peru's expanding chemical import trade, furnishing in 1942, 57 percent of Peru's total chemical imports amounting to $9,600,000. Colombia's imports of chemicals likewise have been increasing, imports of finished chemical products amounting to $10,300,000 in 1941, with paints, pigments, varnishes, explosives, matches, and pyrotechnics leading after pharmaceuticals. The United States' share in this trade was $6,000,000 in 1942.

The six Central American republics—Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama—will continue after the war to offer a steadily expanding, though small-scale market for United States' chemicals and related products. The United States has always been a major source of chemicals for Cuba.

The accompanying table, "United States' Exports of Principal Chemicals and Allied Products to Selected Countries, 1942" is from the Bureau of Foreign and Domestic Commerce Chemical Unit.

Postwar Export Markets

Many factors affecting the chemical import markets of Europe, Asia, Oceania and Africa are unforeseeable at this time, the Bureau states. The United Kingdom and Empire countries have extended their chemical manufacturing industries during the current war and are planning to export a larger portion of their excess output than formerly. How much of Germany's pre-war chemical industry will remain for peacetime exports is obviously problematical.

Canada has been either the largest or second largest market for American chemicals and allied products over the years, running for first place with the United Kingdom. From the same sources as above, the following table is reproduced showing principal United States exports of chemicals and related products for 1937, 1939 and 1942, to Canada:

U. S. Exports of Chemicals and Allied Products to Canada

(*Figures in thousands of dollars*)

	1937	*1939*	*1942*
Coal tar products	$2,706	$3,630	$7,658
Medicinals	1,607	2,575	4,556
Chemical specialties	6,312	8,036	16,483
Industrial chemicals	6,465	7,898	18,979
Pigments, paints and varnishes	2,566	2,824	4,942
Fertilizers	2,774	3,120	5,711
Naval stores	2,130	1,872	3,193
Sulphur	3,658	2,460	6,476

The Bureau of Foreign and Domestic Commerce anticipates a world importation of chemicals of $1,397,000,000 by 1948, or a 10 percent increase over 1938, the last year for which statistics are available for the majority of countries. Europe is expected to continue in postwar years to be the leading area consuming the largest percentage of the import trade, if its manufacturing industries are restored even in part.

The Western Hemisphere possesses the combination of the world's major chemical producing country, the United States, and those countries, Latin America and Canada, whose chemical manufacturing industries have been growing fastest with increasing industrialization.

The Far Eastern and African areas as a whole are expected to record increased chemical demand, but not on the same scale as other regions, increases being expected in China (present figures are restricted), possibly Netherlands East Indies, Turkey, Belgian Congo, Egypt, former European colonies; Australia, New Zealand, Union of S. Africa, in the British Empire.

Penn Salt Forms Export Department

Pennsylvania Salt Manufacturing Company announces the organization of an Export Department at the Company's main office at 1000 Widener Building, Philadelphia.

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
Aug., '42, $0.930 Aug., '43, $0.910 Aug., '44, $0.884

	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	.14¾
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'l. 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.	1.85	2.10	1.85	2.50	1.75	2.50
Ammonia anhyd, cyl ......lb.	...	.16	...	.16	...	.16
Ammonium Carbonate, lumps, dms ....lb.	.08½	.09¼	.08½	.09¼	.08¼	.09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks..lb.	.0435	.0850	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls..lb.	.27	.33	.27	.33	.27	.33
Perchlorate, kgs (A) ...lb.	.55	.65	.55	.65	.55	.65
Phosphate, dibasic tech, bbls ....lb.	.07¼	.08½	.07¼	.08½	.07¼	.08½
Stearate, anhyd, dms ...lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk (A) ton	28.20	29.20	28.20	29.20	28.20	30.00
Amyl Acetate (from pentane) c-l, drs, delv ....lb.	...	.15½	...	.18½	...	.18½
Aniline Oil, drs ....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls..lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs .....lb.	.15	.15½	.15	.15½	.15	.15½
Arsenic, whi, kgs—powd..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 Market		1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks ....ton	60.00	75.00	55.00	75.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ....ton	73.00	78.00	73.00	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	3.60	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ....ton *i*	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.1895	.1945	.1755	.1945	.1575	.1840
Cadmium Metal (*PC*) ...lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ....ton	50.00	95.00	50.00	95.00	50.00	95.00
Carbonate, tech, c-l bgs, ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.58	.57	.58	.57	.58
Phosphate, tri, bbls, cl ..lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls ....lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl ....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) Zone 1, 52½ gal, drms ....lb.	**.73**	**.80**	**.73**	**.80**	**.73**	**.80**
Casein, Acid Precip, bgs, 100 or more ....lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract (*FP*) (A) ....lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract ...lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs ....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude ....bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt Acetate, bbl (A) lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs (A) ..lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP*, *PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls.lb.	.19½	.20	.19½	.20	.19½	.20½
Sulfate, bgs, wks crypt. (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.	.1950	.2240	.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

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Gum Arabic, amber sorts bgs ....lb.	.11½	.12	.11½	.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

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Kauri, N Y (A)						
Pale XXX ....lb.	...	.65¾	...	.65¾	...	.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	.09¾
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*	.31	.38	.31	.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
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bls, wks ....lb.	...	.48	...	.48	...	.48
Penicillin, hospitals, institutions, ampules per 100,000 units	3.20	4.50	3.20	4.50	...	...
For gov. purchases, ampules per 100,000 units	...	1.90	...	1.90	...	...
Pentaerythritol, tech, bl lb.	.29	.33	.29	.33	.29	.35½
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.	.09⅝	.10	.09⅝	.10	.09⅝	.10
Carbonate, hydrated 83-85% calc ....lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Chlorate crys,bgs,wks(A)lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs ....lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks ......lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans...lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, 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 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.	...	1.13	1.05	1.13	...	1.13
Caustic, 76% flake drms, cl ....100 lb.	...	2.70	...	2.70	...	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, anhyd. dms ....lb.	.08½	.10	.05	.10	.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
Bislfite powd, bbls, wks ....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35-40% bbls, wks ..100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, bgs, wks c.l. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks ....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l ....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs (A) ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% dom, cl. lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di wks ..100 lb.	6.00	7.25	6.00	7.25	6.00	7.25
Tri-bgs, cryst, wks 100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel, bbls, wks lb.	.10	.10¼	.10	.10¼	.10	.11
Pyrophosphate,bgswks c-l lb.	.0528	.0610	.0528	.0610	.0528	.0610
Silicate, 52°,drs. wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY ..lb.	.06½	.12	.06½	.12	.05	.12
Sulfate 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	.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.	.24	.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	.34½	.44½	.34½	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton ....lb.	.83¼	.93¼	.83¼	.93¼	.83¼	.93¼
Xylol, Indus. 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

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Babassu, tks, futures ....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls ......lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY lb.	...	.39	...	.39	...	.39
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	...	.88	...	.90	...	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1510	...	.1510	...	.1530
Menhaden, tks ....gal.	...	.1180	...	.1225	...	.1225
Light pressed, drs .....lb.	...	.1260	.1208	.1307	.1305	.1307
Oiticica, liquid, tks ......lb.	...	no stocks	.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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14—10,000, 15,000, 20,000 and 26,000-gal. Cap. Horizontal and Vertical
100,000-gal. Cap. Tank on 80-ft. Tower
50,000-gal. Cap. Tank on 100-ft. Tower
35,000-gal. Tank on 75-ft. Tower
5—Underwriter's Fire Pumps. 750 and 1,000 G.P.M., and 1,500 G.P.M.

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Vallez Rotary Filter 35 Leaf, 957 sq. ft. filter area, with 60" x 60" monel metal wire cloth.

One Sr. Valley Iron batch Pulp Beater Unit.

Fuller Kinyon 12-15 ton per hour capacity, remote control transport pump.

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MACHINERY & EQUIPMENT

of former

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Decatur, Indiana

All in Perfect Operating Condition.

1—Battery of 5—40" bronze basket, Western States 1600 RPM. belt driven CENTRIFUGALS, ball bearing, water-cooled heads; mixer with Stevens mingler coil, syrup troughs, all supporting framework, unloaders.

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—19,000 sq. ft., quadruple effect, horizontal, brass tube EVAPORATOR, with all piping, pumps, etc.

2—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.

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1—Hersey double unit ROTARY DRYER or GRANULATOR.

1—Burman Rotary Double Shell Direct Heat PULP DRYERS.

MISCELLANEOUS: Crystallizers, Pumps, Packaging Machinery, Dryers, Coil and Calandria Pans.

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at Bayonne, New Jersey

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,
12' dia. bowl with 2'3" x 21'4" rake,
15' dia. bowl with 2'3" x 23' rake.

3—DORR THICKENER MECHANISMS—
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.

2—RAYMOND BROS. "IMP" PULVERIZERS, No. 40, with direct connected motor starting equipment, cyclone collectors, tubular dust collectors and all interconnecting piping.

1—OLIVER DRY VACUUM PUMP, 14" x 8".

1—HARDINGE CONSTANT WEIGHT FEEDER, with ¼ hp. motor.

1—HORIZONTAL STEEL STORAGE TANK, 8' x 28' 10,000 gal.

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Dryers, Cookers, Retorts, Storage Tanks and Packaging Equipment

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FOR SALE

1—J. H. Day—3 Roller Mill, Water Cooled, 16" x 40"
1—Dorr Filter, Type BM—8' dia. x 12' long—Rotating Continuous operation
1—Stokes Jacketed Chemical Mixer—3' x 4' x 8' long with agitator
2—Patterson Horizontal Jacketed Mixers 48" x 54" x 20'—0"
10—New Stainless Steel Storage Tanks, up to 1000 gal. capacities.
1—Cast Iron Bubbler Plate Column 20" dia.—20 sections 8½" high each—8 caps per plate
1—H1—Chrome Iron Absorption Column—45" ID x 41'3" high—26 plates—18 caps each plate
12—Steel Storage Welded and Sectional Tanks, 1550 gals., 11,460 gals.
8—New Portable Agitators ¼hp to 2hp

Also:—Cast Iron Filter Presses—Pumps—Air and Ammonia Compressors—Dough Mixers

Write For Latest Stock List

PERRY EQUIPMENT & SUPPLY COMPANY

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AVAILABLE

1—60 gal. Copper Vacuum Still.
1—6 x 15' Allis-Chalmers Tube Mill.
1—40" Tolhurst copper basket Centrifugal.
2—No. 2 and No. 3 Austin Gyratory Crushers.
3—12x32" and 16x40" 3-roll Mills.
1—#30 Day Imperial Mixer.
2—4x6' Atmospheric Drum Dryers.
4—Lead-lined Tanks, 400 and 1000-gal.
2—Triangle Fillers, Gluers, Sealers.
1—No. 150 Kelly Filter.
9—Variable speed Drives—1½-5 hp.
1—Stokes size F Tablet Machine.
1—6" Centrifugal Pump and 75 hp. motor.
2—Colloid Mills requiring 40 hp. each.
1—Blue Streak 20 hp. Hammer Mill.

What equipment have you for sale?

LOEB EQUIPMENT SUPPLY CO.

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FOR SALE

1—Kent 3-Roll, 12 x 30 Horizontal Roller Mill, with water-cooled rollers.

1—J. H. Day 3-roll 16 x 40 Roller Mill, water-cooled steel rollers, equipped with roller bearings and silent chain motor drive.

1—Baker Perkins 60 gallon, Double Arm Mixer with fish tail blades.

BOX 1948

WANTED TO BUY

EQUIPMENT WANTED

We will pay you CASH for a single machine or entire plant, and will remove equipment immediately! Wire or phone COLLECT what you can offer.

UNION STANDARD EQUIPMENT COMPANY

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WANTED

1-500-gal. jacketed mild steel kettle with closed top, man hole, agitator, draw-off pipe, and reflux condenser, tubular or coil type.
1-500-gal. jacketed lead lined steel kettle with agitator, draw-off pipe and vent.
1-Plate and frame, steel or iron filter press with 100 sq. ft. minimum filtering space.
1-Basket type centrifuge made of acid-resisting material 36" or 48" type.
1-750 or 1000-gal. steel kettle with dished bottom and draw-off valve from the bottom equipped with agitator; kettle must have either jacket or coil for heating.

If you have any items similar to the above, please give complete specification and description as to condition. Also, state availability and price.

American Chemical Paint Company

Ambler, Pa.

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PATENTS

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WANTED: FLAVOR CHEMIST

Must possess sufficient experience, imagination, and initiative to assume full responsibility of our Flavor Division.

Liberal starting salary and excellent opportunity for the man who is capable of producing the best in Beverage Flavors.

Your reply, which will be held strictly confidential, should contain complete past employment record and sufficient information to enable us to determine whether interview will be mutually worthwhile. Address:

Roy C. Collins (Personal), Clyde Collins, Inc. Memphis, Tennessee.

Starch Chemist Wanted

Wish to interview experienced, competent, energetic, starch chemist with former experience in the development of new products and control or production of old forms of starch adhesives. In replying please state age, nationality, where born and when available. Permanent position with old established firm. Box 1945.

BUSINESS OPPORTUNITIES

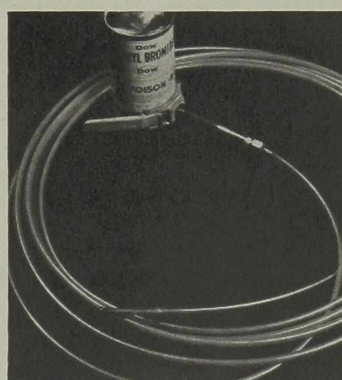
WE WOULD LIKE TO ACQUIRE AN INTEREST

in a small varnish and/or resin plant to be continued in operation as a separate unit. Also other chemical plant considered. Box 1946, Chemical Industries.

Specialized Foreign Trade Organization

Desires to contact responsible chemical manufacturers interested in taking advantage of the postwar export opportunities now in the making. Correspondence is invited. Manufacturers Foreign Trade Co., 7-11 Water Street, New York 4, N. Y.

Plastics Used In Boxcar Fumigation



Because of the greatly increased shipment of foodstuffs and their treatment to prevent the development of infestation, The Dow Chemical Company has announced the use of translucent Saran tubing as applied to the fumigation field. The applicator is manufactured by the Arrow Products Company of Carlstadt, New Jersey, and this method allows fumigation from outside the car, simply by placing one pound cans of methyl bromide in the applicator, which punctures the can, allowing the gas to escape. This simplified method allows overnight fumigation, a time-saving factor of importance when vast quantities of vital foodstuffs must be protected against infestation.

Paris Green Fights Malaria

Paris green, once known only as an effective potato beetle killer, has been drafted in the war against malaria, both in this country and in South Pacific and Italian theatres of operations. The brilliant green chemical whose laboratory name is copper aceto-arsenite is dusted over the surface of mosquito larva infested waters, thus offering an opportunity for poisoning the larvae during its search for food. Paris green, now being produced in large quantities at the Boundbrook, N. J., Division of The Sherwin-Williams Company, has been found to have such powerful toxic action that less than one ten-millionth of a gram can destroy a larva.

New Pest Survey Head Named

The Department of Agriculture has named Gilbert J. Haeussler chief of the Division of Insect Pest Survey and Information in the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration.

This division conducts insect pest surveys, and reports on insect conditions to help farmers and insecticide companies control serious crop pests. It also prepares information and publications on research, control and regulatory work in entomology and plant quarantine activities.

Increased Potash Content In Fertilizers Urged

Increased potash supplies this year should enable fertilizer manufacturers to turn out mixed fertilizers with higher potash content than in the last few years, according to the War Food Administration.

In a letter to fertilizer manufacturers, P. L. Groggins, chief of the Chemicals and Fertilizers Branch, Office of Materials and Facilities, suggested that mixed fertilizers this year can and should carry as much potash as they customarily did before the war. He pointed out that an increase in the potash content of mixed goods would be in line with the WFA's general recommendation that manufacturers produce fertilizers having a high plant food content.

The more concentrated fertilizers conserve labor, transportation and packaging, which are so short that they tend to limit production and distribution. Farmers have already been asked by WFA to help meet the same problems by ordering and accepting delivery of fertilizer early.

Increased supplies of potash should help materially, crop scientists say, in the production of cereal grains, legumes, starch and sugar crops, cotton and tobacco.

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"WE"-EDITORIALLY SPEAKING

Do you want a used piano?—or a pair of skis?—or a slightly out-of-date range finder? These and thousands of other items will comprise an estimated 50 to 100 billion dollar stockpile at the end of the war, and what to do with it is the concern of Surplus War Property Administrator William L. Clayton.

Economists of the "scarcity school" advocate scrapping most of it so that it will not impede post-war employment; the surplus will represent several months'—and even years'—normal production in some industries. Others, thinking of the taxpayer, prefer that the Government sell whatever it can, either directly to buyers or to the original manufacturers for distribution through regular trade channels. Still others would use it to rehabilitate the destitute populations of Europe and Asia; but envious Americans would howl if fine woollens and other high quality military materiel, which they themselves could never afford, were given outright to foreigners.

This much appears certain—whatever decision is made will be over the clamor of one pressure group or another, and we suggest that any aspirin stockpile be shovelled right into the next train for Washington.

The Week of October 8 to 14 has been designated as Fire Prevention Week.

Chemical plants and warehouses are crowded today with an unprecedented stock of flammable materials—a potential cause of disaster. Just because a particular week has been set aside doesn't imply that we should relax our watchfulness during the rest of the year, but it would be a good idea if you made an *extra* inspection that week—just to make sure that everything is shipshape.

We were amazed recently to learn what happens to some of our salvaged waste paper. Tons of it are being used to make the plastic barrels of the flying bazookas which the Army Air Forces have installed on the Thunderbolt and other fighter planes.

A plastic composition was chosen because it is lighter and better adapted for the job. Exactly what resins are used was not revealed, but the plastic is undoubtedly fire resistant in order to withstand the fiery blasts of the rocket missiles. It is certainly an unexpected use for paper.

Fifteen Years Ago

From Our Files of September, 1929

Sir James C. Irvine is awarded Elliott Cresson gold medal by the Franklin Institute in recognition of his research in the field of carbohydrate chemistry.

Standard Textile Products Corp. purchases Cotex Corp., Newark, manufacturers of imitation leather and rubber cloth.

Carbide & Carbon Chemicals Corp. manufactures 48,000 proof gallons of ethyl alcohol synthetically under a temporary permit issued by the Bureau of Prohibition, according to a letter written by Dr. James M. Doran, Commissioner of Prohibition. In his letter Mr. Doran stated that the manufacture of alcohol in this manner is limited only by the supply of petroleum and coal, as it is apparent that the manufacturing problem has been solved.

Davison Chemical Co. acquires controlling interest in Fremont Cotton Oil Co., Goldsboro, N. C.

Ansbacher-Siegel Corp. is to be formed by merger of G. Siegel Corp. of America and Ansbacher Corp. The former is engaged only in the manufacture of fine colors, while the latter is not only a manufacturer of dry colors but also a large producer of agricultural insecticides.

Helium produced during July by government plant near Amarillo, Texas, totaled 648,850 cubic feet at an average purity of 97 percent.

Kessler Chemical Corp. is organized as a subsidiary by the American Commercial Alcohol Corp. The acquisition of the Kessler Co., it is believed, will effect better service by making possible cooperation in research and engineering and advantages in the procurement and use of raw materials.

Therm-o-Proof Insulation Co., Chicago, works out process for making mineral wool from lead slag. This mineral wool is a fluffy and light substance that will not burn or melt at less than 2,500 deg. F., and is being used for insulating material.

Duval Texas Sulphur Co. is reported producing about 500 tons of sulfur per day from its 2,000 acres of leased land in Duval county, Texas. It is estimated that the acreage will yield about 3,750,000 tons.

Chemistry is wonderful! We learn that even that tight-lipped bivalve, the oyster, has succumbed to the black art. The difficult and frequently dangerous job of opening oysters for the home table has been solved by a small tablet which liberates carbon dioxide. When it is dropped into a container of water with the oysters, they simply relax, yawn, and open themselves.

In this day of scientific control it is not surprising that at least one industrial firm uses aptitude tests to pick their salesmen. The Todd Company, Rochester, New York, has published its findings, and we mention it only to point out that chemical salesmen, tested for comparison, rated particularly high in mental ability, accuracy, and personnel relations.

The 108th meeting of the American Chemical Society this month brought men and women from all parts of the country to New York, where scientists and production men were able to get together to iron out problems and exchange ideas. Groups which make no direct contribution to the war have been discouraged from holding national meetings; but the American Chemical Society meetings do not hinder, but rather expedite the flow of new and necessary items to the battle-lines. They are not a "holiday" for good behavior, but rather an opportunity for further service. The emphasis during the last few years has been on the Constitutional phrase, "to provide for the common defense," but we hope that before long the major concern will again be "to promote the general welfare."

Neoprene will soon be at home in the boudoir as well as on the wheels of Army jeeps. Feminine figures—and possibly some of the masculine as well—will soon be urged into esthetic contours by Neoprene girdles, we learn from the WPB.

Manpower and critical materials shortages will slow production until next spring, however, and even then only a quarter of the demand will be met. In the meantime we'll have to confine the chronic bulkiness of the wartime silhouette with whatever inelastic means we have on hand.

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. 564, Nos. 2, 3, 4—Vol. 565, No. 1 (July 11–Aug. 1, '44) p. 520

*Industrial Chemicals—Organic

Manufacture of alphamethylglycerol from reaction mixture obtained by oxidation of crotonaldehyde in presence of water and below about 40° C. and containing alphamethylglyceraldehyde. No. 2,351,302. Hanns Staudinger and Karl Tuerck to The Distillers Co., Ltd.

Producing diene-synthesis products which comprises reacting a hydrocarbon compound containing two conjugated C=C double linkages with a halogenated ethylene compound. No. 2,351,311. Kurt Alder and Hans-Ferdinand Rickert.

Producing isophorone by condensing acetone and recovering a mixture comprising mesityl oxide, diacetone alcohol and isophorone, the improvement of freeing said isophorone from mesityl oxide and diacetone alcohol. No. 2,351,352. Sumner McAllister and William Bailey, Jr. to Shell Development Co.

Continuous isomerization of butane in the vapor phase with a catalyst comprising an adsorptive alumina and aluminum chloride. No. 2,351,354. Frank McMillan to Shell Development Co.

Preparing acetoacetic esters which comprises causing diketene to act upon compound of group consisting of alcohols, phenols, alkyl mercaptans and thiophenols in presence of a ctalyst. No. 2,351,366. Franz Pohl and Walter Schmidt.

Converting ketoximes into acid amides by means of sulphuric acid. No. 2,351,381. Georg Wiest.

Preparing carbon tetrafluoride. No. 2,351,390. Anthony Benning and Joseph Park to Kinetic Chemicals, Inc.

Arylaminoketo compound and preparation. No. 2,351,409. Joseph Dickey and James McNally to Eastman Kodak Co.

Treating fermented liquors for recovery of glycerol by distillation. No. 2,351,413. Eduard Farber and Victor Dayton and James Wallerstein to The Overly Bio-Chemical Research Foundation, Inc.

Increasing the iodine value of non-drying vegetable oils having at least one hydroxyl group and at least one unsaturated carbon linkage. No. 2,351,444. Hoke Miller to Air Reduction Co., Inc.

Decolorizing and neutralizing a mineral oil free of asphaltic, sludgy and resinous materials with clay. No. 2,351,445. Maurice Morgan to Standard Oil Development Co.

Alkylation of isoparaffins. No. 2,351,464. Alexis Voorhies, Jr. and Erwin Hattox to Standard Oil Development Co.

Purifying a fat spent solutizer solution containing hydrocarbons and suspended, insoluble, solid impurities. No. 2,351,467. Joseph Wilson to Shell Development Co.

Refining crude methanol. No. 2,351,527. Richard Lembcke to Cities Service Oil Co.

Preparation of detergent mixtures. No. 2,351,559. Andrew Treffler to Solvay Sales Corp.

Isomerizing straight chain paraffin hydrocarbons. No. 2,351,562. Preston Veltman to The Texas Co.

Conversion of normal butane to isobutane. No. 2,351,577. Samuel Thomas to Shell Development Co.

Alkylation of a low-boiling isoparaffin with an olefin. No. 22,510. Arthur Goldsby and Ernest Pevere, Louis Clarke and George Hatch to The Texas Co.

Preparing zein solutions directly from gluten. No. 2,352,604. Roy Coleman to Time Incorporated.

Forming cyclic compounds which comprises heating an alpha, gamma diene with a compound containing a carbon to carbon double bond and hydroxyl group. No. 2,352,606. Kurt Alder and Erwin Windemuth.

Dipping meat which comprises preparing a dipping bath containing a predetermined concentration of gelatin solids. No. 2,352,611. William Bowers to Wilson & Co., Inc.

Formal of ethylene cyanohydrin. No. 2,352,671. Joseph Walker to E. I. du Pont de Nemours & Co.

Preparing a sulphonated product. No. 2,352,698. James Eaton and Peter Volk to E. F. Houghton & Co.

Making halogenated ethers by splitting carbon-to-oxygen-to-carbon linkages in open chain aliphatic compounds containing more than two such linkages to form halogenated ethers containing fewer ether linkages. No. 2,352,745. Walter Toussaint and Louis MacDowell, Jr., to Carbide & Carbon Chemicals Corp.

Insect repellent comprising cyclohexyl 2-ethyl hexoate. No. 2,352,746. Ludwig Wasum to Kessler Chemical Co., Inc.

Hydrocarbon conversion. No. 2,352,755. Jerry McAfee to Universal Oil Products Co.

Motor fuel comprising hydrocarbons boiling within gasoline boiling range and reaction product obtained by reacting a phosphatide with a polymeric metal carbonyl. No. 2,352,760. Richmond Bell to The Pure Oil Co.

Trimethylene chlorbromide. No. 2,352,782. Clyde Gardenier to Thomas A. Edison, Inc.

Thermal vapor phase conversion of high boiling hydrocarbons into lower boiling products. No. 2,352,789. Gerald Ibach to Phillips Petroleum Co.

Treatment of fatty oils containing saturated and unsaturated constituents. No. 2,352,883. Don Bolley to National Lead Co.

Reaction product of aldehydes and triazine derivatives. No. 2,352,942. Gaetano D'Alelio and James Underwood to General Electric Co.

Reaction product of aldehydes and diazine derivatives. No. 2,352,943. Gaetano D'Alelio and James Underwood to General Electric Co.

Triazole derivatives. No. 2,352,944. Gaetano D'Alelio to General Electric Co.

* Continued from last month (*Vol.* 563, *Nos.* 2, 3, 4—*Vol.* 564, *No.* 1)

*Paints, Pigments

Diazine derivatives. No. 2,352,945. Gaetano D'Alelio and James Underwood to General Electric Co.

Antioxidant which is a sulphonyl amino phenol, in which sulphonyl group is attached to phenol group through amino group. No. 2,352,950. Charles Gates to United States Rubber Co.

Benzene-soluble copolymer of butadiene with at least one of cyclopentadiene and methyl cyclopentadiene. No. 2,352,979. Frank Soday to The United Gas Improvement Co.

Benzene-soluble copolymer of isoprene with at least one of cyclopentadiene and methyl cyclopentadiene. No. 2,352,980. Frank Soday to The United Gas Improvement Co.

Benzene-soluble copolymer of piperylene with at least one of cyclopentadiene and methyl cyclopentadiene. No. 2,352,981. Frank Soda to The United Gas Improvement Co.

1, 4-diamino-2-nitroanthraquinone. No. 2,353,010. Edwin Buxbaum to E. I. du Pont de Nemours & Co.

Preserving large amounts of oxidizable materials comprising circulating an inert gas through a confined space to displace atmospheric air. No. 2,353,029. William Graham, Jr. to American Dairies, Inc., and The Quaker Oats Co.

Segregation of styrene from petroleum oils containing same. No. 2,353,040. Minor Jones and Alfred Wells to Jasco, Inc.

Pourpoint depressant comprising Friedel-Crafts condensation product of a monomeric aromatic compound and an aliphatic monohalogen substituted hydrocarbon. No. 2,353,053. Eugene Lieber to Standard Oil Development Co.

Preparing primary aliphatic amines which comprises reacting diethyl ether with hydrogen cyanide in presence of a dehydrating catalyst. No. 2,353,091. Ober Slotterbeck and Allen Kittleson to Standard Oil Development Co.

Catalytic isomerization process comprising forming a slurry of a powdered aluminum chloride catlyst mass and at least one normal paraffin. No. 2,353,098. James Whiteley, Jr. and Charles Lynch to Standard Oil Development Co.

Anilinoanthraquinones containing not more than one anthraquinone nucleous which carry in the anilino groups at least one methylol radical. No. 2,353,108. Alexander Wuertz and David Klein to E. I. du Pont de Nemours & Co.

Catalytically converting hydrocarbon oils, with powdered catalytic materials comprising a mixture of activated carbon and active inorganic clay type catalytic material. No. 2,353,119. Arnold Workman to Cities Service Oil Co.

Subjecting a hydrocarbon fraction containing normal and isoparaffins and olefins to action of an aqueous solvent having a high selectivity for olefins to form an olefin extract. No. 2,351,609. Vladimir Haensel to Universal Oil Products Co.

Treating hydrocarbons of motor fuel boiling range to increase the antiknock value. No. 2,351,624. Julian Mavity to Universal Oil Products Co.

Tetracyclic ketones. No. 2,351,637. Leopold Ruzicka and Moses Goldberg to Ciba Pharmaceutical Prods., Inc.

Process of adding a quaternary ammonium compound to a vinyl ester-containing composition to inhibit polymerization of the vinyl ester. No. 2,351,658. Allan Berne-Allen, Jr. to E. I. du Pont de Nemours & Co.

Manufacture of vinyl and ethylidene esters. No. 2,351,664. Frank Cockerille to E. I. du Pont de Nemours & Co.

Production of succinic acids. No. 2,351,667. Russell Dean and Edwin Hook to American Cyanamid Co.

Process of producing sulphonyl chlorides. No. 2,351,674. Arthur Lawrence Fox to E. I. du Pont de Nemours & Co.

Preparing mercaptans comprising hydrolyzing the reaction product of phosphorus pentasulfide and an unsaturated hydrocarbon. No. 2,351,763. Carl Hull to Standard Oil Co.

Producing a terpene polymer which comprises polymerizing an acyclic terpene in the presence of hydrogen fluoride. No. 2,351,786. Alfred Rummelsburg to Hercules Powder Co.

Treating material for mineral fibers comprising a stable two-phase system, one of said phases being in form of a water solution of a water-soluble, oil-in-soluble thermosetting, incompletely reacted aldehyde condensation product, and other phase being an oleaginous lubricant incompatible with the aldehyde condensation product and emulsified with the aqueous phase. No. 2,351,802. William Bergin and Allen Simison to Owens-Corning Fiberglas Corp.

Bleaching flour products with nitrogen trichloride and then with nitrogen peroxide. No. 2,351,809. Charles Ferrari and Willis Hutchinson to General Mills, Inc.

Deodorizing an alkali refined glyceride oil of soya bean oil, linseed oil and sunflower oil. No. 2,351,832. Ralph Neal to The Best Foods, Inc.

Oil-in-water-type emulsion comprising a dispersed phase of an emulsifiable organic water-insoluble material, an aqueous continuous phase, and an emulsifying agent comprising a water-soluble alkali soap of polymerized rosin. No. 2,351,912. Joseph Borglin to Hercules Powder Co.

Decontaminating by yperite, lewiste and other war gases that can be destroyed by chlorine, particularly on fatty surfaces and on porous surfaces such as wood, cement, plaster, certain paints, the ground, leather, living skin. No. 2,351,924. Boruk Carnauh.

Enzyme activator comprising member of group consisting of a soy bean flour and a wheat flour, and a buffer salt. No. 2,351,954. Herbert Gore and Charles Frey to Standard Brands, Inc.

Separation of yeast from yeast suspensions. No. 2,351,970. Max Jansen.

Manufacture of rennet. No. 2,352,037. Basil Thornley and Stanley Hilton to Benger's Limited.
Refining mineral oil. No. 2,352,064. Carl Zerbe.
Reaction products of formaldehyde and a N-polyalkylene polyaminoamide of malonic acid, having a reactive methylene group. No. 2,352,070. Louis Bock and Alva Houk to Rohm & Haas Co.
Reaction products of formaldehyde and an N-aminoalkyl amide of malonic acid. No. 2,352,071. Louis Bock and Alva Houk to Rohm & Haas Co.
Production of organic sulfonic acid chlorides having from two to eight carbon atoms per molecule and containing chloride in an easily saponifiable form. No. 2,352,097. Paul Herold, Karl Smeykal, Friedrich Asinger and Wilhelm Wolf, to General Aniline & Film Corp.
Separating components of a liquid solution comprised of alcohol, water and an oil such as fatty acid in such manner that the alcohol does not esterify the fatty acid. No. 2,352,160. Alexander Brown to Emery Industries, Inc.
Metal deactivator consisting of a neutral purely organic substance which is normally stable but oxidizes when exposed to atmospheric oxygen in presence of a copper oxidation catalyst. No. 2,352,164. Hugh Burnham and Frederick Weiss to Shell Development Co.
Producing a substantial yield of toluene which comprises subjecting benzene and methane to contact. No. 2,352,199. Vladimir Ipatieff and George Monroe to Universal Oil Products Co.
Producing a substantial yield of toluene which comprises subjecting a mixture of benzene and methane to contact under alkylating conditions. No. 2,352,200. Vladimir Ipatieff and George Monroe to Universal Oil Products Co.
Purifying aliphatic acid anhydrides. No. 2,352,253. Frank Cockerille to E. I. du Pont de Nemours & Co.
Monomeric vinyl ester of a carboxylic acid inhibited against polymerization and development of excessive acidity by addition of diphenylamine. No. 2,352,263. Frederick Hopper to Niacet Chemicals Corp.
Separation of a butane-ethyl-chloride mixture into its component parts by subjecting to an azeotropic fractional distillation with sulfur dioxide. No. 2,352,268. Charles Kimberlin, Jr., to Standard Oil Development Co.
Production of wax modifying agents. No. 2,352,280. Louis Mikeska to Standard Oil Development Co.
Reaction product of monomethyl-p-amino phenol with dry sulphur dioxide. No. 2,352,287. Verne Reckmeyer and August Brunner, Jr., to General Aniline & Film Corp.
Preventing absorption oil carry-over in high pressure absorbers. No. 2,352,295. William Swerdloff to Phillips Petroleum Co.
Recovering wool grease values from wool steeping and wool washing liquors containing emulsified wool grease and which overfroth when subjected to froth flotation. No. 2,352,365. Robert Booth and Adolphus Webb to Chemical Construction Corp.
Condensation products which consist of hexamethylene diamine with monomeric carbonyl compounds selected from aldehydes and ketones. No. 2,352,387. Heinrich Hopff, August Weickmann and Rudolf Kern to General Aniline & Film Corp.
Increasing wetting and penetrative capacity of alkaline mercerizing baths, which consists of adding to mercerizing bath, 2-methyl-2, 4-pentanediol and a solubilizing agent selected from phenol, ortho-, meta-, and para-cresols. No. 2,352,409. Hillary Robinette, Jr., to Commercial Solvents Corp.
Production of a thioether containing a primary alkyl radical. No. 2,352,435. Johan Hoeffelman and Rinke Berkenbosch to Shell Development Co.
High molecular weight unsaturated organic acids and process of preparing them. No. 2,352,461. Joseph Walker to E. I. du Pont de Nemours & Co.
Metal deactivator consisting of a neutral organic substance which is normally stable but oxidizes when exposed to atmospheric oxygen in presence of a copper oxidation catalyst, said substance having dissolved therein a metal organo complex of an organic nitrogen-bearing deactivator for copper catalysts. No. 2,352,462. Frederick Weiss and Vladimir Anastasoff to Shell Development Co.
Oximino ether. No. 2,352,514. Herman Bruson and Thomas Riener to The Resinous Products & Chemical Co.
Preparing unsaturated polynitriles containing at least one B-cyanoethyl radical attached to an aliphatic carbon atom. No. 2,352,515. Herman Bruson to The Resinous Products & Chemical Co.
Oximino ether. No. 2,352,516. Herman Bruson and Thomas Riener to The Resinous Products & Chemical Co.
Recovery of benzene from a benzene fraction containing same and like-boiling, non-aromatic hydrocarbons, which comprises distilling benzene fraction and rectifying distilled vapors in presence of 4-methyl dioxolane. No. 2,352,534. Richard Greenburg to Allied Chemical & Dye Corp.
Separating into components a mixture of glycerides and a mixture consisting of fatty acids derived from said glycerides, said mixture including a component which is relatively difficultly soluble and a component which is relatively more soluble in a furane compound. No. 2,352,546. John Jenkins to Pittsburgh Plate Glass Co.
Separating resin acids from tall oil, which process comprises dissolving oil in polar solvent selected from mono methyl ether of ethylene glycol, and diacetone alcohol. No. 2,352,547. John Jenkins to Pittsburgh Plate Glass Co.
Formation of an alkyl ester of an unsaturated aliphatic monocarboxylic acid which comprises conducting such reaction in presence of mercuric ions as catalyst. No. 2,352,582. Howard Worne, to Samuel Brass.

*Leather

Tanning with d'methoxy-d-hydroxymethyl diglycollic aldehyde. No. 2,351,338. Kenneth Howard to American Cyanamid Co.

*Medicinals

Preparing hydroxy-pregnane derivatives. No. 2,352,648. Russell Marker to Parke, Davis & Co.
Acetyl salicylic acid salt of an alkamine ester of amino benzoic acid, an anesthetic compound. No. 2,352,691. David Curtis.
Sarsasapogenin ester having a monobrominated side-chain characterized in that the side-chain ($C_8H_{15}BrO_2$) is unaffected by selenium dioxide in acetic acid. No. 2,352,849. Russell Marker to Parke, Davis & Co.
Pseudo-diosgenin. No. 2,352,850. Russell Marker to Parke, Davis & Co.

* Continued from last month (*Vol. 563, Nos. 2, 3, 4—Vol. 564, No. 1*)

Sapogenin derivatives and preparation of same. No. 2,352,851. Russell Marker and Harry Crooks, Jr. and Eugene Wittle to Parke, Davis & Co.
Preparation of steroidal compounds. No. 2,352,852. Russell Marker to Parke, Davis & Co.
Preparation of oxidation products of sapogenin derivatives which comprises oxidizing an exo-dihydro-pseudo-sapogenin unacylated in side chain and separating C_{27}acid thus formed. No. 2,352,853. Russell Marker to Parke, Davis & Co.
Physiologically-active preparation applicable to treatment of human ailments, comprising an alcohol soluble and water soluble, protein-free, nitrogenous product containing solids including non-protein nitrogen and sodium chloride and being capable of causing a transitory lowering of the systemic blood pressure. No. 2,353,016. Paul Daughenbaugh to Sharp & Dohme, Inc.
Injecting epinephrine into a living animal thereby causing depletion of tissue glycogen. No. 2,351,614. Claude Hills and Halvar Halvorson to Regents of the University of Minnesota.
Glucosides and process of making same. No. 2,351,625. Karl Miescher, Werner Fischer, and Jules Heer to Ciba Pharmaceutical Products, Inc.
Preparing d-ribose-2-nitro-4,5-dimethylanilide. No. 2,351,721. Alexander Surrey to Winthrop Chemical Co., Inc.
Therapeutic agent comprising calcium aurothiomalate. No. 2,352,124. Albert Sabin and Joel Warren to The Children's Hospital.
2-methyl-1,4-naphthohydroquinone derivatives and method of preparing them. No. 2,352,189. Erhard Fernholz to E. R. Squibb & Sons.
Manufacture of hydroxyaldehydes of saturated and unsaturated cyclopentanopolyhydrophenanthrene-series and derivatives thereof. No. 2,352,568. Tadeus Reichstein and Hugo Frey to Ciba Pharmaceutical Products, Inc.

Metals, Alloys

Spraying of fused lead to reduce it to finely divided particles. No. 22,494. Allan Ferguson to Oxides, Inc.
Production of zinc from zinc-containing lyes which comprises electrolytically depositing zinc. No. 2,351,383. Hermann Wolf, Ernst Kuss, Hans Hohn and Fritz Stietzel.
Producing pulverulent nickel-iron alloys for electromagnetic purposes. No. 2,351,462. Georg Trageser to General Aniline & Film Corp.
Wiping solder containing lead, bismuth, tin, arsenic, and antimony. No. 2,351,477. George Bouton, George Phipps and Earle Schumacher to Bell Telephone Laboratories, Inc.
Reduction of pure magnesium oxide with a metallic reducing agent at sub-atmospheric pressures. No. 2,351,488. Hugh Cooper, one-half to Frank Wilson.
Vacuum metallurgical furnace for distillation production of magnesium. No. 2,351,489. Hugh Cooper, one-half to Frank Wilson.
Refining of lead which has been previously purified by elimination of copper, tin, antimony and arsenic, which comprises forming anodes of said lead. No. 2,352,625. Paul Gueterbock and Arthur Baxter to Capper Pass & Son, Limited.
Making and treating magnesium castings. No. 2,352,990. Robert Wood to Aluminum Co. of America.
Preparing steel objects for galvanizing. No. 2,353,019. Colver Dyer to Monsanto Chemical Co.
Bronze paste consisting of straight run bronze powder, resin of acid number lower than 8 and a volatile thinner free of sulphur and acidity. No. 2,353,058. Leo Mitchell.
Coating metal surfaces by an acidic phosphate coating solution accelerated by a nitrite, the step of including in solution an acid which does not add to PO_4 in solution. No. 2,351,605. Robert Gibson to Parker Rust Proof Co.
Production of an electrodeposit of a molybdenum-oxygen compound. No. 2,351,639. Ernest Schweikher to E. I. du Pont de Nemours & Co.
Process for the recovery of tungsten from its ores. No. 2,351,678. Robert Hall.
Obtaining metal from ore where metal may be obtained by contact of fluid with ore. No. 2,351,765. Benjamin Jeffery, one-half to Scott Lilly.
Ferrous alloy comprising carbon, chromium, cobalt, molybdenum, silicon, vanadium, manganese, and iron, said alloy being characterized by wear-resistance, corrosion resistance, and freedom from hot metal scale pick-up. No. 2,351,791. Jacob Trantin, Jr.
Coating a body whose surface portions are formed of a metal which consists in part of copper with an alloy consisting in part of titanium. No. 2,351,798. Peter Alexander.
Reducing magnetostriction in a silicon-iron alloy containing up to 6% of silicon and which has been fabricated into strip form and treated to develop magnetic characteristics. No. 2,351,922. Stephen Burgwin to Westinghouse Electric & Manufacturing Co.
Preparing articles for electrolytic plating. No. 2,351,940. Jules Dupuis.
Nickel depositing bath consisting of an aqueous solution of nickel chloride and nickel acetate. No. 2,351,966. George Hogaboom to Hanson-Van Winkle-Munning Co.
Protection of magnesium and magnesium base alloys against corrosion. No. 2,352,076. Charles Bushrod to Magnesium Elektron, Limited.
Separation of copper from other metals. No. 2,352,096. John Hay to The Harshaw Chemical Co.
Forming metal-bonded abrasive bodies. No. 2,352,246. Raymond Benner and William Sbley to The Carborundum Co.
Producing from powder ferrous metal material shaped bodies resembling steel of predetermined chemical composition. No. 2,352,316. Claus Goetzel to American Electro Metal Corp.
Producing iron castings formed in ultimate shape of use and possessed of physical wear resisting properties resulting from securement of austenite in iron at room temperature. No. 2,352,408. Herbert Reece and Oliver Smalley to Meehanite Metal Corp.
Means of oxidizing metal articles. No. 2,352,441. Earle Lewis to Ethel Lewis.
Treating lead contaminated austenitic nickel cast iron. No. 2,352,452. Franklin Rote to The International Nickel Co., Inc.

Paint, Pigments

Making varnishes which comprise heating together soaps of drying oil fatty acids having non-conjugated double bonds and an oil soluble varnish resin. No. 2,351,545. Alfred Rheineck and Samuel Crecelius to Devoe & Reynolds Co., Inc.
Production of cadmium red pigments. No. 2,351,985. Johannes Loeffler.
In a paint, a vehicle containing non-volatile rosin ingredients as major

drying and film-forming constituents. No. 2,352,172. Laszlo Auer to Ridbo Laboratories, Inc.

Lacquer of nitrocellulose type, in which the film-forming vehicle-solids consist of nitrocellulose, a plasticizer, and non-volatile rosin ingredients. No. 2,352,173. Laszlo Auer to Ridbo Laboratories, Inc.

Treating a pyroxylin lacquer to render same adhesive to zinc surfaces. No. 2,352,579. Joseph Waters to Etched Products Corp.

Paper and Pulp

Drawing composite laminated moisture-proof cup-shaped fibre container parts from an advancing web of fibre base stock material, the step of applying a liquid lubricant composed of a dilute solution of glycol stearate. No. 2,352,652. Wirt Morton and Donald Magill to American Can Co.

Making paper of high wet strength which comprise mixing with aqueous suspension of paper fibers a water-soluble protein and a synthetic sulfonated aromatic compound having tanning properties. No. 2,352,922. Joseph Thomas, Robert Diehm and Ian Somerville to Rohm & Haas Co.

Making paper pulp screen plates. No. 2,352,968. Samuel Orton to Union Screen Plate Co.

Composite paper comprising outer sheets of Kraft paper, an intermediate film of bibulous wet-strengthened paper, said sheets being absorptive to asphalt. No. 2,352,293. John Sherman to A. P. W. Paper Co., Inc.

Petroleum Chemicals

Resolving petroleum emulsions of water-in-oil type, by subjecting emulsion to action of a demulsifier comprising 2-amino-2-methylpentanol-4 salt of water-soluble, non-hydrophobe petroleum sulfonic acids of the green acid type. No. 2,351,017. Melvin De Groote and Bernard Keiser to Petrolite Corporation, Ltd.

Breaking petroleum emulsions of water-in-oil type, by subjecting emulsion to action of a demulsifier comprising an oxyalkylated drastically-oxidized dehydrated ricinoleic said compound. No. 2,351,018. Melvin DeGroote and Bernhard Keiser to Petrolite Corporation, Ltd.

Highly refined mineral lubricating oil containing less than 2% of 2,4-dimethyl-6-tertiary octyl phenol. No. 2,351,347. Daniel Luten, Jr. to Shell Development Co.

Controlling oxidation of petroleum hydrocarbons in the vapor phase. No. 2,351,793. Vanderveer Voorhees to Standard Oil Co.

Increasing octane number of a gasoline fraction containing a substantial amount of olefins. No. 2,352,416. Charles Thomas and Herman Bloch to Universal Oil Products Co.

Hydrocarbon conversion process which comprises subjecting a hydrocarbon to contact with a catalyst comprising finely divided hydrated silica produced by adding an acid to a solution of an alkali metal silicate containing an alkylene polyamine. No. 2,352,484. Elmer Kanhofer to Universal Oil Products Co.

Petroleum Refinery

Producing motor fuel from crude petroleum oil. No. 2,351,154. Walter Schulze to Phillips Petroleum Co.

Cracking of hydrocarbon oil. No. 2,351,422. Edwin Gohr to Standard Oil Development Co.

Improving aqueous drilling mud which comprises adding pecans in combination with caustic alkali. No. 2,351,434. Frank Jessen and Jack Battle to Standard Oil Development Co.

Radiological method of logging wells. No. 2,352,993. Maurice Albertson to Shell Development Co.

Producing high octane motor fuel. No. 2,352,025. Jean Seguy to Universal Oil Products Co.

Producing motor fuels of high antiknock value by a desulfurizing and reforming action. No. 2,352,059. Paul Woog.

Conversion of hydrocarbon oils containing nitrogenous catalyst poisons. No. 2,352,236. Charles Thomas to Universal Oil Products Co.

Mud-laden fluid for oil or gas wells, which comprises suspension of colloidal clay and cellulose ether of water-insoluble type and a solvent of said cellulose ether. No. 2,352,468. Thompson Burnam.

Photographic Chemicals

Photographic coating which can be exposed for printing in subdued daylight under Mazda light. No. 2,352,822. John Dessauer to The Haloid Co.

Making exposures in three colours on lenticular films. No. 2,352.864. Anne Jacques Saint Genies.

Resins, Plastics

Obtaining improved polyamide composition from mixture of different polyamides each of which melts below 150° C. No. 2,351,074. Leroy Salisbury to E. I. du Pont de Nemours & Co.

Polymeric vinylidene chloride composition plasticized with a nuclearly substituted alpha-phenyl-ethyl phenol ether. No. 2,351,102. Edgar Britton and Fred Talor to The Dow Chemical Co.

Mercaptan modified polymeric derivatives of nonbenzenoid acetylene polymers and process for making films with same. No. 2,351,108. Arnold Collins to E. I. du Pont de Nemours & Co.

Products obtained by reacting with an aldehyde substance the normally solid polymers obtained by polmerization of carbon monoxide with a polymerizable organic compound containing ethylenic unsaturation. No. 2,351,120. William Hanford to E. I. du Pont de Nemours & Co.

Plastic compound comprising wheat gluten, casein, rubber, and balance consisting of proteins derived from soya beans, rice, and maize. No. 2,351,149. Marc de Becker Remy.

Casting superpolyamide films wherein a solution of a superpolyamide in a solvent is cast on a casting support and dried thereon, the method for overcoming the tendency of rolling of the film. No. 2,351,208. Otto Hermann and Anton Wunderer and Hans Bottger.

Elastic, resilient, rubber-like molded article free from water and composed of a homogeneous mixture of a partial ester of polyvinyl alcohol. No. 2,351,301. Harold Sonnichsen to E. I. du Pont de Nemours & Co.

Production of fibers, films and ribbons which comprises melting paraffins having straight chains of more than 600 carbon atoms prepared by reacting one part of carbon monoxide with two parts of hydrogen. No. 2,351,345. Johannes Kleine.

Composite structure comprising layers of a rigid base, halogenated rubber, a vulcanized polymerized haloprene, and a plasticized polyvinyl halide. No. 2,352,637. Arthur Juve to The B. F. Goodrich Co.

Composite structure comprising layers of a rigid base, halogenated rubber, a vulcanized copolymer of butadiene and an unsaturated nitrile. No. 2,352,705. Benjamin Garvey and Donald Henderson to The B. F. Goodrich Co.

Shaped body composed of a synthetic linear polyamide, having a pearlescent effect due to presence of minute elongated voids. No. 2,352,725. William Markwood, Jr., to E. I. du Pont de Nemours & Co.

Impregnating bamboo containing cells and membranous cell walls with a synthetic resin of phenolic aldehyde resins and urea aldehyde resins. No. 2,352,740. Harvey Shannon to Bakelite Corp.

Manufacture of a water-soluble resin which comprises reacting boric acid and a biuret. No. 2,352,796. Earle McLeod to Arnold, Hoffman & Co.

Polymeric chemical compound comprising monovalent saturated aliphatic and divalent aryl radicals linked to silicon atoms. No. 2,352,974. Eugene Rochow to General Electric Co.

Forming articles from plastic material comprising applying an emulsion comprising an aqueous suspension of hydrocarbon to plastic material. No. 2,353,000. Arthur Austin and Leslie Austin.

Treating a cellulose acetate film containing a residual solvent. No. 2,353,023. Ernest Freund and Friedrich Deutsch.

Resinous composition comprising product of reaction of urea, melamine, formaldehyde and monochloroacetamide. No. 2,351,602. Gaetano D'Alelio to General Electric Co.

Preparing a tough, horny, non-friable, homogeneous and non-cellulose composition for injection molding which consists in kneading under high pressure a mixture of cellulose ester and thermally active plasticizer. No. 2,351,866. Isador Miller.

Producing insoluble, infusible cast resin products. No. 2,351,937. Emil Dreher.

Preparation of a heat hardenable orthocresol-formaldehyde condensate. No. 2,351,958. Bernhard Habraschka.

Fibers, films, foils, ribbons, and like of high molecular paraffins containing more than 400 chain-carbon-atoms, corresponding to formula C_nH_{2n+2}. No. 2,352,328. Johannes Kleine.

Manufacture of chlorinated polyvinyl chloride which comprises reacting chlorine with a suspension of polyvinyl chloride in a mixture of carbon tetrachloride and tetrachloroethane. No. 2,352,525. William Evans to Imperial Chemical Industries, Limited.

Condensation products of urea and amines. No. 2,352,552. Jean Kienzle.

*Rubber

Preparing rubber-coated artificial filaments. No. 2,351,090. Francis Alles to E. I. du Pont de Nemours & Co.

Thiazyl sulphenamide derivative in vulcanization product of rubber. No. 2,351,496. William Ebelke to United States Rubber Co.

Producing a rough rubber coating on vapor-permeable fabric. No. 2,351,498. Donald Fowler to United States Rubber Co.

Producing gas-expanded rubber which comprises gas inflating the rubber by means of thermal decomposition products of zinc diammonia nitrite liberated within the rubber. No. 2,351,555. Wendell Smith to United States Rubber Co.

Manufacture of sponge rubber by maintaing the density until gelling takes place of a latex foam sensitized with zinc oxide, an ammonium salt of a strong acid and a slightly soluble salt of fluosilicic acid. No. 2,351,556. Edward Svendsen and William Clayton to United States Rubber Co.

Curable neoprene composition comprising a mixture of an uncured chloroprene polymer and an accelerator comprising litharge and a butyraldehydeamine. No. 2,351,735. Louis Bake to E. I. du Pont de Nemours & Co.

Extending an oil resistant synthetic rubber selected from polychloroprene, polyalkylene polysulphide, and butadiene-acrylonitrile copolymer, which comprises mixing with said synthetic rubber a vulcanizable natural rubber and an aryl guanidine polysulphide. No. 2,351,860. John Kelly, Jr. and Milton Stern to Dryden Rubber Co.

Producing foraminous composite material, which includes superposing a sheet of uncured rubber upon a sheet of textile fabric. No. 2,352,194. Josef Grabec.

Laminated packing for structural members, comprising a core layer of sponge rubber material. No. 2,352,314. Albert Fischer.

Manufacture of a vulcanizable rubber reclaim which is soluble in customary rubber solvents. No. 2,352,460. Angiolo Treves to Rubber & Plastics Compound Co., Inc.

Preserving latex which comprises adjusting pH and adding p-amino phenol, amino-benzoic acid, 2-amino-8-naphthol-6-sulfonic acid, and 1-amino-8-naphthol-3, 6-disulfonic acid. No. 2,352,573. William Stewart to The B. F. Goodrich Co.

*Textiles

Cuprammonium solution of cellulose for manufacture of rayon containing a stabilizing agent which comprises a water soluble hydroxy alkylene ether of a polyhydric compound. No. 2,350,985. Kenneth Brown to Atlas Powder Co.

Dyeing yarns and other shapes comprising vinyl polymers, comprising treating yarn with a dye bath in presence of compound selected from p-chlorobenzaldehyde, 2,4-dimethoxybenzaldehyde and p-dimethylaminobenzaldehyde. No. 2,351,046. Karl Heymann to American Viscose Corp.

Open weave fabric having interstices closed with individual films which do not become sticky when subjected to 400° F., comprising polyvinyl acetate, a solution of said polyvinyl acetate dispersed in ethyl acetate and ethyl alcohol and a surface coating of a thermoadhesive composition over said individual films. No. 2,351,182. Alva Bateman to E. I. du Pont de Nemours & Co.

Hose having a water-holding wall comprising fabric woven from cotton which is non-stretching, having hydroxy ethyl cellulose incorporated therein. No. 2,352,707. Charles Goldthwait to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Preparing a fabric having an adherent coating, which comprises applying a coating composition having a basis of a film-forming derivative of cellulose to a fabric prepared from continuous filament regenerated cellulose yarns. No. 2,352,747. William Whitehead to Celanese Corp. of America.

Making twisted multifilament yarn of supercooled strands of a normally crystalline vinylidene chloride polymer. No. 2,352,861. James Pierce to The Visking Corp.

Sizing material for rayon yarn comprising a mixture of polyethylene glycols. No. 2,351,865. Frank Mattinson and Rudolph Hoffman to Skenandoa Rayon Corp.

Production of yarn of high voluminosity, comprising spinning together two kinds of staple fibres, one of which is made from filaments of an organic derivative of cellulose and the other from cellulose filaments, and treating resulting yarn with an organic shrinking agent for first-mentioned component. No. 2,352,244. Angus Bell and William Angus to Celanese Corp. of America.

Production of fabrics of voluminous character, comprising spinning together into a yarn two varieties of staple fibre, one of which is made from filaments of highly polymeric esters or ethers and the other from cellulose filaments. No. 2,352,245. Angus Bell and William Angus to Celanese Corp. of America.

Adhesive coated fabric and barrier coating composition therefor. No. 2,352,463. Elwood Wenzelberger and Frank Manley to Johnson & Johnson.

Water Sewage and Sanitation*

Reagent for preventing deposits within water formations and on well screens. No. 2,352,832. Norris Gunderson to Layne-Northern Co., Inc.

Water treating apparatus. No. 2,351,835. Eric Pick to The Permutit Co.

Agricultural Chemicals

Insecticidal composition containing a tertiary amine. No. 2,353,442. Edward Callaway and Robert Rosenstiel.

Producing a mixture consisting of dicalcium orthophosphate and ammonium chloride. No. 2,353,658. Edward Fox to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Wood product consisting of dense, compressed, permanently water-resisting phenol-formaldehyde resin-treated face-plies, having hard weather- and chemical-resistant smooth finished surfaces and a distribution of resin throughout cell-wall structure. No. 2,354,090. Alfred Stamm and Raymond Seborg to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Insecticide. No. 2,354,192. Charles Bowen to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Insecticide. No. 2,354,193. Charles Bowen to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Fungicidal composition comprising phthalic diphenyl guanidine and lime, calcium, carbonate, talc, bentonite, clay, or fuller's earth. No. 2,354,206. Marion Goldsworthy to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Insecticide comprising an alicarbocyclic unsaturated ketol whose carbonyl group is part of ring and an additional insecticide selected from pyrethrum and derris. No. 22,524. Seaver Ballard and Vernon Haury to Shell Development Co.

Fungicide containing dimorpholine thiuram disulfide as its active ingredient. No. 2,354,940. Roscoe Carter and Marion Goldsworthy to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Cellulose

Bleaching of cellulosic material, which comprises subjecting material to be bleached to aqueous solution containing a compound selected from chlorites of alkali metals and alkaline earth metals and a compound selected from persulfates of alkali metals and alkaline earth metals. No. 2,353,823. Clifford Hampel to The Mathieson Alkali Works, Inc.

Moistureproof and heat sealable wrap for articles high in moisture content, consisting of a cellulose base sheet selected from paper and regenerated cellulose, coated on inside with an under coat of latex solids containing glycerine and a top coat of paraffin wax, and on outside surface with a coating of paraffin wax. No. 2,354,060. Cecil Rhodes and John Sermattei to Rapinwax Paper Co.

Making cellular articles of low density containing thermoplastic derivatives of cellulose. No. 2,354,260. Clifford Haney and Mervin Martin to Celanese Corp. of America.

Regenerated cellulose yarn treated with agent to protect them against injury by rubbing agent consisting of oleaginous material, a protective colloid and a water-soluble salt of a polyvalent metal. No. 2,354,335. Louis Sheps, Maurice Boisclair, and Kendall Cooper and Peter Fristensky to The Richards Chemical Works.

Production of artificial shaped articles comprising shaping a composition of a thermoplastic derivative of cellulose. No. 2,354,745. Camille Dreyfus.

Ceramics

Improving apparent surface hardness of vitreous enamel coat of enameled articles the step of subjecting enameled article after usual firing process to a second firing process. No. 2,353,165. Ignaz Kreidl and Werner Kreidl.

Reduced glass which will become black throughout when slowly cooled or heated through its upper annealing range but which will be clear or white when rapidly cooled from some higher temperature, which contains silica, alkali oxide, lead oxide, and tin oxide. No. 2,353,354. Martin Nordberg to Corning Glass Works.

Manufacturing safety glass which comprises assembling a plurality of glass plates and interposed sheets of plastic material. No. 2,353,473. Leroy Keslar to Pittsburgh Plate Glass Co.

Making light-weight concrete, by including in mixture an asphalt-emulsion containing a saponified-resin as stabilizing-agent and having property of maintaining bulk of mixture. No. 2,354,156. Glenn Sucetti to Universal Zonolite Insulation Co.

Copper ruby glass comprising ordinary glass and containing a copper phosphide dispersed therein. No. 2,354,164. Woldemar Weyl to Monsanto Chemical Co.

Manufacture of vesicular glass. No. 2,354,807. John Fox and William Lytle to Pittsburgh Plate Glass Co.

Chemical Specialties

Lubricating composition comprising lubricating oil and a halogen and nitrogen bearing aliphatic compound and a thionic material. No. 2,353,169. Bert Lincoln and Waldo Steiner to The Lubri-Zol Development Corp.

Lubricating composition comprising lubricating oil and a halogen and sulfur bearing aliphatic compound and a thionic material. No. 2,353,170. Bert Lincoln and Waldo Steiner to The Lubri-Zol Development Corp.

Loose-fill material comprising a multiplicity of light weight comminuted composition pieces. No. 2,353,271. Charles Schuh to Carbide and Carbon Chemicals Corp.

Lubricating oil composition. No. 2,353,491. Edward Oberright to Socony-Vacuum Oil Co., Inc.

Lubricating composition comprising lubricating oil and a stable oil-soluble halogen bearing ester of phthalic acid. No. 2,353,585. Carl Prutton and Albert Smith to The Lubri-Zol Development Corp.

Roofing sheet comprising a base of felted structure having upon a face thereof a coating of plastic adhesive. No. 2,353,680. Arthur MacNutt to Certain-Teed Products Corp.

Manufacture of soap, which comprises grinding coffee material with a fatty base to colloidal fineness. No. 2,353,686. Robert Brown to Brownmil Laboratories, Inc.

Crack sealer composition comprising an aqueous emulsion of bitumen mixed with ground particles of vulcanized rubber, bentonite, and mineral fiber. No. 2,353,723. Edwin Groskopf to The Patent and Licensing Corp.

Germicidal soap comprising a detergent soap and 2,2′-dihydroxy-3,5-3′,5′-tetrachloro diphenyl. No. 2,353,724. William Gump to Burton T. Bush, Inc.

Germicidal soap comprising a detergent soap and 2,2′-dihydroxy-3,5,6-3′,5′,6′-hexachloro diphenyl sulfide. No. 2,353,735. Eric Kunz, Max Luthy and William Gump to Burton T. Bush, Inc.

Repellent roll for slitting pressure sealing and pressure sensitive sheets and tape, comprising a base of soapstone carrying a layer of material repellent to pressure adhesives, comprising an incompletely hydrolyzed polyvinyl acetate sold as "Solvar 405" and a sodium sulfonate of an oleic acid ester of an aliphatic compound sold as "Igepon AP." No. 2,353,789. Gustave Schieman to International Plastic Corp.

Plastic composition for wallboard joints which comprises casein, clay, and lime, an alkaline salt, ground limestone and mineral fillers. No. 2,353,822. Harry Gardner to Certain-Teed Products Corp.

Air pump lubricant for lubrication at 500-1000° F. comprising water, mineral oil, triethanolamine stearate, and free stearic acid. No. 2,353,830. Gus Kaufman, Karl Uhrig, and Robert Barnett to The Texas Co.

Lubricant comprising a lubricating oil, having a glyceride phosphoric acid ester and a sulfurized polymer of olefinic hydrocarbons. No. 2,353,837. Clarence Loane and James Gaynor to Standard Oil Co.

Method of determining receptivity of sheet materials to coatings, inks, and like. No. 2,353,852. Ben Rowland, Douglas Fronmuller and Johannes Van den Akker to The Institute of Paper Chemistry.

Defeathering compound which comprises a waxy composition containing rosin and petroleum wax, and a water insoluble soap of a metal. No. 2,353,869. Oscar Bloom to Industrial Patents Corp.

Dehairing skins by subjecting skins to aqueous alkaline medium containing lime, an alkali sulfide and a substance selected from water soluble inorganic and organic peroxides, peracids, peranhydrides, and hydrogen peroxide. No. 2,353,878. Edward Christopher to Industrial Patents Corp.

Chewing gum comprising an elastomeric ester of a polyhydric alcohol and a maleic adduct of an unsaturated cyclic material selected from monohydric esters of rosin acids and unsaturated terpenes and a modifier selected from waxes and softeners. No. 2,353,927. Oscar Pickett to Hercules Powder Co.

Polishing and fog-inhibiting article, which is dry to touch, consisting of a non-linting textile material impregnated with a neutralized sulfated aliphatic hydrocarbon derivative. No. 2,353,978. Harold Weber.

Drying a product containing water comprising freezing said product, subjecting said frozen product to a vacuum effective to sublime the ice without permitting it to pass through an intermediate liquid phase. No. 2,353,986. Courtland Barr to Sharp & Dohme, Inc.

Lubricant for metal beating comprising comminuted particles of a metal soap from calcium stearate, magnesium stearate, and zinc stearate, insoluble in alcohol, soft and capable of microscopic subdivision, each particle being covered by a surface layer of a fatty acid sodium soap soluble in alcohol. No. 2,354,072. Donald Swift to M. Swift & Sons, Inc.

Lubricant consisting of a chlorinated benzene inhibited against corrosion and reinforced for load carrying capacity with corrosion inhibitor and an extreme pressure addition agent. No. 2,354,171. John Morgan to Cities Service Oil Co.

Drying wet freshly tanned hides and skins which comprises, freezing such a hide or skin quickly. No. 2,354,200. Wallace Cutler to United Shoe Machinery Corp.

Using normally gaseous selective dewaxing solvents to chill oil solutions to dewaxing temperatures, the process of dewaxing oil and deoiling the wax. No. 2,354,247. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Lubricating composition stabilized against oxidation containing mineral lubricating oil having incorporated therein an anti-oxidant and anti-sludge forming agent, comprising a primary phenylene diamine, and an ethanolamine acting as dispersion agent for phenylene diamine. No. 2,354,252. Harold Fraser and Thomas Maxwell to International Lubricant Corp.

Protective preparation for animal skin and skin appendages comprising gelatin, plasticizer selected from glycerine and glycols, alum and a harmless acid. No. 2,354,319. Walter Andrew Inman.

Non-guttering candle. No. 2,354,343. Ralph Webber and Lossie Anderson to Standard Oil Co.

Lubricating oil composition. No. 2,354,536. Joseph Nelson to Standard Oil Development Co.

Lubricating oil for internal combustion engines comprising metal salt of a hydroxy organic compound and refined mineral lubricating oil base stock capable of imparting a blue to black stain on a bright steel strip. No. 2,354,547. Roger Richardson and Floyd Miller and Carl Winning to Standard Oil Development Co.

Lubricating composition. No. 2,354,550. Raphael Rosen to Standard Oil Development Co.

Making a thin bodied starch of high adhesive strength, exceptional clarity and freedom for set back of its aqueous gel. No. 2,354,838. Herman Schopmeyer and George Felton to American Maize-Products Co.

Increasing strength and water resistance of hydraulic-cement compositions which comprises: treating with a water-soluble reagent from chromic anhydride, manganese trioxide, and molybdic acid. No. 2,354,876. Calvin Arthur Owens.

Lubricating grease composition comprising a low pour point lubricating mineral oil distillate and a mixture of lithium and barium soaps of saturated fatty acids. No. 2,355,009. Arnold Morway and John Zimmer to Standard Oil Development Co.

Coal Tar Chemicals

Preparing dry, crushed coal for conversion into metallurgical coke by high temperature carbonization. No. 2,353,752. Carl Otto to Fuel Refining Corp.

Coking high volatile coal. No. 2,353,753. Carl Otto to Fuel Refining Corp.

Coatings

Producing a coated can cover having sharply bent portions from metallic sheeting which comprises coating said sheet with resinous copolymer. No. 2,353,198. Frank Soday to The United Gas Improvement Co.

Transfer, adapted for use in coating of a surface with a coating of synthetic resinous material, which has a backing sheet comprising a smooth, glossy, non-fibrous cellulosic film and a normally non-tacky thermoplastic coating thereon. No. 2,353,717. Carleton Francis, Jr. and Worth Wade, to Sylvania Industrial Corp.

Coating composition comprising a resin resulting from polymerization of a vinyl ether of an alcohol, an alkyd resin which has been modified with an oxidizable unsaturated fatty acid and a volatile organic solvent. No. 2,353,910. William Lawler, George Hable and John Steinle to S. C. Johnson & Son, Inc.

Forming continuous vitreous coatings of selenium on solid surfaces. No. 2,354,109. Edward Flood to The Honorary Advisory Council for Scientific and Industrial Research.

Making a base product for preparation of calcium carbonate-adhesive coatings consisting in dry milling precipitated calcium carbonate, adhesive selected from casein and extracted protein from soybean protein. No. 2,354,318. Ausker Hughes, Harold Browne and Howard Roderick to Wyandotte Chemicals Corp.

Producing a weather-resisting coated asbestos-cement article which comprises applying to surface a flowable coating composition comprising solution of an alkali metal silicate and a water-insoluble compound of a divalent metal from zinc oxide, calcium carbonate, magnesium carbonate and high-burned magnesium oxide. No. 2,354,350. Clyde Schuetz to United States Gypsum Co.

Coating asbestos-cement articles having free calcium hydroxide in surface thereof with a liquid glazing composition containing a soluble silicate and an insoluble metal compound reactive therewith. No. 2,354,351. Clyde Schuetz to United States Gypsum Co.

Flexible material resistant to attack or penetration by liquid or vaporous vesicants or other chemical warfare agents comprising a fabric having a coating of viscose. No. 2,354,707. Robert Sebastian and Herbert Scruton to United States of America, as represented by the Secretary of War.

Heat sealing layers of similar plastic dielectric materials. No. 2,354,714. Harold Strickland, Jr. to Budd Wheel Co.

Dyes, Stains

Manufacture of symmetrical dyestuffs and dyestuff intermediates having two heterocyclic ketomethylene nuclei linked to one another. No. 2,353,164. John Kendall and Douglas Fry to Ilford Limited.

Printing textile fabric with an unmetallized mordantacid azo dyestuff, improvement which consists of applying the dyestuff to the fabric from a printing paste containing a water-soluble compound of a metal and containing further triethanolamine. No. 2,353,411. Charles Miller to E. I. du Pont de Nemours & Co.

Sulphonamido monoazo dyestuffs which are yellow powders, dyeing animal fibres in bright yellow shades of excellent fastness properties. No. 2,353,569. Oscar Knecht and Theodor Wirth to Sandoz Ltd.

Monoazo dyestuffs and their manufacture which on treatment with chromium salts give chrome-complex compounds and which dye animal fibres by one-bath chrome and after-chrome process violet, blue and black shades. No. 2,353,675. Oscar Knecht and Otto Senn to Sandoz, Ltd.

Unsulfonated mono-azo-dyestuffs. No. 2,354,187. Friedrich Felix and Rudolf von Capeller to Society of Chemical Industry in Basle.

Vat dye composition comprising a dispersed vat dyestuff and an ester of a sulfopolycarboxylic acid with aliphatic alcohols. No. 2,354,463. Roy Kienle and Chester Amick to American Cyanamid Co.

Trimethinecyanine dyestuffs. No. 2,354,524. Karl Kumetat and Oskar Riester to General Aniline & Film Corp.

Improving dyeing properties of a dischargeable azo dyestuff giving white discharges on reduction and containing, as a result of manufacture of dyestuff, impurities which stain materials dyed therewith. No. 2,354,588. Frank Gainey to Allied Chemical & Dye Corp.

Equipment

Inductor for applying a high frequency electromagnetic field to a plurality of objects to be heated. No. 2,353,130. Paul Dravneek to Induction Heating Corp.

Oil, moisture, and gas separator. No. 2,353,138. Edward Beach.

Flotation apparatus. No. 2,353,161. Henry Heigis and Theodore Hannant to Specialties Development Corp.

Absorption oil distillation purifier. No. 2,353,176. Charles Meyers to Phillips Petroleum Co.

Device for mixing fluids of different temperatures and densities. No. 2,353,195. Alfred Sims. Alfred William Sims, executor of said Alfred Sims, deceased.

Additional patents on equipment, explosives, fine chemicals, industrial chemicals, 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 May 2, 1944 (Continued)

Capillary viscosimeter of the outflow type design. No. 419,912. Ernest Paul Irany.
Irritant gas discharge device for theft prevention. No. 419,924. Frederick Sabini.
Fuel-injection engine. No. 419,925. Arthur Freeman Sanders.
Method of manufacturing slide fastener elements. No. 419,928. Martin Winterhalter.
Process of producing pyrazolone compounds. No. 419,968. General Aniline and Film Corp. (Hans Zischler).
Fluorescent dye containing pencil for invisible laundry marking. No. 419,981. National Marking Machine Co. (Francis M. Sell).
Electrolyte for condenser composed of ethylene glycol, water, ammonium hydroxide, and boric acid. No. 419,985. Philips Lamps Ltd. (Anthony F. P. J. Claassen, Johan C. M. Basart).
Drop-out half tone negative production process. No. 420,000. Benjamin Liebowitz, Arthur L. Huttkay.
Electrical conductor connector design. No. 420,003. Johann Heinrich Saueressig.

Granted and Published May 9, 1944

Process of propagating yeast under aerating conditions characterized in that seed yeast liquor containing seed yeast and alcohol is used without separating or pressing as a nutritive substance for the production of commercial yeast. No. 420,018. Marcel Celestin Honore Deloffre.
Rotary blower and exhauster design. No. 420,019. Victor Vladimirovitch Dibovsky.
A non-splinterable substitute for window glass formed of a basic material of wire gauze, wire net, or perforated metal, to which a solution of incompletely polymerized resin is applied, solvent removed, and polymerization effected. No. 420,023. Colin Garrett.
Method of angle welding plates by means of intermediary reinforcing strip. No. 420,025. Sydney Slater Guy.
Grounding equipment for outdoor electrical apparatus. No. 420,029. Frederick Hicks Luecke.
Refuse incinerator apparatus of completely enclosed design. No. 420,037. Charles Austin Potter.
Process for producing cast cuts for printing purposes by preparation of bichromate film, Plaster of Paris impression thereof, and direct casting of metal thereinto. No. 420,042. James Stitt.
Electrolytic apparatus for protecting submerged metallic surfaces from corrosion. No. 420,044. William Louis Walker.
Improved process for regenerating exhaled air which comprises reacting with one of the oxygenating agents from group of peroxides or persalts with at least one substance insensitive to the action of moisture alone but converted by carbon dioxide into a substance capable of releasing oxygen in the presence of moisture. No. 420,049. Airsealand Ltd. (Nicolas Herzmark).
Fish preparing process comprising salting for extended period to remove substantial percentage of moisture, leaching to remove excess salt, canning, and cooking. No. 420,064. British Columbia Packers Ltd. (Charles Hartwell Gillespie).
Starting relay circuit for fluorescent lamps. No. 420,076. Canadian Westinghouse Co. Ltd. (Robert F. Hayes).
Method of making closed-cell cellular soft vulcanized rubber by means of nitrogen generating blowing agent. No. 420,098. Dominion Rubber Co. Ltd. (George Raymond Cuthbertson).
Method of making gas expanded rubber by incorporating into a vulcanizable rubber composition two temperature selective vulcanizing agents. No. 420,099. Dominion Rubber Co. Ltd. (George Raymond Cuthbertson).
Tread block design for track for track laying vehicles. No. 420,100. Dominion Rubber Co. Ltd. (Ray Sinclair Garber).
Gas dehydrating process with means of protecting oxide dehydrating agent from contamination. No. 420,104. The Fluor Corp. Ltd. (Arthur John Lindsay Hutchinson).
Preparation of insoluble resin suitable for water treatment by reaction of sugar, meta-phenylene diamine hydrochloride, and addition of formaldehyde to form a gel. No. 420,120. The Permutit Co. (Eric Leighton Holmes).
Method of sectionally constructing refractory walls. No. 420,121. Pilbrice Jointless Firebrick Ltd. (Edward Morley Wilson).
Manually operated construction and adjusting tool for refractory wall construction. No. 420,122. Pilbrico Jointless Firebrick Ltd. (Edward Morley Wilson).
Auxiliary spark ignition apparatus. No. 420,124. Rotax Ltd. (Ivan Jack Hulbert).
Means to prevent aeration of liquid in a liquid circulating system. No. 420,129. Tecalemit Ltd. (Camille Clare Sprankling Le Clair).
Pneumatic mechanism for paper leaf counting. No. 420,130. Telefonaktiebolaget L. M. Ericsson (Axel Edvin Rosswall).
Fermentation process for the conversion of solid or semi-solid organic matter into an oxidized and dehydrated material, employing initial anaerobic fermentation and subsequent controlled temperature aeration. No. 420,139. Wellesley Holdings Ltd. (Douglas McIntyre Proctor).
Water repellent sheet material manufacture comprising web impregnation of water-dispersed resin, colloid application, and curing. No. 420,148. William Craig Toland, Ellis Bassist.
Selective separation of non-metallic ore, by grinding, adding collecting agent, classifying by separating slime from coarse sands, froth flotation of coarse sands, and adding increments of slime to pulp as the flotation progresses. No. 420,154. Ventures Ltd. (Frederick R. Archibald).

Granted and Published May 16, 1944

Hydraulic remote control apparatus. No. 420,159. Charles Hyland.
Process of dehydrating waste liquors from cellulose pulp production by injecting partially concentrated liquors into hot gases. No. 420,164. Torsten Ramen.
Continuous means of shelling eggs preparatory to dehydration. No. 420,165. Peter M. Serbu.
Tantalum carbide alloy for tool composition. No. 420,169. Fay H. Willey.
Apparatus for electric purification of fluids. No. 420,178. Aqua-Electric Corp. Ltd. (Frank Gaies Negus).
Production of nickel-iron powder by mixing nickel powder with iron oxide or iron oxalate, heating in a reducing atmosphere, and crushing. No. 420,184. Automatic Telephone and Electric Co. Ltd. (Philip Norton Roseby).
Electric discharge device temperature regulating system. No. 420,195. Canadian General Electric Co. Ltd. (Harry Kebbell Bourne).
Process for hydrolyzing titanium sulphate solution to obtain an anatase hydrolysate therefrom, which on calcination, yields improved rutile titanium oxide pigment. No. 420,203. Canadian Industries Ltd. (John Lewis Keats, Henry Moroni Stark).
Preparation of titanium pigment by hydrolyzing at elevated temperature a titanium-hydroxy halogen. No. 420,204. Canadian Industries Ltd. (Foord von Bichowsky).
Production of phthalonitrile by reacting phthalic acid diamide with an acid halide such as phosgene, thionyl chloride, or phosphorous oxychloride in presence of an acylated secondary amine. No. 420,228. J. R. Geigy A. G. (Emil Stocker).
Rendering textiles water repellent by treatment with quaternary ammonium compound of stearoxymethyl pyridine chloride in presence of sodium bicarbonate or sodium acetate. No. 420,234. Heberlein Patent Corp. (Ernst Waltmann).
Process for the manufacture of isocyanic acid ester. No. 420,235. Heberlein Patent Corp. (Ernst Waltmann, Edgar Wolf).
Method of producing metallic magnesium which comprises calcining metamorphosed crystalline, magnesium containing material, mixing calcined material with ferrosilicon, briquetting, preheating, and retort heating under pressure of less than 0.2 mm. to distill off magnesium. No. 420,240 Dominion Magnesium Ltd. (The Honorary Advisory Council for Scientific and Industrial Research, assignee of Lloyd Montgomery Pidgeon).
Manufacture of ductile magnesium from calcined magnesium containing material by thermal reduction by introduction of charge into atmospheric pressure-reaction temperature retort and reducing pressure. No. 420,242. Dominion Magnesium Ltd. (The Honorary Advisory Council for Scientific and Industrial Research, Lloyd Montgomery Pidgeon).
Apparatus for producing metallic magnesium by thermal reduction. No. 420,243. Dominion Magnesium Ltd. (The Honorary Advisory Council for Scientific and Industrial Research, Lloyd Montgomery Pidgeon).
Vacuum distilling apparatus for magnesium production. No. 420,244. Dominion Magnesium Ltd. (The Honorary Advisory Council for Scientific and Industrial Research, Lloyd Montgomery Pidgeon).
Thermal reduction magnesium producing apparatus. No. 420,245. Dominion Magnesium Ltd. (The Honorary Advisory Council for Scientific and Industrial Research, Lloyd Montgomery Pidgeon).
Divided beam optical projection apparatus. No. 420,249. International Standard Electric Corp. (Martin Denzil Wibmer, Percy Parsons Atkins, Edwin Geo. Mander Holbrow).
Method of dewaxing catalyst employed in catalytic reactions. No. 420,254. The M. W. Kellogg Co. (Robinson Bindley Processes Ltd., Wm. Whalley Myddleton).
Cyclic process for treating copper ore, comprising lixiviating with sulphuric acid, treating resultant copper sulphate solution with sulphur dioxide and a halogen to precipitate copper halide, recovering sulphuric acid, freeing the halide by heating, hydrogen sulphide, or calcium hydrate treatment, recovering halide, and reducing copper salt to metallic copper. No. 420,264. Ovalle, Tupper & Amenabar Limitada. (Arturo Amenabar).
Semi-stiff collar in which a vinyl resin is employed as stiffening agent. No. 420,294. Canadian Industries Ltd. (John D. McBurney, Edgar H. Nollau).
Process for making corrugated wood sheets. No. 420,295. Frederico Worschitz.

Granted and Published May 23, 1944

Tube container closure design with rotary valve ball inclusion. No. 420,312. James S. Kennedy.
Internal expanding braking and clutching device. No. 420,313. Wilfred Dell Koch.
Gas blast circuit breaker. No. 420,326. Aktiengesellschaft Brown, Boveri & Cie. (Alfred Halm).
Method of stabilizing hydrocarbon oil against the formation of sludge by

red phosphorous treatment. No. 420,332. The Atlantic Refining Co. (James W. Johnson).

Production of white mineral oil by multiple-stage treatment with fuming sulphuric. No. 420,334. The Atlantic Refining Co. (Vladimir L. Chechot).

Method of producing anti-halation layer for photographic film employing carbinol base of phenylmethane dye, mixed with alkali soluble synthetic resin having free acidic groups to form a dye-colloidate. No. 420,341. Canadian Kodak Co. Ltd. (Bernard Beilenson).

Anti-halation photographic layer consisting of cellulose acetate phthalate and colloidal carbon. No. 420,342. Canadian Kodak Co. Ltd. (Norwood L. Simmons).

In a process for evaporating metallic fluorides in a vacuum the method of forming a bead of the metallic fluoride in a filament. No. 420,350. Canadian Kodak Co. Ltd. (George Burr Sabine).

Process to render textiles heat, acid, and alkali resistant by treating with water-soluble alkyd resin formed from phthallic anhydride, glycerine or triethanolamine, and drying at an elevated temperature. No. 420,371. Cosmos Imperial Mills Ltd. (Boris Monsaroff).

Cylindrical, rubber, resilient bearing. No. 420,374. Dominion Rubber Co. Ltd. (Heston Hart Hile).

Electron discharge device. No. 420,376. Electric and Musical Industries Ltd. (Hans Gerhard Lubszynski).

Thermionic valve oscillator circuit. No. 420,377. Electric and Musical Industries Ltd. (Charles L. Faudell).

Electron mirror. No. 420,378. Electric and Musical Industries Ltd. (Frederick Hermes Nicoll).

Electrical oscillation generator. No. 420,379. Electric and Musical Industries Ltd. (Charles L. Faudell).

Electrical oscillation generator. No. 420,380. Electric and Musical Industries Ltd. (Lawrence Casling White).

Corrosion resistant coating of magnesium and alloys by making the magnesium the negative electrode of a galvanic cell arrangement. No. 420,391. Magnesium Elektron Ltd. (Walter Mannchen).

Welding rod comprising a coating and core containing ground ivory nuts. No. 420,403. Philips Lamps Ltd. (Jan Hendrik de Boer, Jacob Sack, Paul Christianvan der Willigen).

Process of treating material containing animal fibre to reduce its tendency to felt by treatment with chlorine-containing anti-felting reagent. No. 420,419. Tootal Broadhurst Lee Co. Ltd. (John Bamber Speakman, Chas. S. Whewell).

Treating animal fibre textile material to reduce its tendency to felt by impregnation with resin-forming materials. No. 420,420. Tootal Broadhurst Lee Co. Ltd. (John Frederick Cowley).

Enclosed electric arc furnace design. No. 420,437. Raoul Nissim.

Granted and Published May 30, 1944

Apparatus for making cavitated boards. No. 420,447. Wm. George Brubacher.

Combined threading and facing device. No. 420,452. Lorne Secord Falls.

Tire safety valve. No. 420,457. Fernand Gerin-Lajoie.

Apparatus for spray drying solutions or suspensions. No. 420,474. John Thomlinson.

Arc furnace regulator comprising a solenoid connected with the current transformer of the furnace and designed to react to variations in the current passed through the transformer and thereby to actuate electrode controlling apparatus. No. 420,476. John Young.

Improving wet strength of fibrous materials by producing water-resistant size films on the fibres by means of aqueous glue-acid, hardening agent, impregnation. No. 420,487. Canada Glue Co. Ltd. (John R. Hubbard).

Apparatus for the continuous manufacture of paper bag handles. No. 420,488. Canada Paper Co. (Edward Keith Robinson, John Bagnall).

Preparation of 2, 2, 3-trichlorobutane by chlorination of 2-chlorobutene-2, in absence of light in liquid phase at 0° Cent. in presence of stannic chloride. No. 420,492. Canadian Industries Ltd. (A. A. Levine, O. W. Cass).

Manufacture of 2-chlorobutene-2 by contacting vapours of 2, 3-dichlorobutane with barium chloride. No. 420,493. Canadian Industries Ltd. (A. A. Levine, O. W. Cass).

Apparatus for the partial polymerization of mobile monomeric liquid. No. 420,494. Canadian Industries Ltd. (Chas. Marion Fields, Reuben Thos. Fields).

Fractional wave film and polarizing system. No. 420,495. Canadian Industries Ltd. (Emerson Dudley Bailey).

Thermal method of removing free sodium from finely divided sodium monoxide. No. 420,496. Canadian Industries Ltd. (Harvey Nicholas Gilbert).

Fibre consisting of intimate mixture of protein and synthetic linear polyamide. No. 420,498. Canadian Industries Ltd. (George De Witt Graves).

Process for making 12-ketostearamides. No. 420,500. Canadian Industries Ltd. (Wm. Edward Hanford).

Water insoluble, completely aliphatic resin formed by condensation of formaldehyde with semicarbazide. No. 420,501. Canadian Industries Ltd. (Frederick Lewis Johnston).

Resinous reaction product of hexamethylene diisocyanate and condensation product of formaldehyde with a monomeric organic compound reactive therewith. No. 420,502. Canadian Industries Ltd. (Burt Carlton Pratt).

Impregnation of paper with aqueous solution of polyvinyl alcohol and water soluble N-methylol aliphatic compound, and heating to insolubilize. No. 420,503. Canadian Industries Ltd. (George Lewis Schwartz, Jos. Fred. Walker).

Non-foaming cooling liquid containing glycol and aromatic ester of stearic, palmitic, oleic acid group. No. 420,509. Carbide and Carbon Chemicals Ltd. (Leo J. Clapsadle).

Beta-amino acid amide manufacture. No. 420,510. Carbide and Carbon Chemicals Ltd. (Henry G. Goodman Jr.)

Reversible flow paper making machine design. No. 420,513. Dominion Engineering Works Ltd. (Bernard A. Malkin).

Separation of butylene-1 and isobutylene by distillation in presence of sulfur dioxide. No. 420,514. The Dow Chemical Co. (Edgar C. Britton, Howard S. Nutting, Lee H. Horsley).

Fluid-tight sealing of metallic part of an electrical fitting to ceramic part by means of polymerizing styrene in situ. No. 420,535. Northern Electric Co. Ltd. (Thomas Robertson Scott, Leonard Arthur, Charles Pooley).

Folding and interleaving machine. No. 420,552. Howard Smith Paper Mills Ltd. (Herbert A. Brawn).

Electric regulator of carbon pile type. No. 420,553. J. Stone & Co. Ltd. (Leslie Reginald Nixon).

Improved boiler design for steam cooker. No. 420,583. Richard Morgan Wiles, James Kenneth Wiles, Cuthill Wiles, Ivor Wm. Wiles.

Shaping of vinyl chloride and vinyl acetate films or fibres by stretching in steam atmosphere. No. 420,586. Henry Dreyfus (Robert Pierce Roberts, Edgar Bert Johnson, Michael Anthony Young).

Process comprising condensing trimethylhydroquinone with phytol in presence of phosphorous pentoxide. No. 420,591. Fritz von Werder.

Manufacture of derivative of 4, arylpiperidine-4-carboxylic acid. No. 420,592. Otto Eisleb.

Granted and Published June 6, 1944

Thickening or settling apparatus. No. 420,600. Harrison S. Coe.

Production of aliphatic hydrocarbons by subjecting carbon monoxide and hydrogen to reaction in presence of cobalt-thoria-copper catalyst under near atmospheric pressure and temperature not exceeding 230 degrees Cent. No. 420,602. Henry Dreyfus.

Method of molding plastic teeth. No. 420,606. Ernest Byron Kelly.

Improving animal tissue by treatment with macin. No. 420,609. John M. Ramsbottom.

Tenderizing animal tissue by employment of ficin. No. 420,610. John M. Ramsbottom.

Process for production of carboxylic acid chlorides and bromides. No. 420,639. Canadian Industries Ltd. (Morris Selig Kharasch, Herbert Charles Brown).

Method of dispersing colouring material in colloids. No. 420,641. Canadian Kodak Co. Ltd. (David E. Bennett, Jr., Scheuring S. Fierke).

Anti-halation film employing hydrolyzed cellulose organic acid ester and cellulose mixed organic acid dicarboxylic acid ester and light absorbing material. No. 420,642. Canadian Kodak Co. Ltd. (Gale F. Nadeau, Alfred D. Slack).

Cylinder supporting and protecting device. No. 420,651. Carbide and Carbon Chemicals Ltd. (Ralph C. Pierson, Willis G. Schepman).

Method of applying a tin alloy to an article from an alkaline tin alloy plating bath. No. 420,652. The City-Auto Stamping Co. (Victor Alexander Lowinger, Sydney Walter Baier).

Condenser for drawing mechanism of textile slivers. No. 420,653. Colonia Guell S. A. (Ramon Balmes Solanas).

Rotenone containing parasiticide containing stabilizer of formamidine sulphinic acid. No. 420,657. Dominion Rubber Co. Ltd. (William Pieter Horst).

Electrical mechanism for measuring and indicating the roughness of a surface. No. 420,671. Kapella Ltd. (Richard Edmund Reason, Raymond Ivan Garrod).

Sodium perborate, mannitol dentifrice composition. No. 420,674. McKesson and Robbins Inc. (Allen L. Omohundro, Emil G. Fanto).

Processing of soya beans in edible oil to improve edibility. No. 420,703. J. L. Trumbull Ltd. (Charles Potter).

Spirit level with means for adjusting the flexure of the tube. No. 420,716. Edgar Dale Ball & Geo. H. Alexander Machinery Ltd.

Method of encasing electrical condensers by surrounding with moulding powder of cellulose acetate and thereafter moulding to envelop condensers. No. 420,719. Henry Dreyfus (William Henry Moss).

Production of hydrocarbons by reaction of carbon monoxide and hydrogen in presence of cobalt containing catalysts with low pressures yielding low boiling liquid hydrocarbons and 5 to 50 atmospheres for the preferred production of solid hydrocarbons. No. 420,722. I. G. Farbenindustrie Aktienegesellschaft (Arno Scheuermann, Klaus Meisenheimer, Arnold Kotzschmar).

Production of liquid hydrocarbons by passing hydrogen-carbon monoxide mixture with a larger volume of the latter over an iron-containing catalyst in contact with liquid oily product obtained by previous reduction of carbon monoxide. No. 420,723. Franz Duftschmidt, Eduard Linckh, Fritz Winkler.

Conversion of hydrogen and carbon monoxide into hydrocarbons by use of sintered metal catalyst of Group 8 in presence of liquid hydrocarbon. No. 420,724. Wilhalm Michael, Wolfgang Jaeckh.

Manufacture of polymers by subjecting mixture of ethylene and acrylic acid ester to polymerization in an aqueous dispersion in presence of substance supplying oxygen. No. 420,725. Heinrich Hopff, Seibert Goebel, Curt W. Rautenstaruch.

Granted and Published June 13, 1944

Improved air feed cooling system for super charged internal combustion engines. No. 420,730. Louis Birkigt.

Flexible laminated foil sheet reflector having its surface so formed with minute indentations as to reflect substantially all light transmitted thereto from a light source. No. 420,735. Thoger G. Jungersen.

Method of preparing a group of unsaturated compounds possessing free valences with catalytic activity, by inter-reaction of formaldehyde and calcium hydroxide solutions, exposing to ultraviolet light, and vacuum evaporating to syrup form. No. 420,739. Wm. F. Koch.

Re-sharpening worn files by degreasing with sulphonated fatty alcohol, immersing in sulphuric acid bath, applying positive electric potential of 2 to 20 volts to the files in the bath, and subjecting to the action of powerful oxidizing agent. No. 420,740. John Bernard Leyland.

Improved hollow glass bulb float valve design. No. 420,747. Francisco Diaz Posada.

Expansion rivet design. No. 420,754. Everett Raymond Swank.

Process for recovery of tin from low grade ore, in a single operation, by admixture of ore and iron pyrites and direct heating above 700° Centigrade and condensing volatile sulphide compounds formed thereby. No. 420,755. Urlyn Clifton Tainton.

Knock down packing box so cleated and grooved as to permit ready assembly and dissembly. No. 420,756. Arthur C. Thompson.

Camera having separated film carrying chambers, lens system, and means whereby the lens system may be moved to position with relation to either of the film chambers. No. 420,757. William De Poy Thompson.

Process of treating residual sulphite liquor from magnesium base method by spray drying and burning below fusion temperature to yield residue of highly reactive caustic magnesium oxide, and recovering the sulfur dioxide, to regenerate magnesium base cooking liquor. No. 420,758. George H. Tomlinson.

Diagonally channeled, concave surface, glass razor blade hone. No. 420,760. William A. Wilson.

Ceramic member adapted for sealing to glass consisting of heat treated admixture of steatite and a refractory insulating material such as magnesia or zirconium silicate. No. 420,776. Canadian General Electric Co., Ltd. (James R. Lait)

(To be continued)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

408,133. The Liquid Carbonic Corp., Chicago, Ill.; filed May 6, 1943; for medical gases; since Aug. 31, 1942.
408,134. Briggs Clarifier Co., Washington, D. C.; filed May 19, 1943; for oil filters; since Aug. 1, 1942.
408,143. Hill Mfg. Co., Atlanta, Ga.; filed Oct. 5, 1943; for absorbing moisture; since Apr. 21, 1943.
408,219. Reliance Varnish Co., Inc., Louisville, Ky.; filed Aug. 13, 1942; for lacquers; since July 1, 1942.
408,325. Truscon Labs., Inc., Detroit, Mich.; filed Nov. 20, 1943; for paint-like material; since May 1, 1943.
451,433. American Phenolic Corp., Chicago, Ill.; filed Mar. 6, 1942; for cements; since June 1, 1938.
460,532. The Permanente Metals Corp., Oakland, Calif.; filed May 10, 1943; for magnesia products; since Apr. 12, 1943.
460,533. The Permanente Metals Corp., Oakland, Calif.; filed May 10, 1943; for ferrosilicon; since Mar. 29, 1943.
460,534. The Permanente Metals Corp., Oakland, Calif.; filed May 10, 1943; for magnesia products; since Apr. 12, 1943.
461,740. Filtered Rosin Products, Inc., Brunswick, Ga.; filed June 29, 1943; for paints; since June 18, 1943.
462,461. The Porcelain Enamel & Mfg. Co. of Baltimore as The Porcelain Enamel & Mfg. Co., Baltimore, Md.; filed Aug. 2, 1943; for coatings; since Apr. 30, 1943.
464,693. Eidelman Bros., Detroit, Mich.; filed Nov. 4, 1943; for cements; since Mar. 1, 1943.
465,448. Col-Mac Co., Westbury, Long Island, N. Y.; filed Dec. 2, 1943; for plastic; since Oct. 14, 1943.
465,739. The Dicalite Co., Los Angeles, Calif.; filed Dec. 13, 1943; for dehumidifying gases; since Nov. 29, 1943.
465,971. The American Platinum Works, Newark, N. J.; filed Dec. 22, 1943; for crucibles; since January, 1906.
466,163. J N T Mfg. Co., Inc., N. Y.; filed Dec. 29, 1943; for chemical specialties; since June 18, 1934.
466,550. Rohm & Haas Co., Philadelphia, Pa.; filed Jan. 13, 1944; for lacquers; since May 15, 1925.
467,015. The Canfield Oil Co., Cleveland, Ohio; filed Jan. 31, 1944; for motor sludge solvent; since Dec. 29, 1943.
467,410. Stauffer Chemical Co., San Francisco, Calif.; filed Feb. 14, 1944; for fertilizers; since 1884.
467,858. Quaker Chemical Products Corp., Conshohocken, Pa.; filed Feb. 29, 1944; for coolants; since April, 1942.
468,362. American Petroleum Products Co., N. Y.; filed Mar. 17, 1944; for water proofing; since Oct. 1, 1943.
468,382. S. W. Landsberger Chemical Works, Inc., N. Y.; filed Mar. 17, 1944; for edible acids; since Mar. 10, 1944.
468,568. Walter G. Legge Co., Inc., N. Y.; filed Mar. 23, 1944; for plastic material; since Mar. 1, 1942.
468,611. Illinois Bronze Powder Co., Chicago, Ill.; filed Mar. 24, 1944; for paints; since Mar. 1, 1927.
468,644. Union Bay State Co., Inc., Cambridge, Mass.; filed Mar. 24, 1944; for synthetic latex; since Mar. 16, 1944.
468,646. The United Piece Dye Works, Lodi, N. J.; filed Mar. 24, 1944; crease resistor; since Feb. 17, 1944.
468,809. Nuodex Products Co., Inc., Elizabeth, N. J.; filed Mar. 29, 1944; for driers; since 1935.
469,015. Nuodex Products Co., Inc., Elizabeth, N. J.; filed Apr. 4, 1944; for preservative; since Mar. 2, 1944.
469,091. The Patterson-Sargent Co., Cleveland, Ohio; filed Apr. 6, 1944; for paints; since Mar. 10, 1944.
469,178. Allis-Chalmers Mfg. Co., Milwaukee, Wis.; filed Apr. 10, 1944; for magnesium compounds; since Aug. 17, 1940.
469,233. John McQuade & Co., Inc., Brooklyn, N. Y.; filed Apr. 11, 1944; for paints; since Aug. 31, 1943.
469,234. Nuodex Products Co., Inc., Elizabeth, N. J.; filed Apr. 11, 1944; for insecticides; since March, 1944.
469,286. Solar Aircraft Co., San Diego, Calif.; filed Apr. 12, 1944; for welding fluxes; since July 21, 1943.
469,480. R. T. Vanderbilt Co., Inc., N. Y.; filed Apr. 19, 1944; for rubber accelerator; since Apr. 6, 1944.
469,776. Littlejohn & Co., Inc., N. Y.; filed Apr. 28, 1944; for tanning extract; since Apr. 12, 1944.
469,794-5-8. W & W Auto Finishes, Inc., Boston, Mass.; filed Apr. 28, 1944; for paints; since Apr. 1, 1944, and Nov. 1, 1930.
469,845. Mohawk Labs., Frankfort, N. Y.; filed May 1, 1944; for fluxes; since Apr. 11, 1944.
469,860. Aridye Corp., Fair Lawn, N. J.; filed May 2, 1944; for dyestuffs; since Apr. 17, 1944.
469,861. Aridye Corp., Fair Lawn, N. J.; filed May 2, 1944; for dyestuffs; since Apr. 17, 1944.
469,936. Monsanto Chemical Co., St. Louis, Mo.; filed May 4, 1944; for resins; since Apr. 22, 1944.
469,941. The Penn. Salt Mfg. Co., Philadelphia, Pa.; filed May 4, 1944; for insecticides; since Feb. 11, 1944.
470,048. Stauffer Chemical Co., San Francisco, Calif.; filed May 8, 1944; for insecticides; since Oct. 1, 1943.
470,084. National Starch Products, Inc., N. Y.; filed May 9, 1944; for adhesives; since Apr. 4, 1944.
470,168. The American Oil Co., Baltimore, Md.; filed May 12, 1944; for gasoline; since Mar. 29, 1944.
470,222. Thomas A. Edison, Inc., West Orange, N. J.; filed May 13, 1944; for instruments; since June, 1940.
470,230. Reichhold Chemicals, Inc., Detroit, Mich.; filed May 13, 1944; for plastic resins; since Dec. 12, 1942.
470,286-7-8. Alco Oil and Chemical Corp., Philadelphia, Pa.; filed May 16, 1944; for synthetic resins, synthetic rubber; since Oct. 9, 1942; since Apr. 18, 1944; since May 9, 1944.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, July 11 to Aug. 1, 1944.

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PERMANENTE
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ALCO 100
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