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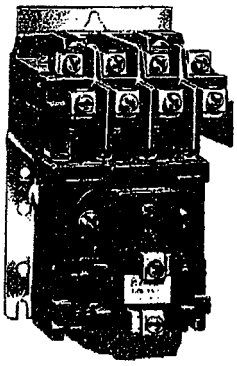
CHEMICAL WEEK

A McGRAW-HILL PUBLICATION 50 CENTS SEPTEMBER 10, 1966

it's false economy not to buy Allen-Bradley

Have you ever stopped to consider the "cost per minute" when a control failure shuts down a production line? You can bet it's plenty—it will wipe out "flocks" of those hoped-for savings from buying motor control at "cut prices."

Allen-Bradley—the quality control—features the time-proven A-B solenoid construction—with only one moving part—which simplicity of design is *your* guarantee of millions of trouble free operations. The weld-resistant silver alloy contacts of a special double break design assure long life and the utmost in contact performance—with never a moment to be spent for maintenance. Coils are pressure molded—replaced free of cost to you if they should fail in service—regardless of atmospheric condition. The built-in air-gap in the magnets remains permanent—no matter what the frequency of service may be—"magnetic sticking" is out of question.



BULLETIN 700 Type BR 4-pole control relay with convertible contacts

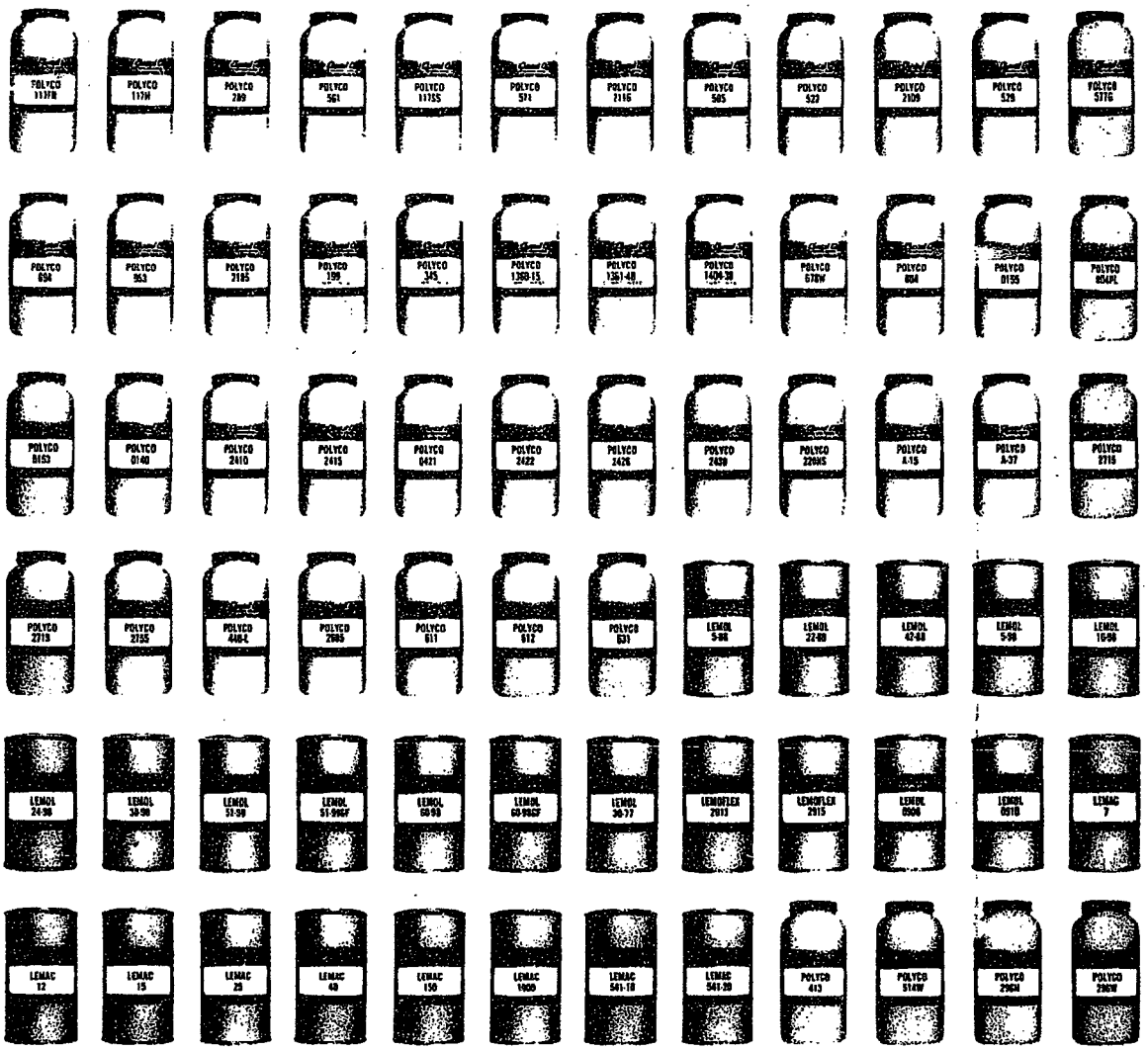
The Type BR relay is of the same general trouble free design as just described and is unusually versatile. All contacts are easily convertible—all it takes is a screwdriver and 30 seconds to change a pole from N.O. to N.C. or vice versa. Also, either one or two extra poles can be quickly added in the field and they are full rated and also convertible. Type BR relays can be furnished with overlapping contacts.

Your local Allen-Bradley appointed distributor carries in his stock a very wide selection of the Allen-Bradley control commonly used in your territory. He has been trained as a control specialist. Please contact him—he is excellently qualified to take care of your control needs. Allen-Bradley Co., 1349 S. First Street, Milwaukee, Wisconsin 53204. Export Office: 630 Third Ave., New York, N.Y., U.S.A. 10017.

ALLEN-BRADLEY

QUALITY MOTOR CONTROL

1065-5APB



73 Resins

for doing business with Borden Chemical's **Polyco** Department!

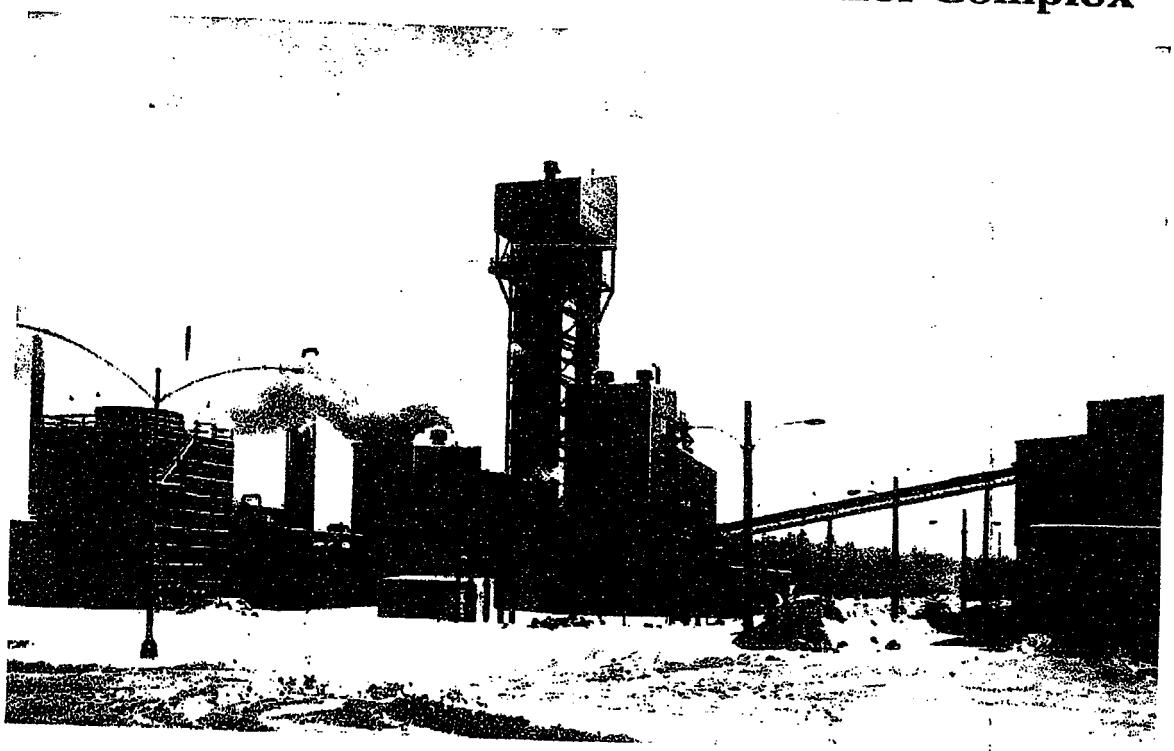
These 73 thermoplastic products and intermediates are the best recommendations we can offer for dealing with us. Being basic back to the monomer, Borden Chemical supplies the broadest range of polymers and chemicals available from a single source. They are designed for use in paints, paper, adhesives, textiles, inks, specialty coatings, water soluble films and in polymerization. Many are useful as binders, thickeners and opacifiers.

With 20 years polymer experience, we have developed the best quality control system possible and can provide unusual shipping flexibility and immediate delivery from over 12 stockpoints.

If you have a problem involving an emulsion or resin, we think we could help. Sound resinable? Then contact The Borden Chemical Company, Polyco Dept., CW-96, 511 Lancaster St., Leominster, Massachusetts.

BORDEN CHEMICAL

Highly Successful Startup At New Brunswick Development Corporation's Fertilizer Complex



Dorchester Cape, New Brunswick facility producing high-quality ammonium nitrate prills and nitric acid at design capacity within three weeks of initial process light-off

The fertilizer complex designed, engineered, procured and constructed by The Lummus Company Canada Limited for the New Brunswick Development Corporation of Fredericton, N. B., is on stream at Dorchester Cape, N. B.

The new complex, which includes a 150 tons per day nitric acid plant, a 190 tons per day ammonium nitrate plant, a nitrogen solution plant, an ammonia storage terminal, and auxiliary facilities, is the first of the installations to be completed in the development of the Westmorland Chemical Park under the sponsorship of the New Brunswick Development Corporation.

The ammonium nitrate plant manufactures both fertilizer (33.5% nitrogen) and explosion-grade prills. The nitric acid process used in this plant has a demonstrated overall ammonia efficiency of better than 95%. Fundy Chemical Corporation Limited is the operator of the new facilities.

For ammonia, ammonium nitrate, nitric acid, ammonium phosphates, nitric phosphates, urea and complex fertilizers—consult Lummus.

Lummus can put at your disposal close to 60 years of experience on more than 1,000 major projects throughout the world.

THE LUMMUS COMPANY
A SUBSIDIARY OF COMBUSTION ENGINEERING

® *an international engineering and construction organization.* 385 Madison Ave., New York, N.Y. 10017. Offices and subsidiaries: Newark, Washington, D.C., Chicago, Houston, Montreal, London, Paris, The Hague, Madrid, Milan, Bombay, Tokyo, Caracas, Munich. Engineering Development Center: Newark.

VOL 99

ON THE COVER: Operator peers into reactor as trickle of magnetic material drops from the opening. New markets are opening up for ceramic permanent magnets as designers perfect smaller and lighter magnets with higher coercive force (p. 101).

CHEMICAL WEEK

Vol. 99, No. 11 SEPTEMBER 10, 1966

THIS WEEK IN BUSINESS

THIS WEEK IN TECHNOLOGY

THIS WEEK IN SPECIALTIES

DEPARTMENTS

Chemical Week is published weekly by McGraw-Hill, Inc., 330 West 42nd St., New York, N.Y. 10036.

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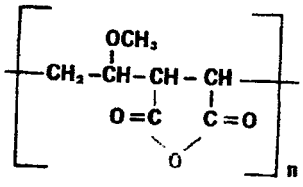
Chemical Week's publisher, New York editorial staff and advertising management are located on the 32nd floor of J. C. Penney Building, 1301 Avenue of the Americas.

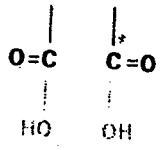
the water-soluble copolymer with reactive functionality

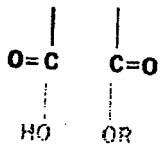
GANTREZ® AN



GAF's interpolymer of methyl vinyl ether and maleic anhydride, GANTREZ AN, offers an exceptionally wide range of formulating possibilities.

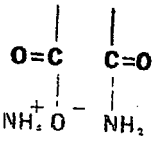
Reacted with water, GANTREZ AN forms a polymeric dibasic acid. In this state (or as the anhydride), it functions as a versatile thickener, tackifier, protective colloid, film former, etc.





Reacted with alcohols, GANTREZ AN makes possible a wide range of polymeric esters having broad utility: partial or monoesters for pH controlled solubility (hair sprays, tablet coatings, spray-on bandages, industrial protective coatings); diesters and long-chained esters for oil solubility. With nonionic surfactants, this polymer forms water-soluble partial esters useful as latex paint thickeners, pressure sensitive adhesives, textile sizes and finishes and stabilizers for surfactant systems.

Reacted with ammonia under anhydrous conditions, GANTREZ AN forms the mono amide/ammonium salt which is of interest in paper coatings, photographic applications and print pastes. Under similar conditions substituted amides can be formed by reacting GANTREZ AN with primary and secondary amines.



Crosslinked with other polyfunctional compounds or used to form complexes with certain metal ions, it produces other useful products such as ceramic binders, protective coatings and corrosion inhibitors. In other words, GANTREZ AN is the key to solving old problems and creating new products for just about any industry. For technical data and samples, send the coupon to our Dyestuffs and Chemical Division. (And remember that you can rely on full technical assistance from GAF.)

GENERAL ANILINE & FILM CORPORATION

140 WEST 51 STREET NEW YORK 10020

Dyestuffs and Chemical Division, Dept. CW-910

Please send me GANTREZ AN sample ( ) and literature for use in _____

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

CHEMICAL WEEK

Is Ad Spending Too High?

Britain's Monopolies Commission rattled advertising agencies in London and New York last week when it found that Unilever and Procter & Gamble are "wasting" money on detergent advertising at the public's expense. The commission recommended a 40% cut in advertising and promotion expenses and proposed at 20% reduction in wholesale selling prices (*CW, Sept. 3, p. 68*).

While this move by the commission goes appreciably further than any U.S. government attack on advertising to date, it is bound to bolster the case of the trustbusters who have argued that excessive advertising could restrain competition.

And the government itself has given strong hints that it is aware of advertising's power and intends to do something about it. In '63, for example, the Federal Trade Commission struck down the P&G purchase of Clorox, arguing that P&G's massive advertising would stretch Clorox's already commanding lead over its rivals.

And last June, Assistant Attorney General Donald Turner, head of the Antitrust Division suggested imposing (for a period of time) an absolute or percentage limitation on promotional expenditures by companies that have violated the Sherman Antitrust Act.

Now, an authoritative new book injects some facts into this emotional issue. It does much to dispel a popular illusion that advertising outlays have outrun other business costs.

The book, out this week, is "Measuring Advertising Readership & Results" (McGraw-Hill), by Daniel Starch, a 40-year veteran of evaluating advertising effectiveness.

We hope that officialdom will read, in particular, the chapter headed "Advertising and Other Business Costs." Starch has measured advertising expenditures as a percentage of gross national product and finds no appreciable yearly change between '50 and '63. Through all these years advertising expenditures have been about 2.25% of the GNP. This means that while dollar advertising expenditures have climbed (from $5.710 billion in '50 to $13.050 billion in '63), this increase has been proportional to the GNP growth.

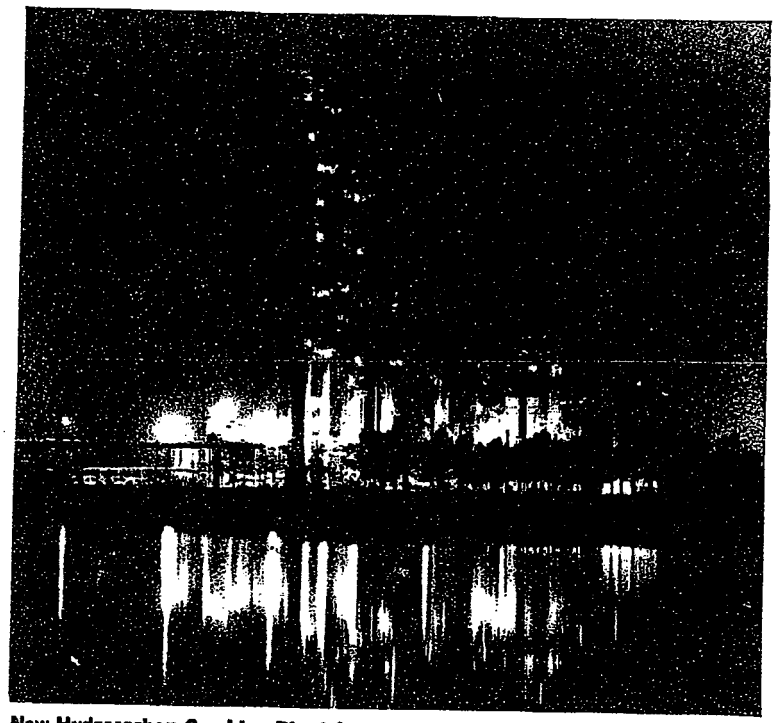
Says Starch: "There is an impression that advertising, although necessary, costs more, attracts fewer readers and observers and is less effective than formerly. Because of competition for the public's attention, it is thought that it is harder to reach people and to get them to pay attention to the ad message."

Not so, he demonstrates, using readership studies. It appears that "advertisments themselves have not become less effective, but, if anything have become more effective in attracting readers."

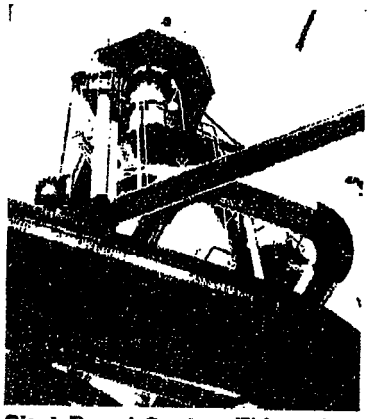
Before attacking the policies of one or two companies, trustbusters on both sides of the Atlantic should consider the philosophy behind advertising, best expressed by Starch:

"The economic and social justification of advertising ultimately rests (a) upon its service in increasing legitimate human wants and (b) upon its being an effective and fair agency of competition.

"So long as we believe that human beings should continue to want more and better things, which will in the long run contribute to their happiness and well-being—so long will we have individual effort and competition. If we believe in a philosophy of competition, then we must permit all means of fair and effective competition."



New Hydrocarbon Cracking Plant for Olefin Production. Texas Eastman Company, a division of Eastman Kodak Company, called on Kellogg to handle design, engineering, and procurement for the multimillion-dollar project. Located on a 2,500-acre site near Longview, Texas, the plant is now in full operation, producing ethylene and co-products by cracking propane feedstock. Kellogg's steam pyrolysis process is used to produce the high-purity ethylene. Other products include polymer-grade propylene, light and heavy aromatic distillates, and a hydrogen product. The olefins are feedstock to Texas Eastman polyolefin and chemical plants where plastics, low-molecular-weight waxes and resins, alcohols, aldehydes, and other chemicals are made. Kellogg is also completing a combined ethylene oxide-ethylene glycol plant at the same site. The new plant is one of nine olefin facilities Kellogg is now engineering and constructing in five countries: combined annual ethylene capacity — nearly 3 billion pounds.



Giant Record Breaker. This 90-foot high-ammonia-production converter weighs one million pounds, has steel walls that are 5 inches thick, and produces a record 1,000 T/D of ammonia by combining hydrogen and nitrogen gases over a catalyst at a pressure of roughly 2,000 psi.

The huge reactor is part of a unique plant designed and built by Kellogg at Yazoo City, Mississippi, for Coastal Chemical Corporation. The plant is the first of its size of completely single-train design. Using but one reforming furnace, ammonia converter, and compressor train, it represents a major advance in economical ammonia production.

Kellogg's new large plant design and ability to quality-engineer giant pieces of equipment, such as this converter, have made possible the manufacture of ammonia at the lowest cost per ton. As a result, Kellogg is currently designing over one-half of the free world's new large ammonia plant capacity. Combined output of these plants will exceed 7 million tons per year.

KELLOGG SCOPE

Worldwide Engineering and Construction

Grass Roots Refinery on Stream in Record Time. The new 25,000 BPD refinery of Amoco Australia Pty. Limited was in full operation just 2 weeks after Kellogg completed construction.

A 25,000 BPD Crude and vacuum unit, 10,000 BPD Kellogg Model C Orthoflow® Fluid Catalytic Cracking unit, together with Ultraformer* and Ultrafiner* units combine to produce premium and regular gasolines, fuel and diesel oils, kerosenes, jet fuels, LPG, and asphalt, all for domestic consumption. Included in the complex are a tanker jetty, crude-storage tank farm, the process units, a utility plant, blending facilities, product storage, workshops, laboratory, and administration buildings.

The M. W. Kellogg Company carried out complete process engineering design for the multimillion-dollar refinery, while Kellogg Overseas Corporation, the Company's affiliate in Sydney, handled all procurement and construction. Across Australia, refineries of Kellogg design now account for almost a third of the continent's total refining capacity.

*Licensed by Standard Oil Company (Indiana)

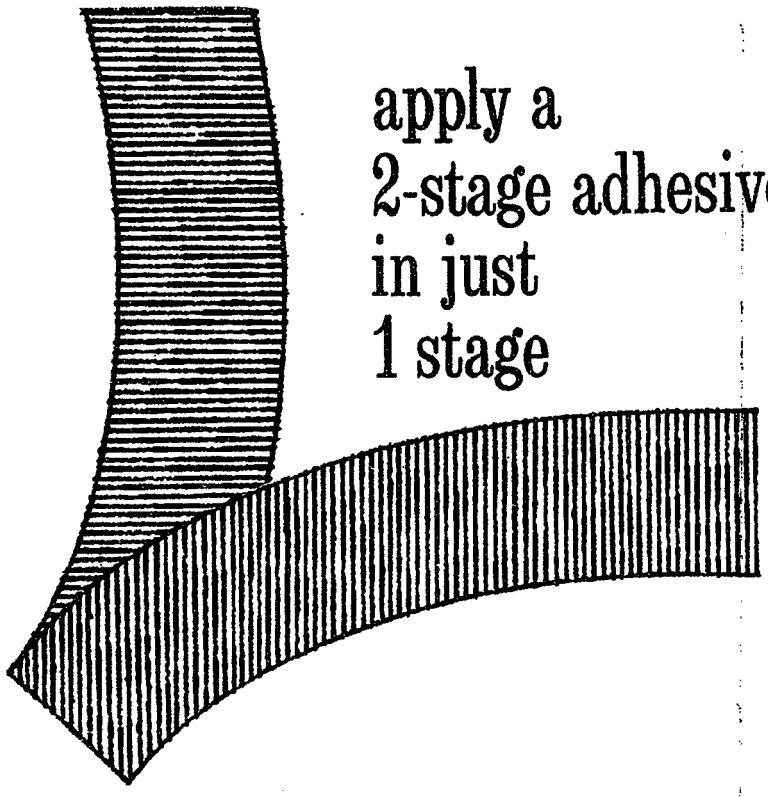
KELLOGG

THE M. W. KELLOGG COMPANY
711 THIRD AVE., NEW YORK, N.Y. 10017
A DIVISION OF PULLMAN INCORPORATED

Offices of other Kellogg Companies are in

Bogota	Madrid
Buenos Aires	Paris
Dusseldorf	Sydney
London	Toronto

With AMSCO You Can...



apply a 2-stage adhesive in just 1 stage

The machinery manufacturer had a good idea. He wanted to eliminate one costly step in applying labels to food packages. But he needed research experience in solvents. Could AMSCO help?

Yes.

Previously, adhesive had been applied to the labels in two stages: resin went on in solution . . . with the plasticizer applied to the label back as a separate step.

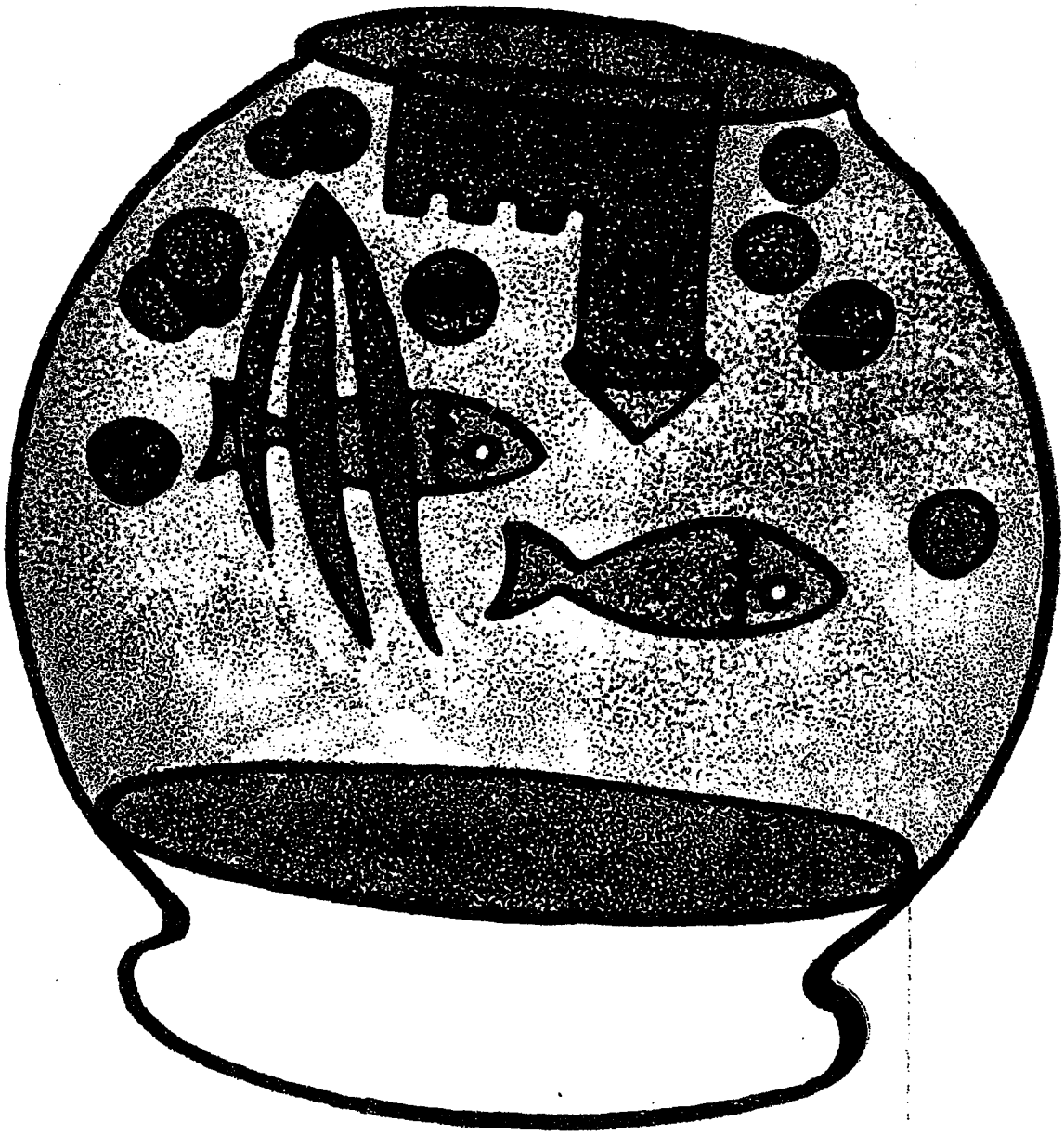
The plasticizer was emulsified in water. AMSCO Technical Service researched solvents which were immiscible in water and would do the job of cutting the resin. One solvent proved ideal. Now resin and plasticizer are applied in a single emulsified system with no premature reaction.

Can you benefit from experience in chemical and solvent research? With AMSCO you can. Just call.

ASK AMSCO

American Mineral Spirits COmpany

Chemicals • Petrochemicals • Solvents
New York—Sales Offices in principal cities
Service world-wide through AMSCO International



Would you believe?

Carbopol resins can be used:

To thicken potassium hydroxide solutions, sulfuric acid solutions.

To emulsify pine oil, tar, asphalt, creosote, silicone oils.

To gel mineral oil, kerosene, gasoline, acetone, methylene chloride.

To suspend core washes, powdered metals, paper-making fibers, graphite.

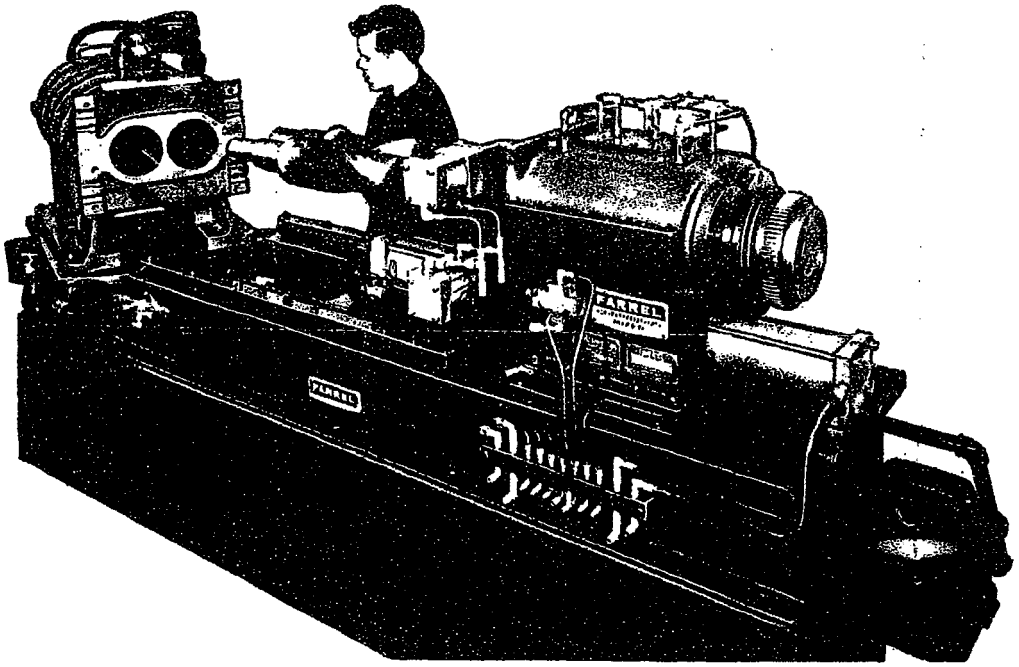
To body rubber, polyurethane, vinyl adhesives.

To disperse insecticides, fungicides, herbicides, fertilizers.

If one of these properties of Carbopol resins interests you, let us know about it. We will be glad to work with you in helping to decide whether or not a Carbopol polymer is your answer. Contact B.F.Goodrich Chemical Company, Dept. CW-5, 3135 Euclid Ave., Cleveland, Ohio 44115.

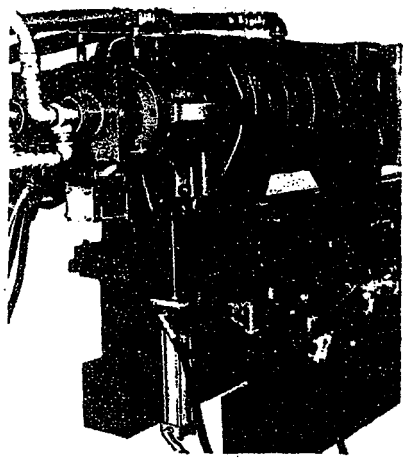
Carbopol
Water-Soluble Resins

B.F.Goodrich **B.F.Goodrich Chemical Company**
a division of The B F Goodrich Company



Above: Size 6FCM with mixing chamber retracted for cleaning. *Right:* Orifice jack shown in position for orifice removal.

FCM:
change from one stock to another without danger of contamination



Although the Farrel Continuous Mixer* is not completely self-purging, one stock can be followed by another, without cleaning, with contamination of only a small amount of material. When required, however, the operator can clean both the chamber and the rotors thoroughly and easily in a very few minutes.

To clean, the mixing chamber is made readily accessible by push-button control. It is first moved forward and then rotated on a turntable, as shown in the upper illustration. This leaves the rotors overhung, supported by the drive end of the machine. The orifice can be easily removed, as a unit, for cleaning.

This is only one of the many advantages of the FCM. A true mixer, it has rotors and a mixing action similar to the Banbury® mixer. Discharge temperature is independent of production rate, and can be kept constant throughout a wide range of rates or can be varied by as much as 100° F at any given rate.

For further details of this unique machine, send for a copy of bulletin 227.

FARREL CORPORATION
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Rochester, N.Y.

Sales Offices: Ansonia, Akron, Chicago, Los Angeles, Houston, Atlanta

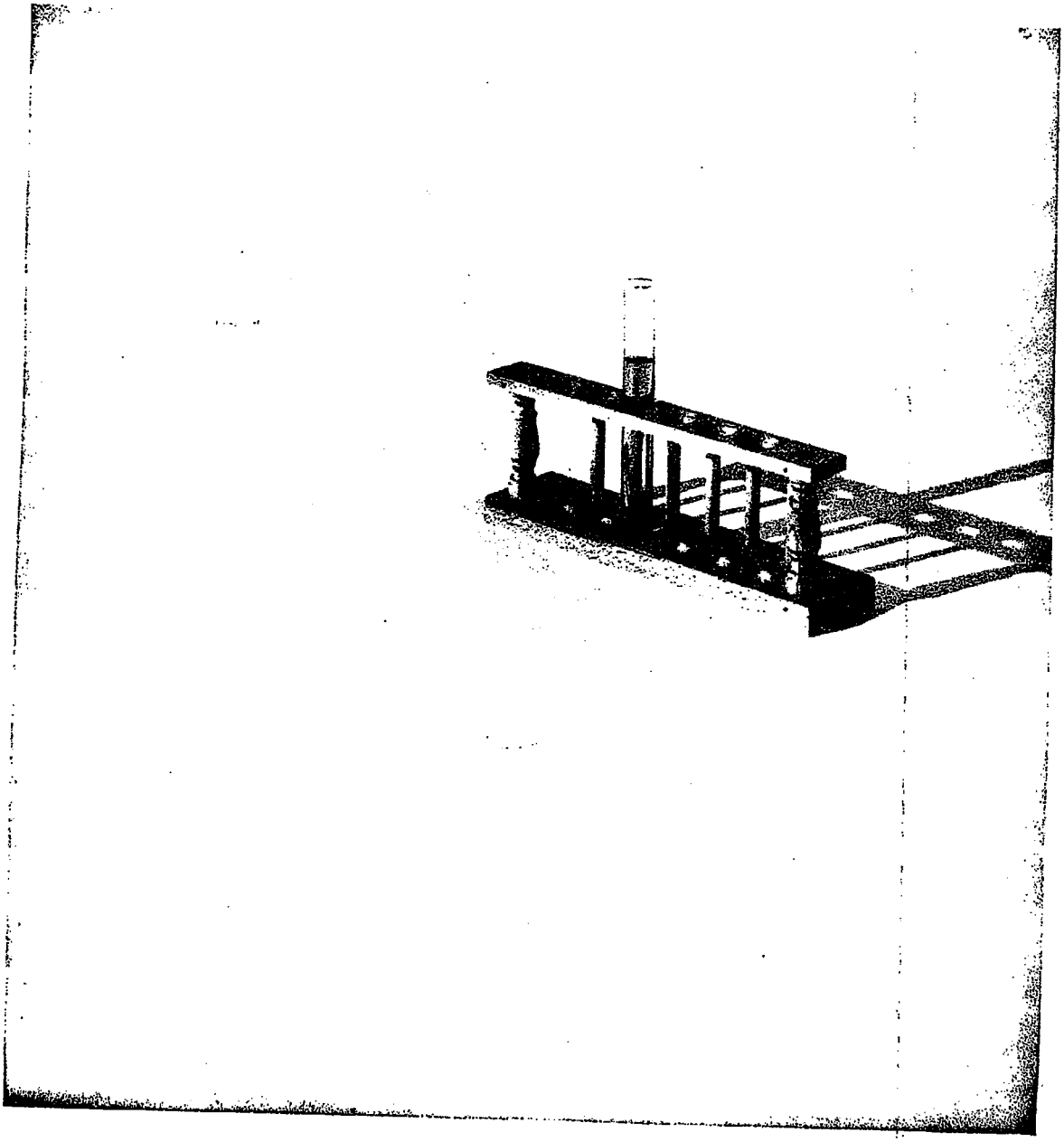
In Europe: Farrel Italiana s. r. l., Via Pergogna 8, Milano, Italy

In Canada: Farrel Canada Limited, 44 Victoria Street, Toronto 1, Ontario

*U.S.A. Patent No. 3,154,808 Patents and patents pending in other principal countries.

FARREL

FA-1360



Will it just sit there?

Moving a new chemical out of R & D into accepted use requires much thought, careful planning and, of course, adequate financing. At Bankers Trust, we have officers thoroughly acquainted with the usual and unusual developments in the chemical industry. They have assisted numerous companies – helping to turn potentials into worthwhile new products. If your company needs a knowledgeable financial man's viewpoint, on anything from the development of new markets overseas to long-term financing, get in touch with our men in chemicals at Bankers Trust.

BANKERS TRUST COMPANY NEW YORK

Look what's happened since we became a division of Hooker Chemical Corporation.

New $20,000,000 PVC and Calendering Plant.

Now under construction in Burlington, New Jersey, this new RC facility will be devoted to the production of PVC homopolymers utilizing an advanced mass polymerization process. Versatile multi-calender lines are also being established here for the increased manufacture of flexible and rigid film and sheeting.

Esterification Capability Doubled.

Substantially increased versatility is now possible in the production of specialty plasticizers, lubricant bases, polyesters for polyurethanes and comonomers.

New Applied Chemo-Plastics Processing Laboratory.

This advanced laboratory contains sophisticated processing equipment for the development of plastic products. Techniques include blown film, blow molding, special compounding processes and polyurethane fabrications.

100% PVC Copolymer Increase Now in Engineering.

Greater production output and faster delivery of copolymer resins for use in vinyl records, floorings, extrusions for packaging and solution coatings.

Continued High Quality— Increased Production.

Call RC First for polyurethane coatings, adhesives, potting compounds, laminates, elastomers and caulking.

Call RC First for PVC film and sheeting, press polishing and Rucorail™ extruded profiles for handrail applications in exclusive woodgrain patterns.

Call RC First for vinyl resins, Rucotex™ butadiene-styrene latexes and latex concentrates, esters and polyesters, liquid compounds, dry blend and pellet compounds.

RC DIVISION/HOOKER CHEMICAL CORPORATION
New South Road / Hicksville, New York 11802 / Telephone: (516) 931-8100

HOOKER CHEMICALS PLASTICS

This solid-state electronic accounting system can compute invoices, give you job cost analysis, and calculate ingredient quantities.

It only costs you $10 a day.

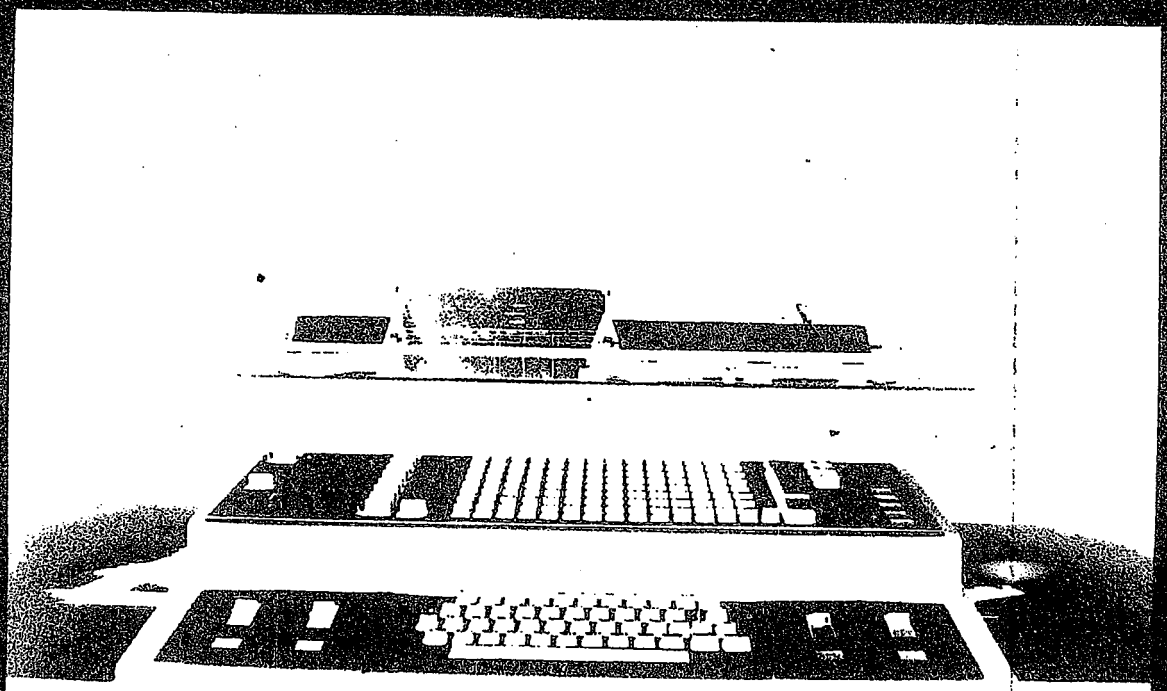
That's about the price of a conventional accounting machine. But this is the NCR 395-300. It does everything an accounting machine does, and some surprising things computers usually handle.

Things that make this low investment pay you a handsome return.

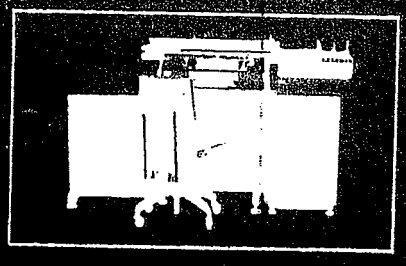
It can give you labor efficiency reports . . . job cost reports . . . wage accrual. Input daily labor from clock or time cards through the keyboard or through punched cards. The 395-300 can automatically compute FICA, withholding, regular and overtime earnings. Then print a labor efficiency report for you.

Or, the report can be punched on paper tape for transmission to a home office computer by teletype or data phone . . . as a satellite for the central computer.

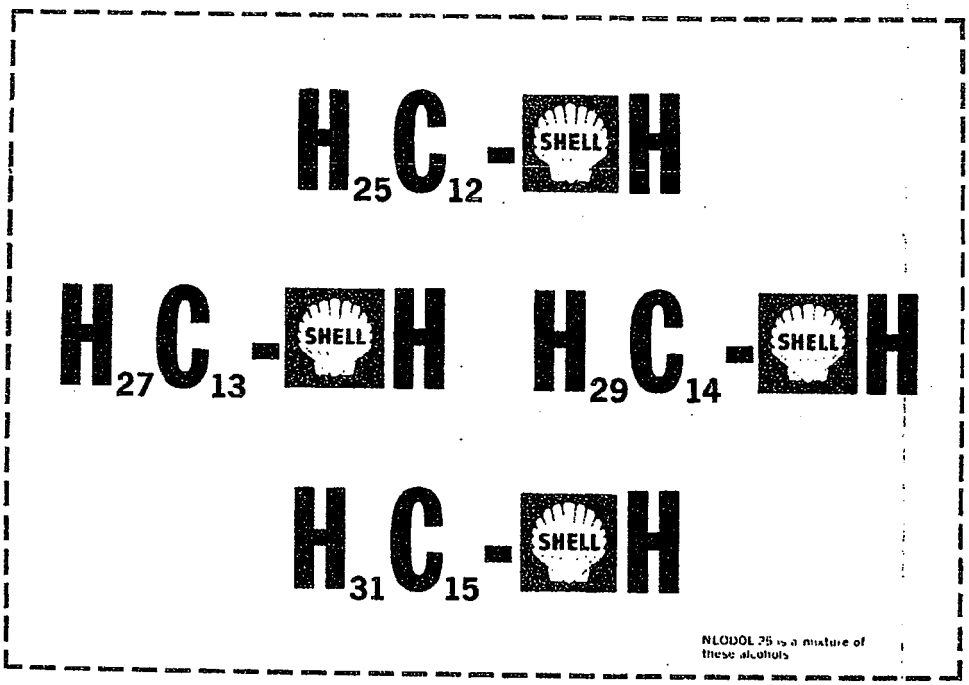
That's a lot of service for $10 a day. Tape and card options cost a little more, but they do more. Do what? Your NCR representative has the specifics. Give him a call. Or write NCR, Dayton, Ohio 45409. We'll rush some literature to you.



NCR



THE NATIONAL CASH REGISTER COMPANY, DAYTON, OHIO 45409



Unique new NEODOL* 25 linear primary alcohol contains both odd and even numbered carbon chains in the C_{12} to C_{15} range– plus traditional built-in Shell quality

This crystal-clear 100 percent primary alcohol has an exceptionally mild, neutral odor—reacts like all alcohols but without unwanted side reactions.

Result: you can count on high yields of exceptional purity in reactions involving Shell NEODOL 25.

The odd-numbered chains in NEODOL 25 have already demonstrated superior performance characteristics in surfactants. Perhaps they can help in your applications for long chain alcohols and derivatives.

Mail coupon for evaluation sample. We'll also be glad to send you technical bulletins on NEODOL 25. Shell Chemical Company, Industrial Chemicals Division, 110 West 51st Street, New York, N.Y. 10020.

*Shell Trademark

Shell Chemical Company CW-9
Industrial Chemicals Division
110 West 51st St., NY., N.Y. 10020

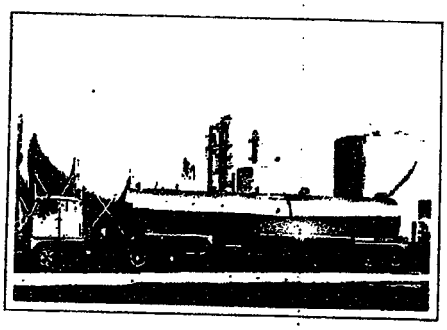
Please send me ☐ sample of NEODOL 25 for evaluation. ☐ technical bulletins about NEODOL 25.

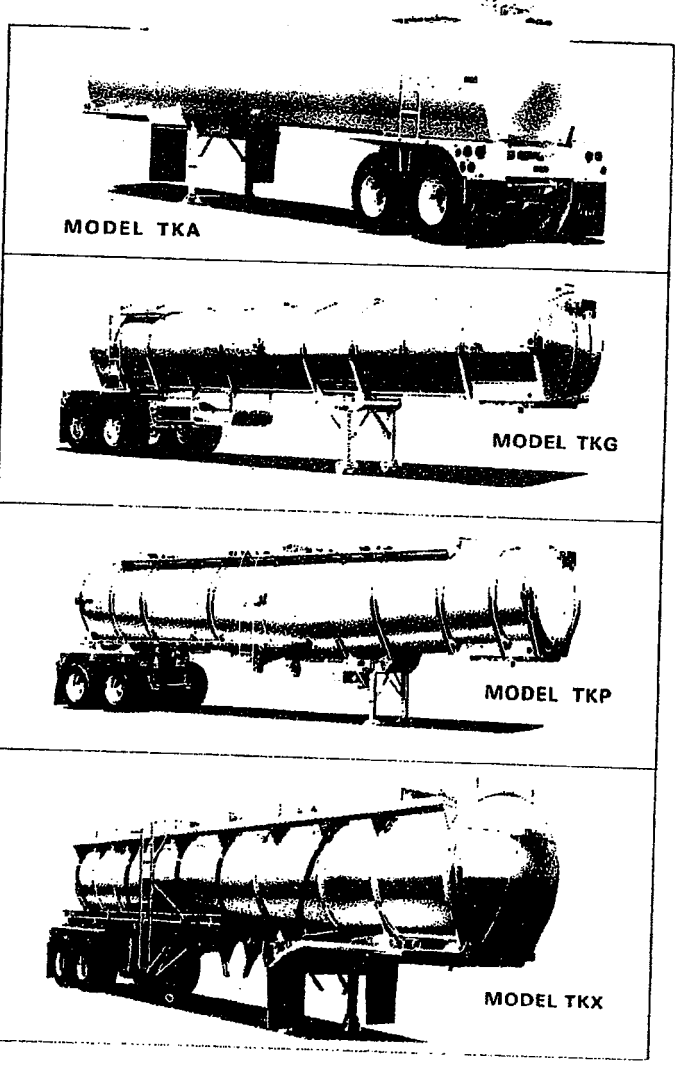
NAME_____
FIRM_____
ADDRESS_____
CITY_____ STATE_____

How's this for versatility?

You name it—FRUEHAUF has a stainless steel chemical tank-trailer to move it swiftly, economically!

Choosing from Fruehauf's complete line of Stainless Steel Chemical Tankers is the easiest way to solve your specialized liquid hauling problems — and at the lowest possible cost. Just state your requirements: insulated or non-insulated — single or multi compartments—for regulated or non-regulated commodities — pressure or non-pressure service. Stainless steel's high resistance to corrosion means low maintenance costs. Fruehauf's four basic models are pictured below. See your local Fruehauf Branch for details, or write to: **Fruehauf Division, Fruehauf Corporation, 10948 Harper Avenue, Detroit, Michigan 48232.**





MODEL TKA—specially designed for dangerous and corrosive liquid chemicals, this single-compartment unit features 3" of Ultrafine insulation and nine thermo panels for steam or hot water heating when hauling such commodities as phenol.

MODEL TKG—for hauling non-regulated products such as acetic acid, glycerin, urea and fuel oil. Readily convertible to handle jet fuel, solvents, paint driers and other flammable products. Single compartment model shown.

MODEL TKP—a 4-compartment model with heavy gauge, deep dished bulkheads, this unit is designated for pressures to 25 p.s.i.g. With proper emergency valves, venting and pressure relief equipment, it's ideal for regulated products like naphtha, alcohols and acetones.

MODEL TKX—a sophisticated, 5-compartment model with options available to modify it for a variety of high-purity chemicals as well as synthetic sweetening agents used in low calorie food products. Easy to clean.

FRUEHAUF TRAILERS

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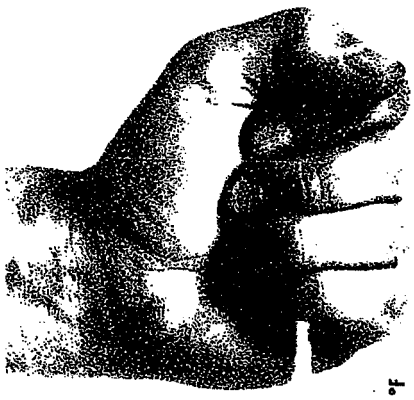
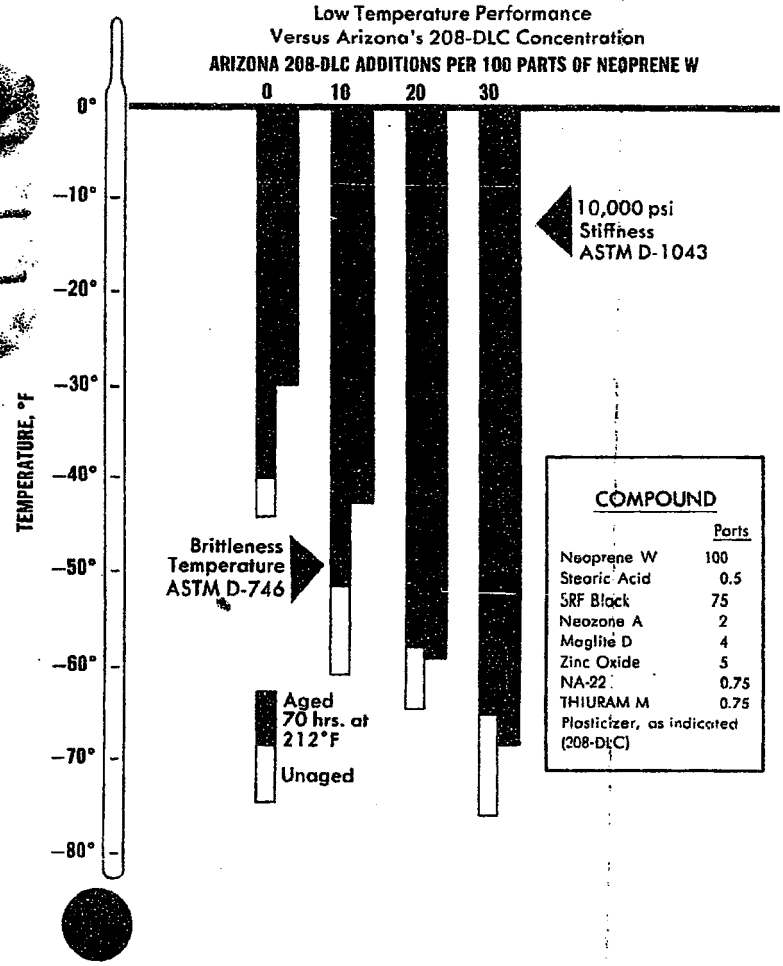
ARIZONA'S 208-DLC
Low-Temperature Plasticizer in New, Free-Flowing Powder Form





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Arizona's 208-DLC offers the important low-temperature flexibility properties of Arizona's 208 Plasticizer, but in a new easy-to-handle powder form. In addition to increased ease of handling, Arizona's 208-DLC reduces mill time and speeds the incorporation of carbon black in chloroprene, nitrile and Hypalon* Elastomer systems.

*DuPont T.M.

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Arizona also offers Tackifiers 27 and 27-DLC, specially designed for tackifying and improving overall processing in ethylene propylene terpolymer (EPT) elastomers and butyl rubber systems.

For more detailed information about Arizona's products, write or call today. Isn't it time you moved to Arizona?

ARIZONA CHEMICAL COMPANY, 111 West 50th Street, New York, New York 10020

LETTERS

Basis for believing

TO THE EDITOR: Concerning the article titled "A More Businesslike Socialism" (*Aug. 6, p. 50*), I am surprised that your . . . authoritative publication takes seriously the "worker's management" propaganda of the Yugoslav government, as evidenced by your statement, "Unlike Western companies (Yugoslav) units will be directed by councils representing the plants' workers."

The system of the fictitious "worker's management" was introduced in the Yugoslav industry in 1952, but industrial units have always remained in the hands, and under the direction of, the government. The "worker's councils" are powerless in directing the affairs of their factories. . . . The decisions of the government are implemented through the plant's director. The council's task, much like the National Assembly's, is merely to formally "approve" the measure so that the document of approval can later be shown to visiting Westerners as "proof" of the "democratization" of Yugoslav communism and its "evolution" toward free enterprise. . . .

May I also point out . . . the following statement by Aleksander Rankovic to the Central Committee of CPY at the time of his dismissal: "Comrades, I do not think that I can be accused of any kind of nationalism or chauvinism. Whenever I have seen this and whenever I was able, I raised this question. . . ." As chief of secret police, Rankovic certainly was in a position to raise this question quite effectively.

DANIEL STEVENS
Chicago

The CW article in question is based on the best available on-the-scene information: a report from our correspondent in Belgrade, plus reporting in such journals as the Economist *and the* New York Times.—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 West 42nd St., New York, N.Y. 10036.

MEETINGS

American Chemical Society, national meeting, New York Hilton and Americana hotels, Sept. 11-16.

Technical Assn. of the Pulp and Paper Industry, 21st plastics-paper conference, Commodore Hotel, New York, Sept. 19-21; 17th testing conference, paper and paperboard, Golden Triangle Hotel, Norfolk, Va., Sept. 27-29.

Society of Cosmetic Chemists, annual seminar, Americana Hotel, New York, Sept. 20-21.

Chemical Marketing Research Assn., Greenbrier Hotel, White Sulphur Springs, W.Va., Sept. 29-Oct. 1.

American Oil Chemists' Society, 40th fall meeting, Bellevue-Stratford Hotel, Philadelphia, Oct. 3-5.

National Bureau of Standards, Institute for Materials Research, first materials-research symposium, Gaithersburg, Md., Oct. 3-7.

Assn. of Official Analytical Chemists, annual meeting, Twin Bridges Marriott Motor Hotel, Washington, D.C., Oct. 10-13.

Technicon international symposium on automation in analytical chemistry, Statler-Hilton Hotel, New York, Oct. 17-19.

Drug, Chemical & Allied Trades Assn., annual meeting, Hollywood Beach Hotel, Hollywood, Fla., Oct. 20-22.

Commercial Chemical Development Assn., discussion of packaging, Drake Hotel, Chicago, Oct. 26-28.

National Assn. of Purchasing Agents, Chemical Group; annual fall conference, Continental Plaza Hotel, Chicago, Oct. 27.

Society of Engineering Science, fourth technical meeting, North Carolina State University, Raleigh, Oct. 31-Nov. 2.

American Society for Metals, national metal congress and exposition, McCormick Place, Chicago, Oct. 31-Nov. 3.

Parental Drug Assn., annual convention, Statler-Hilton Hotel, New York, Nov. 1-4.

Fertilizer industry round-table conference, Mayflower Hotel, Washington, D.C., Nov. 2-4.

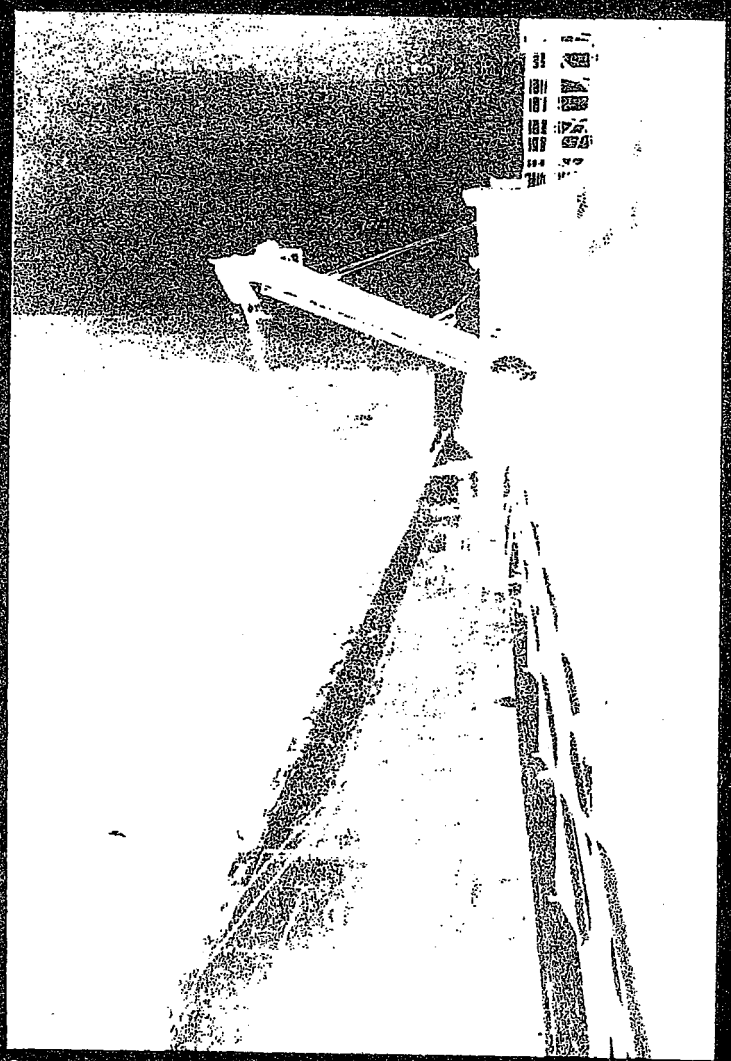
The Society of the Plastics Industry, 11th plastics film, sheeting and coated fabrics conference, Waldorf-Astoria Hotel, New York, Nov. 9-10; conference on cellular plastics in transportation, Edgewater Beach Hotel, Chicago, Nov. 15-17.

The Franklin Institute Research Laboratories, fourth annual symposium on the organic-solid state, Philadelphia, Nov. 14.

General Atomic Division of General Dynamics Corp., and Air Force Office of Scientific Research, fundamentals of gas-surface interactions, San Diego, Calif., Dec. 14-16.

Need raw materials in your business?

(Put your plant in the Houston-Gulf Coast!)



Oyster shell dredged from Galveston Bay and other coastal waters make large supplies of this important raw material available for the manufacture of cement and other industrial products.

Salt . . . oil . . . gas . . . sulfur . . . water . . . shell . . . you'll find them in abundance in the Houston-Gulf Coast. You'll also find a vast petrochemical complex, in which the finished product of one plant becomes feedstock for another.

Raw material supply is just one reason why more than 400 chemical products are being produced in the Houston-Gulf Coast region, and why more than 185 chemical plants have been built here.

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Montgomery ... 262-5787
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Phoenix ... 258-7937
Phoenix ... 254-6111
Tucson ... MA 2-3613
Tucson ... 793-9731
ARKANSAS
Fort Smith ... SU 3-4164
Little Rock ... 565-2355
CALIFORNIA
Bakersfield ... 324-4933
Fresno ... AM 8-5631
Fresno ... 237-6161
Hayward ... 783-1633
Hayward ... 471-5420
La Mirada ... 691-0596
Los Angeles ... 773-3471
Los Angeles ... 269-9531
Los Angeles ... 269-9311
Los Angeles ... 269-0191
Los Angeles ... 263-6105
Richmond ... 235-4810
Riverside ... 683-7165
Sacramento ... 446-7643
Sacramento ... 371-7600
San Diego ... 295-0041
San Francisco ... 621-1866
San Francisco ... 334-2600
San Francisco ... 826-2100
San Mateo ... 341-8763
Visalia ... 732-6606
Watsonville ... 724-1021
COLORADO
Denver ... 623-7225
CONNECTICUT
New London ... GI 2-8579
New London ... 442-8424
North Haven ... MA 4-5144
Waterbury ... PL 3-3181
DELAWARE
Wilmington ... OL 6-8141
DISTRICT OF COLUMBIA
(See Silver Spring, Md.)
FLORIDA
Davenport ... 422-1129
Jacksonville ... EV 7-5531
North Miami Beach ... NA 4-8541
Orlando ... 425-5501
Pensacola ... 432-4118
Tampa ... 877-6751
GEORGIA
Albany ... HE 6-6153
Atlanta ... 451-4831
Augusta ... PA 4-9646
Columbus ... 689-9771
Columbus ... FA 7-3669
Savannah ... AD 4-6647
Savannah ... 234-5186
HAWAII
Honolulu ... 813-311
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Chicago ... 943-3100
Chicago ... 468-2550
East St. Louis ... 271-1220
East St. Louis ... 274-1561
Mount Vernon ... 242-4134
Rockford ... 968-9874
INDIANA
Evansville ... 425-7119
Jeffersonville ... 282-1301
South Bend ... 287-2331
IOWA
Cedar Rapids ... 363-2859
Davenport ... 323-3631
Des Moines ... 244-2281
Marshalltown ... 753-8901
Osceola ... 342-2719
Waterloo ... 233-3549
KANSAS
Wichita ... 265-9606
KENTUCKY
Louisville ... ME 5-7803
Owensboro ... 684-4294
LOUISIANA
Alexandria ... 442-3395
Baton Rouge ... 921-8131
New Orleans ... 866-3601
Shreveport ... 422-0369
MAINE
Lewiston ... ST 4-6481
Portland ... SP 2-7441
MARYLAND
Baltimore ... SA 7-1900
Baltimore ... 789-8100
Cumberland ... PA 2-6700
Silver Spring ... 587-4736
MASSACHUSETTS
Brockton ... 583-4848
Dorchester ... TA 5-9100
Hingham ... 749-4844
New Bedford ... WY 8-5221
Newtonville ... 969-8100
Sommerville ... 776-4490
Springfield ... RE 6-2751
Worcester ... 756-4653
MICHIGAN
Detroit ... TE 1-6556
Grand Rapids ... 456-1418
Kalamazoo ... FI 5-1119

Ammonia-Anhydrous

Owosso ... 725-7136
Saginaw ... PL 5-4454
MINNESOTA
Duluth ... RA 7-4666
Minneapolis ... ST 9-2403
South St. Paul ... 455-8555
Wadena ... ME 1-2671
MISSISSIPPI
Greenville ... ED 2-1861
Gulfport ... 863-5833
Hattiesburg ... 583-0255
Jackson ... FL 5-3467
Meridian ... 483-4218
Tupelo ... 842-8184
Vicksburg ... 636-1467
MISSOURI
North Kansas City ... HA 1-1707
St. Louis (See E. St. Louis, Ill.)
S. St. Joseph ... 238-0661
Springfield ... 869-1544
NEBRASKA
Grand Island ... 382-3680
Omaha ... 331-4525
NEVADA
Reno ... 322-0617
NEW HAMPSHIRE
Manchester ... NA 5-6965
Woodsville ... 747-3313
NEW JERSEY
Lodi ... 472-7900
Newark ... MI 2-6439
New Brunswick ... CH 9-0930
Paterson ... SH 2-4788
Trenton ... EX 2-4123
Vineland ... OX 1-9659
NEW YORK
Amsterdam ... 842-5620
Binghamton ... RA 2-3471
Buffalo ... TT 6-6099
Buffalo ... TL 2-7138
Carthage ... 93
Cuba ... 354
Dunkirk ... EM 6-2100
Elmira ... RE 3-9167
Geneva ... 789-1550
Jamaica ... 297-0440
Newburgh ... JO 2-6500
New York City ... 564-5955
Olean ... FR 2-8585
Poughkeepsie ... GL 4-8701
Rochester ... 454-7572
Syracuse ... 488-4901
Troy ... AS 4-7400
Utica ... RE 2-6195
NORTH CAROLINA
Asheville ... AL 3-3366
Charlotte ... EX 2-2121
Greensboro ... 299-1101
Greensboro ... 273-4450
Raleigh ... 833-1688
Wilmington ... AL 6-3042
NORTH DAKOTA
Bismarck ... 233-8255
West Fargo ... AD 2-3381
OHIO
Akron ... FR 6-3136
Cleveland ... 361-1160
Columbus ... 443-7628
Delphos ... 695-1931
East Liverpool ... 385-9000
Marietta ... 373-0654
Toledo ... 531-5555
Youngstown (Call E. Liverpool Collect)
OKLAHOMA
Oklahoma City ... 685-7741
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Ammonia-Anhydrous

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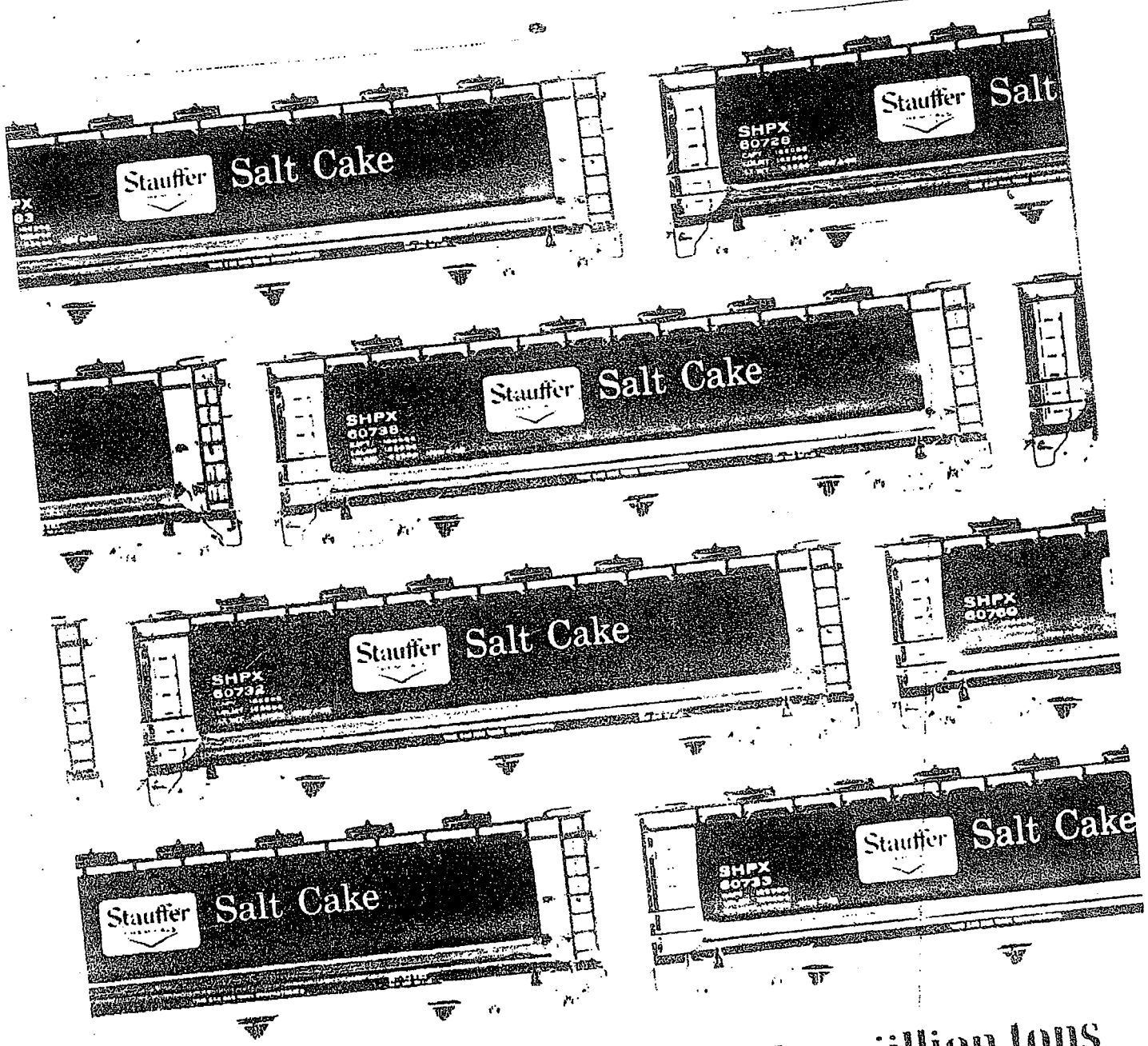
Eugene ... 343-7746
Portland ... 226-2451
PENNSYLVANIA
Altoona ... 944-9438
Carnegie ... 923-1100
Fullerton ... 264-2874
Hazelton ... 454-0868
Hummelstown ... 566-2523
Newcastle ... OL 4-6609
Norristown ... 275-7931
Philadelphia ... 765-0100
Pittsburgh (See Carnegie)
Scranton ... 342-7842
Wilkes-Barre ... 823-3161
Williamsport ... 326-4165
York ... 843-8993
RHODE ISLAND
Providence ... 351-1400
SOUTH CAROLINA
Charleston ... 722-5731
Columbia ... AL 2-3732
Greenville ... 239-9107
SOUTH DAKOTA
Sioux Falls ... 334-4003
TENNESSEE
Bristol ... 764-4158
Chattanooga ... 265-3611
Knoxville ... 525-9356
Memphis ... 272-7581
Memphis ... 948-5515
Memphis ... 948-3323
Nashville ... AL 5-8796
TEXAS
Amarillo ... DR 6-8277
Austin ... GR 6-6251
Beaumont ... TE 5-3426
Corpus Christi ... TU 2-2571
Dallas ... 637-1033
Dallas ... FL 7-7331
El Paso ... 532-5619
Fort Worth ... ED 2-7601
Houston ... 869-5801
Houston ... MI 4-1601
Houston ... 686-4400
Lubbock ... PO 3-2831
San Antonio ... CA 6-7377
Texarkana ... 794-6581
Tyler ... LY 4-6601
UTAH
Salt Lake City ... 363-8849
Salt Lake City ... 328-1112
VIRGINIA
Lynchburg ... VI 5-1266
Norfolk ... 545-2441
Richmond ... 643-1876
Roanoke ... 345-7751
WASHINGTON
Seattle ... 722-7754
Seattle ... 725-6350
Spokane ... 327-5588
Tacoma (See Seattle)
Yakima ... 248-3954
WEST VIRGINIA
Beckley ... 253-3378
Bluefield ... 327-5181
Charleston ... 342-8183
Wheeling ... 232-1526
WISCONSIN
Appleton ... RE 9-5312
Green Bay ... 435-3761
Madison ... 244-0224
Milwaukee ... 271-6200
Milwaukee ... 645-8900
Schofield ... 359-5455



In endless supply...give or take a jillion tons

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No by-product here. Our salt cake is its own product, made from a natural domestic source that is practically inexhaustible.

Pure (99.5% Na_2SO_4) Stauffer salt cake is a free-flowing, non-caking product. Because it's loaded dry and delivered dry . . . dry as the desert from which it comes. Contains no free acid. For more information, call your Stauffer representative. Or write to Stauffer Chemical Company, Industrial Chemical Division, 380 Madison Avenue, New York, New York 10017.

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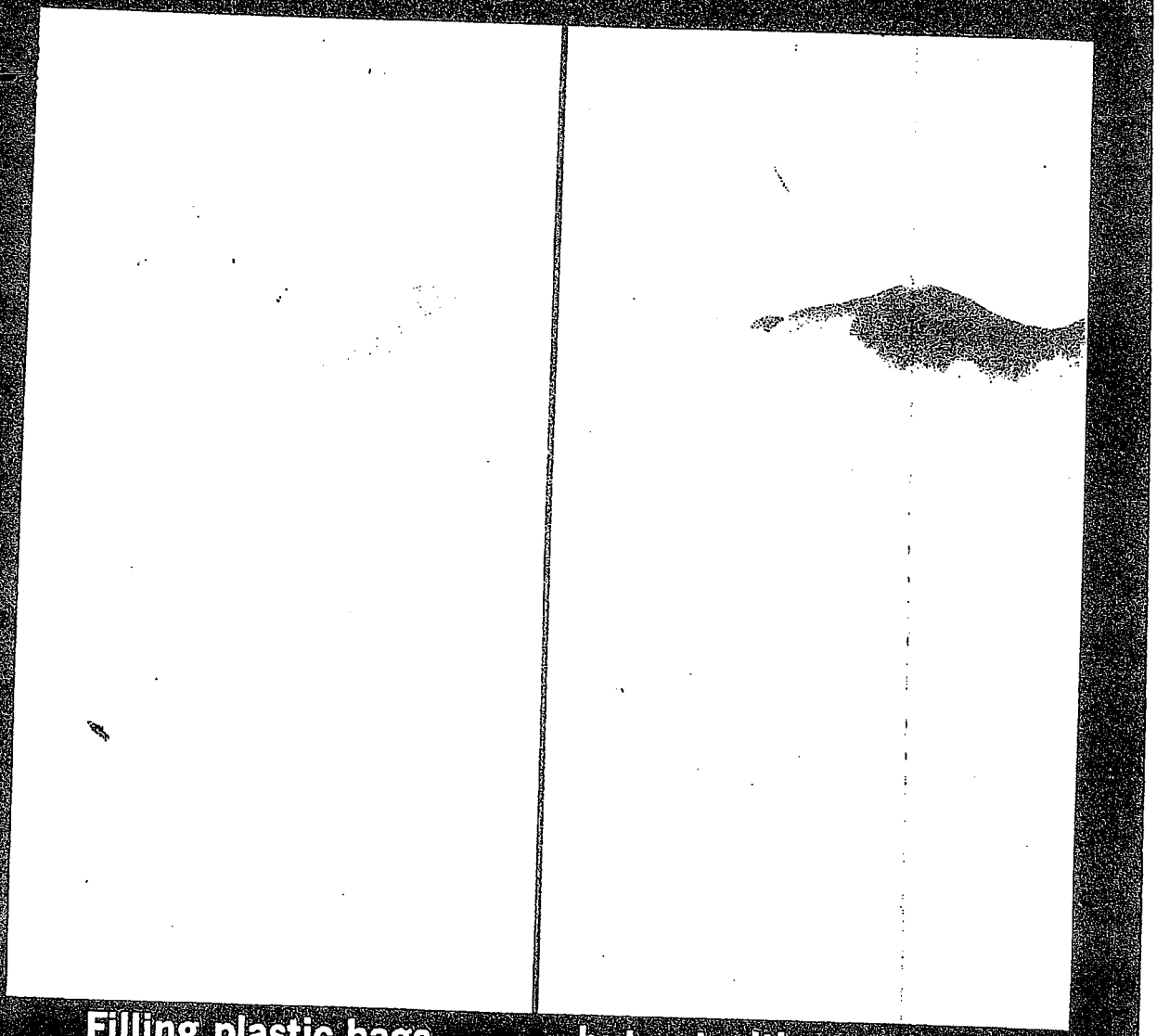

Filling plastic bags can be a problem...

New Owens-Illinois polyethylene shipping sacks have an exclusive Flare Top. An open mouth that stays open until you fill the bag and seal it shut. This top makes our bags easy to pick up and fill. No handling accessories needed. And O-I plastic bags are moisture-proof. A raincoat for products left outdoors. They resist chemicals, seal out dirt and moisture—give a product longer storage life.

but not with new O-I FLARE TOP!

Before use, they take up 1/6 the storage space that would be required for paper bags. And they fill fast—up to 27 50-lb. bags per minute. How's that? You'd buy our plastic bags but you don't have a sealer? Let us explain our trial installation program. Just call or write Owens-Illinois, Bag Sales, Toledo, Ohio and ask our representative to contact you.

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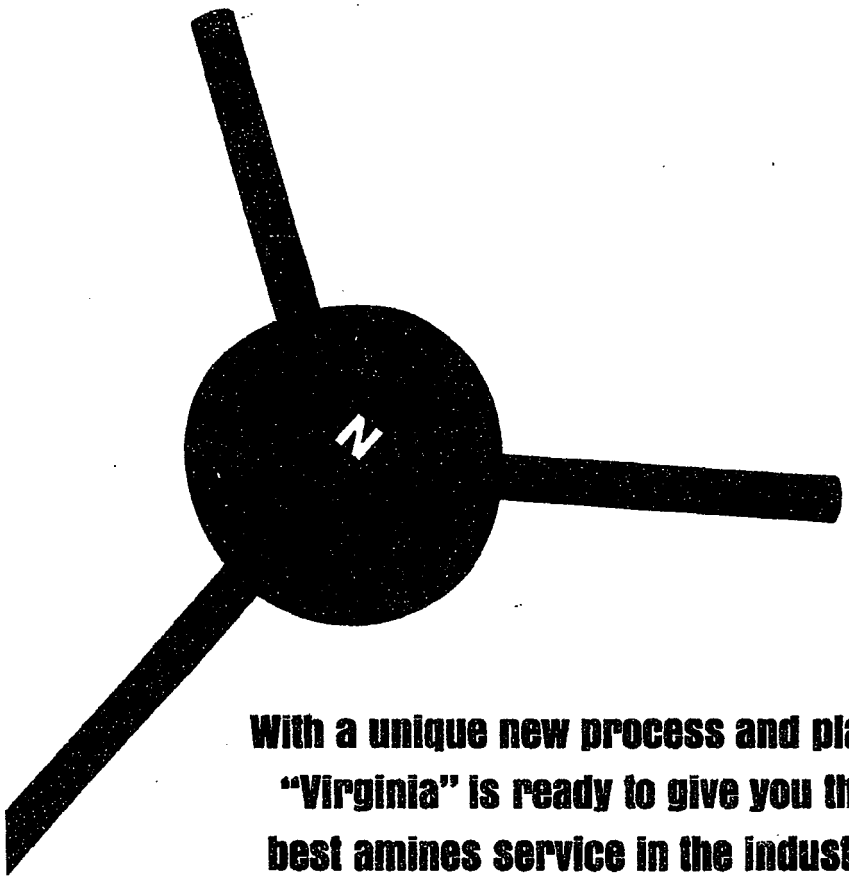
BAG SALES • TOLEDO 1, OHIO



With a unique new process and plant, "Virginia" is ready to give you the best amines service in the industry

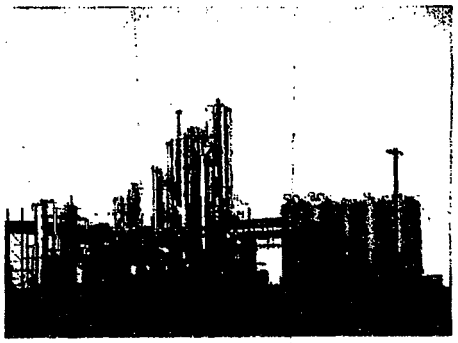
A new, improved production process and plant—unusually flexible, fully automated—now make it possible for "Virginia" to meet your heaviest demand for specific higher amines. In the alkyl group—ethylamine, diethylamine, triethylamine, isopropylamine, diisopropylamine, n-butylamine, di-n-butylamine, tri-n-butylamine. In the cyclic group—cyclohexylamine. Availability—tank cars, tank trucks, 55- and 5-gal. drums.

To this, add the things you normally expect from "Virginia." Highest purity product. Fast delivery. First-class technical service—in the field or, when needed, in the laboratory. With amines, this also includes a semi-commercial facility for smaller quantities of standard or special products. Write for booklet on this new "Virginia" capability. Or write or phone for immediate amines delivery.

VIRGINIA Chemicals®

Virginia Chemicals Inc.

Industrial Chemical Department, No. 499, West Norfolk, Chesapeake, Va. 23703, Tel. 703 397-3441



New "Virginia" amines plant—perhaps the most advanced in the industry—provides for 24-hr., fully automated, multimillion lb. per year operation. Flexibility of new production process meets heaviest demand for specific amines.

Paul Shannon's CDB®s have everything soapers need.

Bev Rose, and Paul Shannon, dry bleach chemicals sales mgr., FMC INORGANIC CHEMICALS DIVISION.

Stability, easy handling, solubility. And dry available-chlorine to spare. FMC's chlorinated isocyanurics. Now being used successfully in a multitude of consumer and industrial cleaners, bleaches, dishwashing detergents and sanitizers. Made to suit your specific formulation, granulation, package, storage conditions and anticipated shelf life. FMC CORPORATION, INORGANIC CHEMICALS DIVISION, 633 Third Avenue, N.Y., N.Y. 10017

BUSINESS Newsletter

Another new U.S. aluminum producer. W. J. Reed & Associates, San Francisco engineering consulting firm, disclosed plans late last week on behalf of a newly incorporated Georgia company, United Aluminum Corp. The new firm will build a $38-million plant "somewhere in the Southeast."

United Aluminum, which will be based in San Francisco, reportedly has been organized by a group of San Francisco and Southern industrialists and is now in the final stages of financing. Names of the principals and precise site of the proposed installation will not be made public for perhaps four or five weeks, *CW* learns. Construction of the plant is expected to get under way next spring, be completed in early '69. Plans call for expansion of capacity to 132,000 tons/year in 10 years.

Word of the United Aluminum project comes just a few weeks after disclosure that another new producer, Northwest Aluminum, was ready to launch a $100-million project in the Puget Sound area of the Northwest (*CW Business Newsletter, Aug. 6*).

•

Union Carbide is pushing its big expansion program. It will build a 300-million-lbs./year synthetic phenol plant (location not disclosed) that will have double the capacity of another UCC phenol unit slated to go into production at Bound Brook, N.J., early next year. The new unit will be completed in '69. UCC Chairman Birny Mason, Jr., says the new installation, based on the cumene process, is expected to be the "largest and most economical phenol plant in the world." While most of the output of both units will be used captively, sizable amounts of phenol and by-product acetone, says Mason, "will be available to meet growing demands of the merchant market."

Carbide also unveiled plans for polyethylene film production at its Wayne, N.J., plant, which has been turning out polypropylene film for packaging. The new polyethylene unit will adjoin the present plant building, will be an extension of the company's polyethylene film production coming out of Cartersville, Ga., and Ottawa, Ill. Construction of the plant will begin next month, be completed late in '67.

•

Humble Oil has the green light on construction plans for its proposed $100-million refinery at Benicia, Calif. The company's application to build needed water-terminal facilities was approved by the San Francisco Bay Conservation & Development Commission. Construction of the project, which was originally planned to be built at Moss Landing, Calif., near Monterey (*CW Business Newsletter, May 28*), will begin immediately; completion is expected by '69. The general construction contract goes to C.F. Braun (Alhambra, Calif.), while the engineering design will be done by

Humble's research and engineering affiliate in Florham Park, N.J.

Although approvals by other California regulatory agencies await further engineering details, the company says it foresees no serious obstacles and is proceeding with site preparation and contract awarding. The huge refinery (about 70,000-bbls./day capacity) will turn out fuel products, chiefly gasoline, jet and diesel fuels.

•

Blaw-Knox gets the contract to engineer and build Pittsburgh Plate Glass' proposed 18,000-tons/year titanium dioxide pigment plant at the latter's chemical division's complex at Natrium, W.Va. Initial production from the plant is scheduled for early '68. Rutile, raw material for the pigment, will come from a new mining and refining operation under construction in Sierra Leone, Africa, by Sherbro Minerals, Ltd. PPG has an 80% interest in Sherbro.

•

Foremost Dairies is making another offer to buy McKesson & Robbins stock from shareholders, following a breakdown in merger talks that have been going on for months. Foremost's chairman and chief executive officer, Rudolph Drews, says his company will pay $53/share for up to 550,000 shares of McKesson stock. McKesson closed late last week on the New York Stock Exchange at $46.25.

Last February, Foremost bid $51/share in attempt to pick up 1 million shares of the big drug distributor, managed to reach only 75% of its goal in the face of bitter McKesson opposition, including a suit in federal court (*CW Business Newsletter, Feb. 5*). The suit was dropped and merger talks started. In addition to the 750,000 shares taken in the February offer, Foremost also holds about 1 million shares acquired from Glen Alden Corp., which tried unsuccessfully last year to wrest control of McKesson. With 40% of McKesson stock in hand, Foremost hopes the new offer will give it majority interest. The Federal Trade Commission, though, has questioned the company's holdings on antitrust grounds, and there is some feeling that FTC may be contemplating divestiture proceedings against Foremost.

•

G. D. Searle & Co. is acquiring Fermco Laboratories from Harshaw Chemical (Cleveland). Acquisition of the Chicago-based Fermco's assets, patents and name (for an undisclosed amount) becomes effective Oct. 1. Fermco is a basic producer of enzymes by fermentation, biochemicals and diagnostic reagents; its activities will be consolidated into Searle facilities in Skokie, Ill.

•

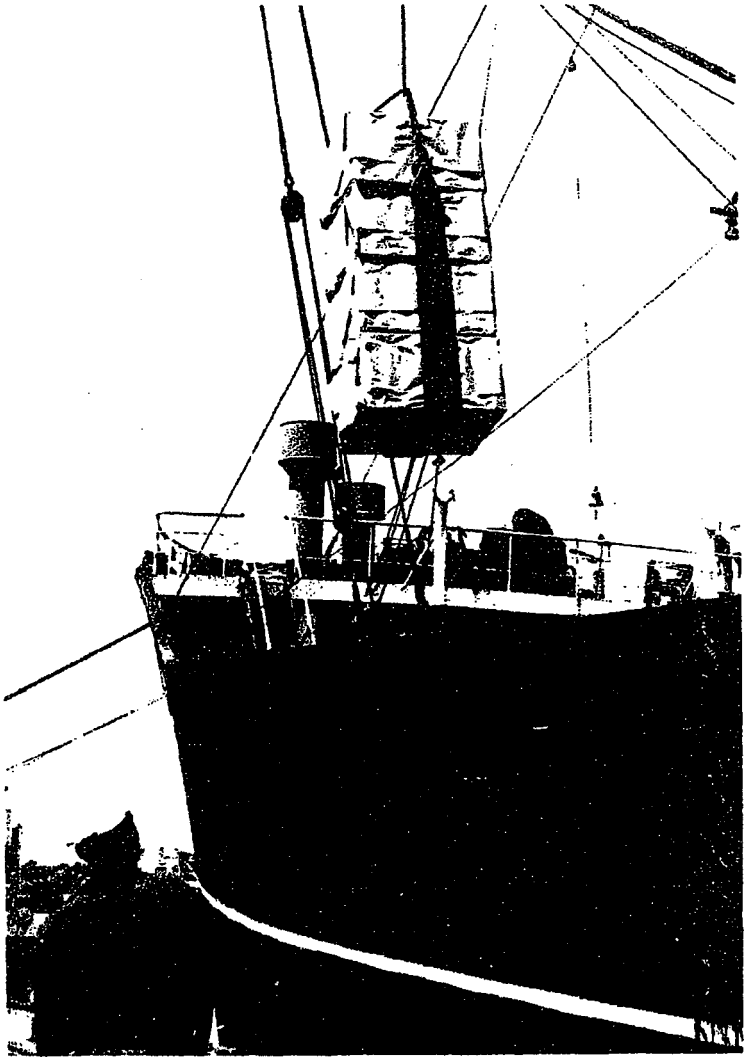
The Justice Dept. will crack down on U.S. companies trying to boost profits by "absorbing" tariff cuts resulting from the "Kennedy Round" of GATT talks in Geneva. Several firms, unidentified by Justice, that have been working out deals to this end with foreign producers have been warned of the antitrust implications.

CHEMICAL WEEK

SEPTEMBER 10, 1966

The Global Spending Spree

Rapid rise in '66 imports could alter U.S. economy



Sky-high demand for foreign products—including foreign cars and foreign chemicals (*photo, left*)—has the U. S. this year heading toward its smallest trade surplus — the excess of exports over imports — since '59. This dwindling balance of trade is likely to influence the Administration's economic policy for the coming year — and perhaps its trade policy as well.

Total U. S. exports in January through July were up about 15% from shipments in the corresponding seven months in '65; but imports were up more than 20%. In chemical products this trend was even sharper: seven-month exports up 15%, to nearly $1.6 billion; but imports up 32%, to $558 million. These figures, however, add up to a chemical trade surplus of $1 billion — slightly higher than for last year's first seven months, and about one-third of the nation's total trade surplus for '66 to date.

While the U.S. had a $7-billion trade surplus in '64 and a $5.2-billion excess last year, the present outlook for '66 is a surplus of only about $4 billion. This would be less than 1% of the $739-billion gross national product now predicted for this year.

Demand Called Excessive: But the declining trade surplus could have a significant impact on the Johnson Administration's economic decision-making. The surge in imports tends to confirm what a good many critics of the Administration have been saying all year — namely, that demand in the domestic economy is much too high.

It now seems clear that demand in

Why U.S. trade surplus is shrinking

First-half '66 exports are up		But imports are rising faster	
Soybeans	+31%	Autos	+89%
Motor vehicles	+17%	Gems	+34%
Chemicals	+15%	Chemicals	+32%
Wood pulp	+10%	Whiskey	+28%
Rubber goods	+ 9%	Nonferrous metals	+24%
Nonferrous metals	+ 8%	Textiles	+16%
Textiles	+ 7%	Newsprint	+16%
Ores	+ 3%	Sugar	+ 7%

the U.S. has outrun the ability of some domestic industries to meet it. Examples in the field of chemicals: phthalic anhydride, sulfur, formaldehyde, phosphoric acid. Civilian demand is at a record high; and, of course, defense requirements have been rising as the U.S. escalates its military effort in Vietnam. One reason exports haven't grown at a faster rate during the past year or so is that domestic demand has absorbed nearly all U.S. output, leaving relatively little merchandise for overseas shipments.

The Federal Reserve Board already has moved to curb demand by making money tight and costly. But still there is intense pressure on the Administration to slow things down by fiscal policy measures. The worsening U.S. trade position can only add to that pressure.

Dollar Deficit Widens: A particularly galling aspect of the trade situation —from the Administration's viewpoint —is the harm it is doing to the U.S. balance-of-payments position. There already is concern among the nation's money managers that the direct costs of the war in Vietnam will push the U.S. payments deficit from last year's $1.3 billion to as high as $2 billion in '66. With the trade surplus shrinking, this could be even worse.

The war, of course, has forced U.S. industry to go overseas for some of the materials needed to meet defense needs. And the extreme tightness in the money market has left commercial banks with comparatively little funds for overseas borrowers — including those who want the money to pay for goods from the U.S. At midyear, commercial bank loans to foreigners totaled nearly $100 million less than at the end of '65. U.S. bankers confirm that foreign customers are not getting all the money they want.

Expediting Exports: The Administration has already started to carry out two plans to help reverse the trade-surplus trend. One is the proposed new set of regulations covering the tax treatment of goods shipped by a U.S. company to its foreign subsidiaries (*CW, Aug. 13, p. 31*). The Treasury Dept. figures the haphazard way in which such transactions have been taxed up to now may have discouraged such exports. Because parent-to-subsidiary shipments account for 25% of U.S. exports, any improvement in this area could be important.

Even more promising is a scheme by the Export-Import Bank to provide more funds for overseas lending by commercial banks (*CW Washington Newsletter, Aug. 27*). Under this program, a bank could borrow from Ex-Im for up to one year an amount equal to 50% of its holdings of eligible export credit documents.

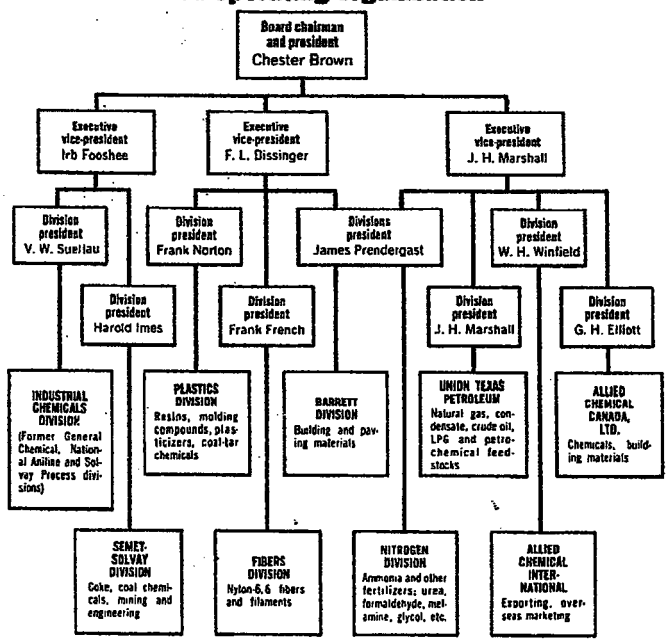
Still, there is little likelihood of any sizable widening of the trade balance this year. That won't come, government specialists concede, until either the super-boom at home or the war in Vietnam comes to an end.

Chemical trade: potent force in U.S. balance of payments

SITC No.	Commodity groups	IMPORTS First-half 1966	IMPORTS Change from '65	EXPORTS First-half 1966	EXPORTS Change from '65	BALANCE OF TRADE First-half '65	BALANCE OF TRADE First-half '66
512	Organic chemicals	$105.8	+ 40.9%	$343.4	+ 5.0%	+$251.9	+$237.6
513	Elements, oxides, halides	73.8	+ 38.5	79.0	+ 3.3	+ 23.1	+ 5.2
514	Other inorganics	25.5	+ 31.0	55.9	+14.4	+ 29.4	+ 30.5
515	Radioactive materials	28.3	— 16.4	25.4	+31.6	— 22.9	— 2.9
521	Crude chemicals from coal, oil, natural gas	5.3	+ 35.7	14.0	— 4.1	+ 10.6	+ 8.6
531	Synthetic organic dyestuffs, indigo, lakes	19.1	+ 51.0	17.5	+13.8	+ 2.8	— 1.6
532	Dyeing and tanning extracts	6.6	+ 25.9	1.5	+34.4	— 4.1	— 5.1
533	Pigments, paints, varnishes	2.5	+ 20.7	33.0	+15.4	+ 26.5	+ 30.5
541	Pharmaceutical products	38.4	+ 68.4	132.1	+11.0	+ 96.2	+ 93.7
551	Essential oils, flavors	22.9	— 22.2	20.3	+13.2	— 11.6	— 2.7
553	Cosmetics and toiletries	5.3	+ 9.4	12.9	+20.7	+ 5.8	+ 7.5
554	Soaps, detergents, polishing preparations	2.7	+ 31.7	33.6	+22.4	+ 25.4	+ 30.9
561	Processed fertilizers	75.1	+ 19.9	93.8	+41.0	+ 4.0	+ 18.7
571	Explosives, pyrotechnics	9.9	+123.2	11.2	+16.3	+ 5.2	+ 1.3
581	Plastics and resins	29.2	+ 64.9	240.6	+19.4	+ 183.7	+ 211.4
599	Other chemical products (pesticides, starches, adhesives, waxes, etc.)	31.9	+ 22.2	201.2	+26.2	+ 133.4	+ 169.3
5	**CHEMICALS**	482.2	+ 30.8	1,315.3	+15.0	+ 774.8	+ 833.1
231.2	Synthetic rubber	11.2	+ 19.4	87.9	+ 9.5	+ 70.9	+ 76.7
266	Synthetic and cellulosic fibers	37.1	+ 75.7	25.0	— 1.2	+ 4.2	— 12.1
271	Crude fertilizers	2.3	+ 48.5	40.6	+27.6	+ 30.3	+ 38.3
274.1,3	Sulfur	13.9	+ 2.7	40.7	+42.9	+ 14.9	+ 26.8

Product groups with improved balance of trade are in color (Dollar figures in millions. Source: U.S. Dept of Commerce)

Allied's operating organization



Three-in-One Division

Last week Allied Chemical Corp. set up an Industrial Chemicals Division by consolidating three former divisions that for many years had been better known among buyers of industrial chemicals than Allied itself.

Merged into the big new division, whose '66 sales will probably exceed $500 million: General Chemical, Solvay Process and National Aniline divisions. They were descended from three of the five companies that merged in 1920 to form Allied Chemical & Dye Corp., as it was known until '58.

The new division will be headed by 63-year-old Vincent Suellau, who has been with Allied since the company was formed and who had been president of the General Chemical Division for the past three years. Its headquarters will be at Allied's corporate research and development facility in Morris Township, N.J.; and initially it will employ about 14,000.

Allied's Biggest: Industrial Chemicals, Allied's largest division, will be one of the two operating divisions under Executive Vice-President Irb Fooshee (*chart, above*).

Fooshee promised customers that the new division "will offer all of the research, production and commercial functions previously provided by the three separate divisions." It will take over major plants at Syracuse and Buffalo, N.Y.; Elizabeth, N.J.; East St. Louis, Ill.; Moundsville, W. Va.; Baton Rouge, La.; El Segundo and Nichols, Calif.; and the new chlorine-caustic facility at Acme, N.C.

In another organizational move last week, James Prendergast was named president of Allied's Nitrogen Division, largest U.S. producer of anhydrous ammonia and derivatives. Prendergast — who was born in Victoria, B.C., in '20, and served in the Royal Canadian Air Force during World War II—will continue as president of the Barrett Division, a post he has held the past three years. As Nitrogen Division president, he succeeds George Meredith, who will retire at the end of December after nearly 40 years as an Allied executive.

An End to 7% Credit?

Congress may write a swift end to the 7% tax credit for new business investments, a law that has notably reduced U.S. business taxes—possibly $2 billion on '66 federal income tax returns. About half of that amount will go to manufacturing industries, among which the chemical industry and the primary metals producers — at about $140 million and $115 million, respectively — are expected to get the largest shares.

Such an abrupt tax law change this late in the Congressional session was deemed most unlikely only a few weeks ago; but now important Administration officials consider suspension of the investment credit "a live possibility." Gardner Ackley, chairman of the Council of Economic Advisors, is believed to be pushing the measure; and even Treasury Secretary Henry Fowler — up to now the Cabinet's strongest advocate of keeping the credit — is said to be reconsidering.

The President Ponders: President Johnson himself has been trying to size up the pros and cons. A White House call for tax credit repeal — as an anti-inflation move — would assure its quick passage. If Johnson takes a hands-off attitude, Congress may end the tax credit on its own.

Late last week Senator Russell Long (D., La.) — chairman of the Senate Finance Committee and majority whip — tacked onto the House-passed foreign investors tax bill a rider to repeal the tax credit. His amendment would deny the 7% tax deductions for all capital equipment ordered after Aug. 30 and for all items not delivered by next Jan. 1. The senator plans to speed the measure through his committee and onto the Senate floor, where it's likely to pass easily.

Discouraging Spending: The fate of the proposal in the House of Representatives is less certain; it is almost entirely in the hand of Ways & Means Committee Chairman Wilbur Mills (D., Ark.), who so far has not aired his views on the matter.

But even if the repeal rider is rejected by the House, Long seems to feel that the action he will generate in the Senate will be enough to cool business spending decisions.

One political angle: congressmen up for re-election could point to repeal as a blow at price rises.

Conoco's McCollum: Carrying out his big oil-gas-coal-chemical merger.

Selling Subsidiaries

Next week Chairman L. F. McCollum of Continental Oil expects to carry out his long-delayed merger with Consolidation Coal Co. Shareholders last week voted almost unanimous approval of the transaction — Consol by 99.4%, Conoco by 99.2%.

Conoco will thereby add Pitt-Consol Chemical Co. (Newark, N.J.) to its expanding chemical operations. Pitt-Consol, major producer of cresol and cresylic acids, will be run as part of Conoco's new Consolidation Coal subsidiary.

But Consol's 50% stock holdings in two other chemical process ventures are to be sold off. Its stake in National Potash Co. and in Mountaineer Carbon Co. will be offered to the other parent companies — Freeport Sulphur Co. and Standard Oil Co. of Ohio, respectively. Asked about conjecture that Consol would offer those shares to its own stockholders, in the event that Freeport and Sohio were unwilling to buy, a Consol spokesman told *CW* they will "definitely not" be offered.

While Sohio would not comment on possible acquisition of Consol's half of Mountaineer, a Freeport spokesman acknowledges that his company would be the "logical candidate" for the potash stock. Trade sources, on the other hand, say both Freeport and Sohio are "negotiating" with Consol and will continue to do so. These sources predict that those transactions will be wrapped up soon.

Preparing Antitrust Appeal

General Dynamics calls divestiture order 'unjustified'; U.S. lauds reciprocity ruling

General Dynamics Corp. (New York) lawyers are studying last week's federal district court decision ordering the company to divest its Liquid Carbonic Division (Chicago). GD calls the decision unjustified, says it has "every intention of contesting it vigorously."

In a 98-page decision, the court ruled that GD's '57 acquisition of Liquid Carbonic violates Section 7 of the Clayton Antitrust Act (which deals with lessening of competition and creation of monopolies) and Section 1 of the Sherman Act (which deals with restraint of trade). GD was given 60 days by Judge John Cannella to submit a plan for divestiture.

The decision is based on a '62 suit filed by the Justice Dept., alleging that GD used its buying power and its authority to award defense subcontracts to coerce other companies to purchase carbon dioxide and other industrial gases from Liquid Carbonic. Justice contended that GD's special sales and trade relations programs were actually restrictive agreements with suppliers and contractors. The suit sought to make GD discontinue the programs and also forbid it from acquiring any other carbon dioxide producing companies (*CW, Nov. 17, '62, p. 45*).

One key point of the government's argument was rejected by Judge Cannella. This was the charge that GD's agreements with suppliers were illegal because the company had, either by "leverage" or "mutual patronage," persuaded the suppliers to buy from Liquid Carbonic. It was the first time a court had been asked to rule on a "reciprocity" question.

Lessening of Competition? In the opinion, Judge Cannella found that reciprocity, whether coercive in nature or based on mutual patronage, is an anticompetitive practice.

Question: Did the reciprocity made possible by the General Dynamics-Liquid Carbonic merger give rise to the probability that a substantial lessening of competition would occur?

The court found that at the time of merger both parties had the intent to use GD's purchasing power to secure sales for Liquid Carbonic.

'Not-So-Subtle Hints': The opinion made it clear that the supply contracts contained no express terms requiring reciprocal dealing. But Judge Cannella listed several instances in which GD officials dropped not-so-subtle hints to its carbon-dioxide-consuming suppliers. Among them: Raytheon, Transitron Electronics, Shell Oil, Standard Oil of California, Sylvania Electronic Products and Midland-Ross.

The judge said such "back scratching" was "inimical to a competitive economic society." However, he said, the government had proved that the agreements accounted for only $177,225 in purchases from Liquid Carbonic, and this wasn't enough to violate the Sherman act.

Justice Dept. officials were "well pleased" with the decision and only "slightly disturbed" by Cannella's refusal to outlaw the agreements themselves. In their view, the judge was putting "a heavy burden of proof" on the government, but they felt that future prosecution could be adjusted and reciprocal agreements would be held illegal. If this happens, it would seriously threaten the now-common practice of "you-buy-from-me, I'll-buy-from-you" mutual patronage.

History of Litigation: In '48 the Federal Trade Commission issued a cease-and-desist order against Liquid Carbonic, prohibiting it from price fixing, predatory pricing to eliminate competitors, and dividing territories with competitors. Also in '48 the Justice Dept. filed suit charging that Liquid Carbonic conspired to restrain trade in the carbon dioxide market.

At the time of its acquisition Liquid Carbonic held 35-40% of the carbon dioxide market. It was the largest domestic producer and distributor of gaseous, liquid and solid CO_2. Its '56 sales totaled $35 million—about $18 million from carbon dioxide. Since the acquisition General Dynamics has not made public the division's financial results.

The company acquired Liquid Carbonic through an exchange of stock, valued at about $58 million.

Riding Herd on Mergers?

Members of the 21-nation Organization for Economic Cooperation and Development's restrictive practices committee may be asked this fall to endorse a proposal that would create an international agency designed "to ride herd" on mergers, cartels, joint ventures and other combinations that might lessen world competition.

The proposal was made by Senator Philip Hart (D., Mich.), chairman of the Senate Antitrust Subcommittee, who feels that the number of links between U.S. and foreign firms may be excessive. He sees the trend as a menace, worries because no government agency is keeping track of the combinations, let alone protecting the public interest.

He has urged the State and Justice Depts. and Federal Trade Commission to support his plan at OECD's meeting. The officials of these agencies say they will consider the proposals, are otherwise noncommittal. Meanwhile, some members of Hart's staff think the OECD group may be too large to effectively deal with the issue, that a smaller unit—possibly including the six-nation European Economic Community (EEC), Britain, Canada and the U.S.—may be more suitable.

Rough Idea: Hart's agency would be the first step toward such protection. He doesn't have all the specific ironed out, but he does offer some rough ideas:

The agency would establish an office staffed by antitrust experts from several countries, who would act as a clearinghouse for information not now collected. It might have investigatory powers, but not powers to prosecute; it could, however, recommend actions to the respective governments involved.

Adding impetus to Hart's proposals was new evidence submitted by FTC showing that the 50 largest U.S. industrial concerns have acquired at least 177 foreign companies since '60. In Western Europe alone these companies since '58 have established 92 joint ventures and bought 78 foreign companies.

FTC Chairman Paul Rand Dixon says U.S. investment abroad in recent years has outstripped private investment here. He refers to these statistics to rebut long-standing company charges that harsh enforcement of U.S. antitrust laws cut off investment opportunities abroad.

"Rather than being hampered by our antitrust laws," Dixon adds, "U.S. firms have been expanding abroad at a faster rate than they have been expanding here. These expansions have reportedly been so great that several foreign governments are fostering mergers among their companies to offset the size of American operations within their country."

Challenging International Unions: Hart has pressed the Justice Dept. on why it hasn't challenged more international combinations. (Latest government suits in the international sphere were filed two years ago. One, still pending, challenges the joint venture of Monsanto and West Germany's Farbenfabriken Bayer, establishing Mobay, the largest U.S. producer of isocyanates.)

Justice Dept. spokesman Edwin Zimmerman refuses to concede that the government is being soft on international combines. He notes that Justice has closely studied several big deals—e.g., GE-Bull-Olivetti, RCA-Siemens, Chrysler-Simca-Rootes—but these didn't have the anticompetitive consequences that would add up to a violation of U.S. laws.

WIDE WORLD

Senator Hart: Seeks Administration support for global antitrust agency.

Fisher Scientific's Fisher: Ready to serve fast-growing research market.

Growing with R&D

Chemical and pharmaceutical research will be growing at a much faster rate than the gross national product during the next few years, Chairman Aiken Fisher of Fisher Scientific Co. (Pittsburgh) predicted in an appearance before the New York Society of Security Analysts.

Annual research and development expenditures by all U.S. industry will rise by more than 20% by '69, according to Fisher's projections, and medical research outlays will climb at about the same rate.

Number of trained young men and women available to carry on the chemical research work will probably increase still faster. Fisher presented a chart showing a 40% gain between '66 and '69 in number of four-year degrees to be awarded in chemistry by U. S. colleges and universities.

This would mean rapid growth in all the major markets served by Fisher's company, which produces and distributes laboratory equipment and reagent chemicals for industry, hospitals, schools, etc. Another major product line: process control instruments.

At present, industrial customers account for about 50% of the company's sales volume. Fisher expects this part of the business to grow, but predicts that the rate of growth will be greater in other areas — e.g., university laboratories, hospital diagnostic and research laboratories. He estimates his company's '66 sales at more than $63 million — up about 10% from '65.

Taking Giant Steps

Two chemical process companies took giant steps toward diversifying into the oceanography field last week, and two paper companies with combined sales of nearly $1 billion/year reached a tentative agreement to merge.

(1) Bendix Corp. (Detroit) expanded its oceanic activities by acquiring for an undisclosed amount of stock Marine Advisers (La Jolla, Calif.), producer of oceanographic instruments for petroleum and utility companies, state and federal agencies, and firms engaged in scientific programs.

(2) Fluor Corp. (Los Angeles) and B. L. McFarland and Associates (Fort Worth and Midland, Tex.), a group of five companies involved in offshore and onshore drilling operations, have agreed to merge, subject to stockholders' approval. The McFarland group operates five offshore drilling rigs in the Gulf of Mexico.

(3) A tentative agreement to merge has been reached by U.S. Plywood Corp. (New York) and Champion Papers, Inc. (Hamilton, O.). It is subject to both directors' and stockholders' approval. The corporate identities of both companies will be preserved.

Reducing Gas Rates

The Federal Power Commission has ordered El Paso Natural Gas Co. and Transwestern Pipeline Co. to reduce by $17 million/year the price of natural gas in the southern California market.

The rate cut stems from the July 26 decision in which FPC turned down the application of Gulf Pacific Pipeline Co. (a Tenneco subsidiary) to supply gas to the Los Angeles area (*CW, Aug. 6, p. 20*). Gulf Pacific last week filed for a rehearing.

El Paso and Transwestern were told they would have to lower their rates to reflect the lower costs resulting from the bigger deliveries possible in the expanded system. At the same time, FPC said it would conduct further proceedings to decide if customers should get additional benefits resulting from more liberal depreciation allowances.

FPC has given the companies 45 days to show cause why the reduction should not take place.

Sources of airborne asbestos

Asbestos-lined ducts used in centrally air-conditioned buildings.
Asbestos ducts and insulation in home central-heating plants.
Motor vehicle brake linings and clutch plates.
Auto undercoatings.
Asbestos ceiling and floor tiles.
Asbestos shingles and sidings.
Construction and demolition
Fitting, cutting, and removing asbestos-filled wallboards and floorings, piping and insulation.
Incineration of asbestos-filled scrap.
Improperly filtered effluent from asbestos processing plants.

Asbestos: Awaiting 'Trial'

The asbestos industry—whose end products are valued at more than $500 million/year—may be in for a shake-up. It could come in the form of federal legislation limiting the use of asbestos, because asbestos has been accused—though not yet "convicted"—as a significant health hazard. Probable contender for asbestos markets: plastics.

Recent studies have convinced U.S. Public Health Service specialists and other medical authorities that about 40% of all Americans have mild, chronic cases of asbestosis, even though most of them never worked directly with asbestos.

Unlike other airborne dust particles, asbestos fibers have the ability—almost as much as activated carbon—to absorb polycyclic hydrocarbons and arsenicals. Furthermore, says USPHS, in the past 30 years the asbestos-related cancer rate has increased sixfold.

The Inferences: While the average asbestos worker is well protected, the man on the street is not. The 3x1-micron asbestos fibers in his lungs can come from a variety of sources (*table, above*).

And medical experts say there's no way to assess hydrocarbon content in those lung deposits.

American Cancer Society researchers feel certain there is a synergistic relationship among airborne asbestos, smoking and lung cancer. They reason that the nondegradable, hydrocarbon-soaked fibers may well be a constant source of lung irritation.

PHS officials think it may take them up to five years to establish asbestos' true role as an air pollutant. However, Congress may act before the research is finished. Says Representative Robert Watkins (R., Pa.): "We've seen enough evidence already. Asbestos will never get a clean bill of health. With just a little more data we'll move for controls and strict ones."

Some form of asbestos control is in the offing, public health officials are certain, if only part of a larger clean-ambient-air program. However, there is the danger that Congress may enact rigorous controls on the quantity of asbestos that could be used.

In that case both Canada and U.S. asbestos producers manufacturers would be hard hit. Of the five forms of asbestos mined today, chrysotile asbestos holds the predominant market position because of its insulating and processing qualities. Canada produces more than 80% of the chrysotile asbestos used in the U.S. In both countries, a number of serious dislocations would occur.

At present, there is no known material that could fill all of asbestos' strategic roles. On the other hand, should federal controls merely call for higher standards for binders and shieldings, that would spark a rise of new products, with plastics taking the lead.

Reason, say industry spokesmen, present polymer technology could easily turn up products to replace asbestos in most end-uses.

WASHINGTON Newsletter

President Johnson's "Great Society" legislation is at stake in November's elections. As is normal in an off-year election, the Democrats, as the party in power, expect to suffer some losses in the House. The question is how many. They hold a two-to-one majority in the 89th Congress and can suffer some losses without losing effective control of the legislative machinery.

Democrats now hold 63 marginal House seats, some won by less than a 5% margin in '64. Republicans must win back 38 seats just to come up to the minority balance they held in the 88th Congress. And most analysts don't expect them to pick up more than 30 seats, despite unrest over Vietnam, inflation and civil rights troubles. This still would leave the President a good legislative margin.

The outlook for Republican gains in the Senate is even dimmer. Many house Democrats are vulnerable because they now will be running without the coattail advantage of Johnson's landslide victory two years ago. But the senators up for re-election won their seats in '60 when the late President John F. Kennedy and Richard M. Nixon split the vote.

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Private patents will be almost impossible to get under provisions of the new auto safety law and its $55-million research contract section. The House and Senate have agreed to language providing for public ownership of inventions if the government's contribution is "substantial." Senator Russell Long (D., La.) is trying to tack such a provision to [illegible] research and development legislation so long as there is no government-wide policy in this field.

•

The proposed Dept. of Transportation may be headed up a dead-end street in Congress. The House last week approved creation of the 12th Cabinet-level department—but only after considerable gutting. And its fate in the Senate is uncertain, tied to how long the bitter civil rights battle will run.

Even if created, the department would have no role in approving rates, mergers of competitive practices. These still would be left to the Interstate Commerce Commision, Civil Aeronautics Board and Federal Maritime Administration. The Maritime Administration is out of the proposed department completely. And the House eliminated a proposal that would have authorized the Secretary of Transportation to lay down standards for evaluating federal-aid programs.

There is little doubt that the department will come into being one of these years. While it will start with little actual authority, it can be expected to lead a fight in Congress for changes in regulatory laws to give it more power.

WASHINGTON Newsletter

Gas pipeline safety bill now seems fairly certain of winning Congressional approval next year. The Senate Commerce Committee has opened hearings on a bill that would give the Federal Power Commission authority to set safety standards for pipelines, a move that interstate pipelines have resisted for years. There is no chance of the bill winning Congressional approval this year. But observers predict that it will be passed in '67.

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Automotive air-pollution controls for large vehicles operating either on gasoline or diesel fuel are under consideration by federal officials. Controls so far are limited essentially to passenger cars and light commercial vehicles. They become effective as cars roll off the assembly line in the fall of '67. The Public Health Service now is seeking methods of setting standards for oxides of nitrogen, not now covered, and of extending carbon monoxide and exhaust hydrocarbon standards to trucks and buses—along with an initial round of controls on diesels. Under consideration are such possible solutions as catalytic mufflers and fuel additives. A proposal along these lines is expected early next year.

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Doctors must get written consent from patients before trying any experimental drugs on them under new rules issued by Food & Drug Commissioner James L. Goddard. A consent requirement has been in the law since '62, but Goodard feels that some loopholes needed closing. A recent survey by the Pharmaceutical Manufacturers Assn. disclosed that 5% of physicians never comply and 30% do not always comply. The new rules limit exceptions to emergencies, cases where the patient can't communicate or understand the situation, or instances where the information would affect the patient's condition.

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Project Mohole is being closed out. The National Science Foundation's $127-million project had two objectives: (1) to drill a hole through the earth's crust to try to learn more about the earth's origin. (2) to teach the oil industry more about deep ocean drilling. But the House decided that the nation could do without the project and refused to bow to Senate efforts to retain the programs. The Science Foundation now has begun closing out its contract with Brown and Root Inc. (Houston), the prime contractor. The project has been replete with controversy since its conception in the mid-'50s. Original cost estimates have risen from $15 million.

•

The 25% nickel set-aside for military production, ordered by the government in August, has been extended through September by the Business & Defense Services Administration. There still is some disruption of the nickel market from the recent Canadian wildcat strike. If the disruption doesn't clear up by the end of September, BDSA undoubtedly will extend the set-aside again. *(Also see Market Newsletter, p. 79.)*

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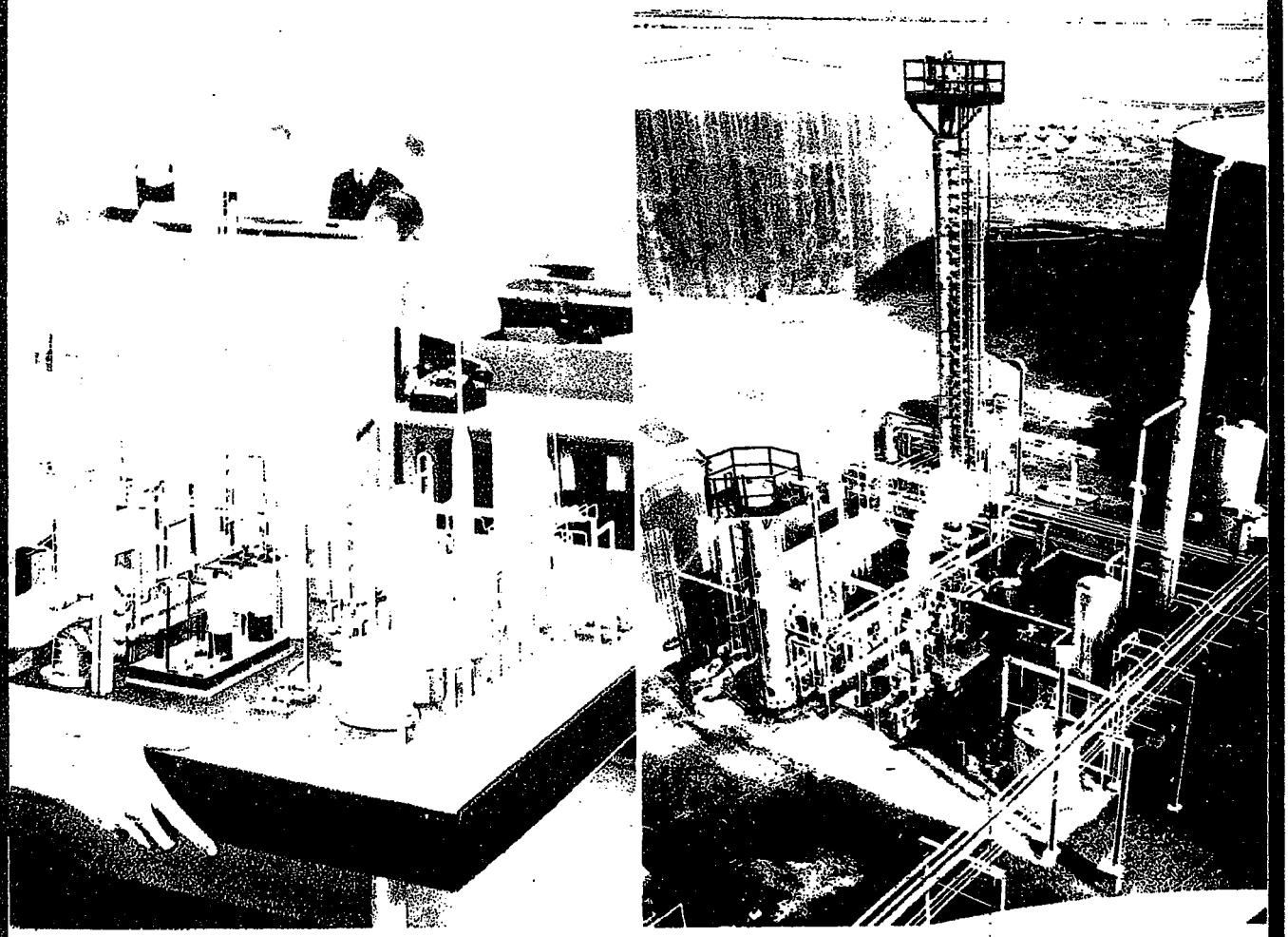
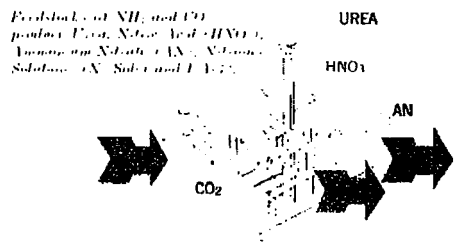


From plant model to model plant



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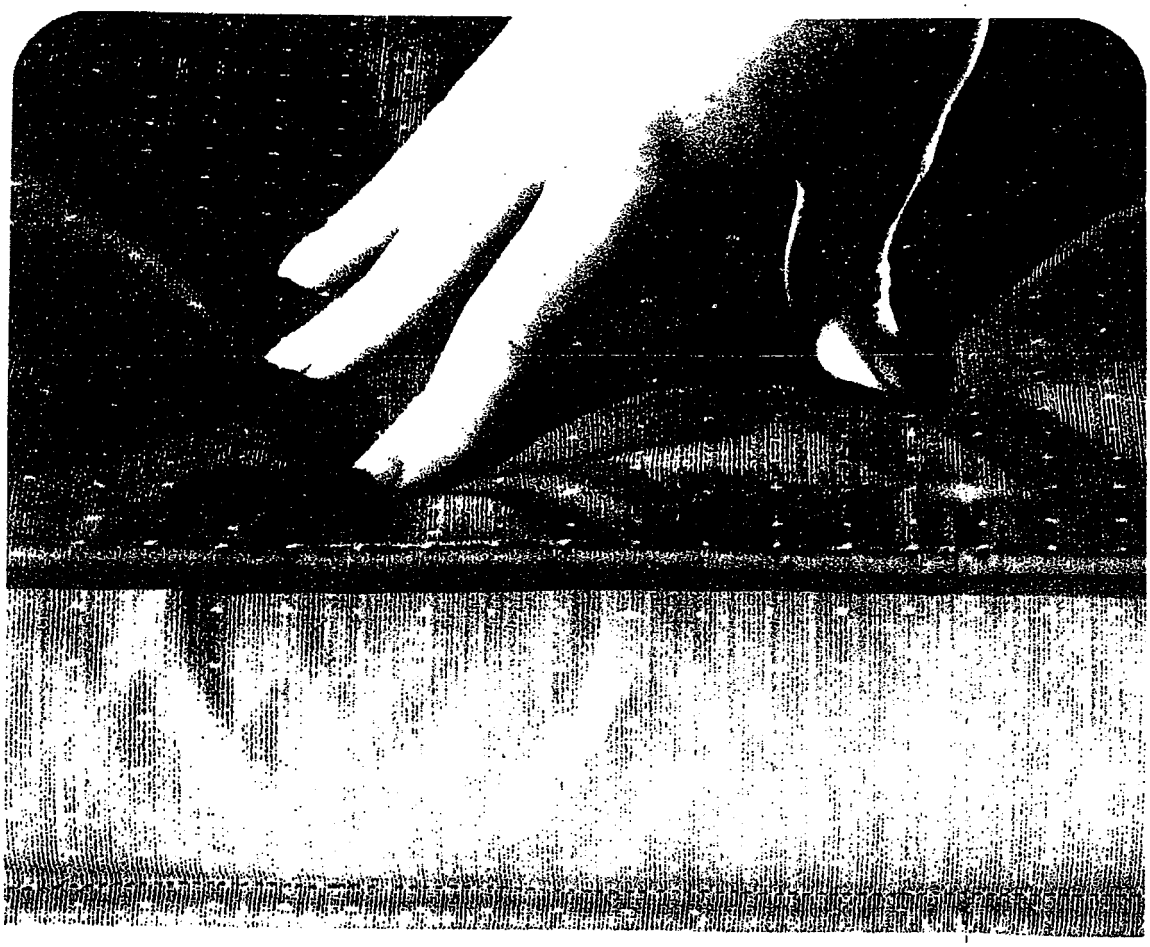

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(stays young itself because of Admex® plasticizers)

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Aerofab ventilated vinyl is designed to spend much of its life outdoors, rain or shine. It must have light stability, flexibility in cold weather, and easy washability. These are only a handful of the virtues an Admex plasticizer can build into a vinyl product.

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VP-5

NATIONAL ROUNDUP

Grow Chemical acquires U.S. Paint; Petrolite enters Humble's complex

Grow Chemical Corp. (New York) has bought **U.S. Paint & Lacquer** (St. Louis) for 84,000 shares of Grow common and about $600,000 worth of preferred stock. The purchase of the protective coatings maker is the second of three planned acquisitions. **Cello Chemical** (Baltimore) was acquired in July and negotiations are under way to buy **Farboil Co.** (Baltimore). (Recent price of Grow shares: $12.50.)

Petrolite Corp. (New York) has purchased an 85-acre site in **Humble Oil & Refining Co.'s** Bayport, Tex., industrial development. Petrolite is the sixth landowner on the 7,250-acre property on Galveston Bay, 25 miles southeast of Houston. Other site owners are Lockheed, Retzloff Chemical Corp., Shaffer Tool Works, Haldor Topsoe, and American Cryogenics.

Dow adds to Ohio site; Stromberg-Carlson to market microfilm

Dow Chemical Co. (New York) has acquired an additional 279 acres in Belmont County, Ohio, which brings its holdings in the area to more than 500 acres. Other land holdings—which lie over what experts believe to be major salt deposits—were acquired in two previous purchases.

Stromberg-Carlson (Rochester, N.Y.)—a **General Dynamics** subsidiary—will market microfilm produced by **Kelvar Corp.** (New Orleans, La.). Stromberg-Carlson **Data Products Division** (San Diego) will manage the distribution of Kelvar's microfilm aperture cards and duplicating equipment.

Abbott acquires Faultless Rubber; Fulton and Producers Cotton Oil merge

The boards of **Abbott Laboratories** (North Chicago) and **Faultless Rubber Co.** (Ashland, O.) have ratified an agreement providing for the acquisition of all Faultless assets for 110,554 Abbott common shares.

And Abbott has reached an agreement in principle with **Air Control** (Norristown, Pa.), a subsidiary of **National Aeronautical Corp.** (Fort Washington, Pa.) for the exclusive distribution of Air Control's laminar airflow filtration hoods.

The merger of **Fulton Industries** (Atlanta, Ga.) and **Producers Cotton Oil Co.** (Fresno, Calif.) has been approved by the directors of both companies (*CW, Aug. 20, p. 32*). Terms of the agreement, subject to stockholders' approval: exchange of three-quarters share of Fulton common and 0.14 shares of new Fulton preferred for each share of Producers common stock. In all, Fulton will exchange 834,447 shares of common and 155,763 shares of new preferred for 1,112,596 shares of Producers common stock. (Recent price of Fulton common: $12.75.)

Purex increases quarterly dividend; Pioneer omits dividend

Purex Corp. (Lakewood, Calif.) has increased its quarterly dividend from 16¢ to 17¢/share, and has declared a 2% common stock dividend.

Pioneer Plastics Corp. (Auburn, Me.) is omitting its regular quarterly 5¢/share dividend to conserve capital for completion of Pioneer's recent move to a larger plant in Auburn, Me., and to install new equipment.

Glidden plans $4-million R&D center; Shell dedicates $75-million light oil complex

The Glidden Co. (Cleveland) will construct a $4-million research center in Strongsville, O., which will house all the research and development activities of its **Coatings and Resins** and **Durkee Foods** groups. The company has an option on a 30-acre site, subject to rezoning of the property. If rezoning is approved, Glidden says it will begin construction by June '67, with completion scheduled for Aug. '68.

The Coatings and Resins and Durkee Foods groups account for about 80% of the company's annual sales. Sales for fiscal '66 (which ends Aug. 31) are expected to total about $345 million. The company's R&D and technical service expenditures for fiscal '66: about $8 million.

Shell Oil Co. (New York) has dedicated its $75-million light oil processing complex at Martinez, Calif. The addition increases the capacity of the Martinez refinery by 55%, brings its capacity to 85,000 bbls./day.

Atlantic Richfield builds coke facility; Fluor Corp. awarded refinery contract

Atlantic Richfield (Philadelphia) is building a $1.2-million petroleum coke storage and handling facility at Long Beach, Calif., for overseas shipments. The unit —to be completed about April '67—is designed to accumulate coke in quantities sufficient to load 10,000-15,000-ton cargoes for Japan and Europe. Product will come from a new, 1,200-tons/day coking unit nearing completion at the company's Watson refinery.

Powerine Oil Co. has awarded a $10-million modernization and expansion contract at its Santa Fe Springs, Calif., refinery to **Fluor Corp.** (Los Angeles). Construction will begin later this year and is scheduled for completion in the summer of '67.

NATIONAL ROUNDUP

Sun lets contract for gasoline plant; Texaco markets automobile filters

Sun Oil Co. (Dallas) has contracted with **Austin Rankin Corp.** to design and construct $1.5-million addition to its natural gasoline processing plant in Premont, Tex. Construction will begin in September.

Texaco (New York) is marketing its own brand of automotive filters at 40,000 Texaco retail outlets. The new filter line complies with requirements for nearly all American-made automobiles.

Monsanto triples sequestrant capacity; Carbide expands methyl isobutyl ketone

Monsanto Co. (St. Louis) will begin work immediately at its Everett, Mass., plant, to triple manufacturing capacity of Dequest, a phosphorus-based deflocculating and sequestering agent. The expansion, the second since the product's introduction in '64, will be completed by early fall.

Dequest is used for sequestering a wide range of metal ions—e.g., calcium, magnesium, copper, iron and aluminum. The product is also used in bottle washing, metal cleaning, rubber compounding, textile and food processing and for clay deflocculating.

Union Carbide will increase methyl isobutyl ketone capacity by more than 20 million lbs./year. The expansion will be completed in first-quarter '67. Cost and plant sites were not disclosed. Carbide says the increase is required to provide for the expanding needs of customers in the protective coatings, rubber, pharmaceutical and plastics industries.

Three companies offer debentures for financing expansion programs

Three chemical process companies have filed preliminary registration statements with the Securities & Exchange Commission for convertible subordinated debentures, proceeds of which will be used for capital expenditures programs.

(1) **Standard Oil Co. (Indiana)** has filed for $175 million in debentures due Sept. 15, '91, with about $150 million earmarked for expansions. The company's estimated '66 expenditures: $460 million. Breakdown: production, 53%; manufacturing, 23%; marketing, 20%; transportation and other, 4%. Standard will complete construction this year of a 400-million-lbs./year dimethyl terephthalate and purified terephthalic acid plant at Decatur, Ala., and a 225-million-lbs./year *para*-xylene plant at Texas City, Tex. Also under construction at Texas City: a 1,500-tons/day anhydrous ammonia unit, scheduled for completion in '68.

(2) **Aluminum Co. of America** filed for a $125-million offering of convertible subordinated debentures due in '91. Through '68 Alcoa will spend $780 million expanding and modernizing its facilities. Expansions now under way at Evansville, Ind., Badin, N.C., and Wenatchee, Wash., will increase the company's domestic primary aluminum production capacity to over 1.1 million tons/year.

Other expansions: an integrated aluminum complex and related power facilities at Surinam, South America; facilities to fabricate sheet, plate and foil (including a new foil mill at Lebanon, Pa.); and a caustic chlorine plant at Point Comfort, Tex.

(3) **Mitron Research & Development Corp.** (Waltham, Mass.) filed for a $1-million offering of 6% convertible subordinated debentures due in '76. About one-fourth of the proceeds will be used to further develop Mitron's titanium casting and molding processes and the company's ceramic fiber-cast metal composites process.

About $100,000 will be used to discharge bank loans of **Rode, Inc.,** a wholly owned subsidiary and $50,000 as a loan to Rode for working capital. The balance will be used for general corporate purposes.

Allis-Chalmers supplies equipment to Airco; Hercules increasing methanol capacity

Allis-Chalmers has signed a $1.7-million contract to supply equipment to **Air Reduction Co.'s** (New York) $24-million complex in Hancock County, West Virginia. The complex—an air-separation plant and a welding wire plant—will utilize two Allis-Chalmers 17,000-hp. main air compression systems and a 10,000-hp. nitrogen cycle compressor.

Hercules (Wilmington, Del.) will increase methanol capacity at its Hercules, Calif., plant by about 15 million gal./year. The expansion, to be completed in late '66, is being made by conversion of ammonia production facilities. Work will begin immediately.

Consumer's Co-op changes name; Gardner, Almo build helium unit

Consumer's Cooperative Assn. (Kansas City) is changing its name to **Farmland Industries** effective Sept. 1. The new name is intended to be more descriptive of the company's activities and services, suggesting agricultural ownership and industrial character.

Gardner Cryogenics Corp. (Hightstown, N.J.) and **Almo Chemical Co.**—wholly owned subsidiary of **Phillips Petroleum Co.**—plan to construct a jointly owned helium extraction and liquefaction plant near Elkhart, Kan. Scheduled for completion in fall of '66, the plant will process 385,000 cu.ft./day of high-purity (99.95%) helium gas.

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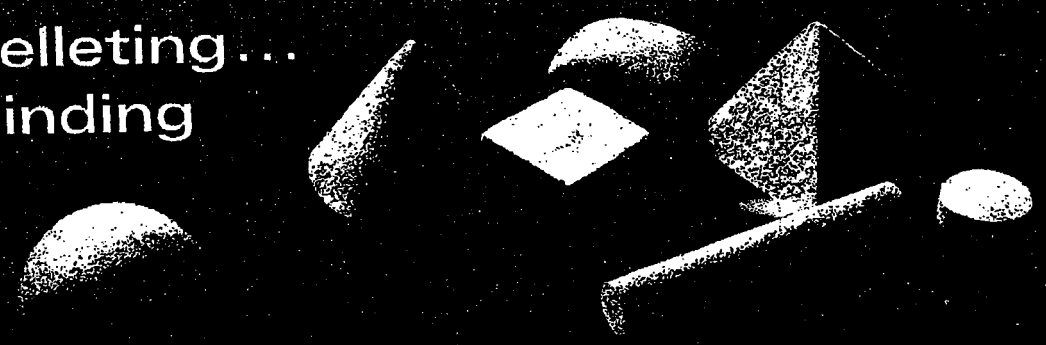

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VOL 99

FEASIBILITY STUDY— NITROGENOUS FERTILIZERS

STEP I

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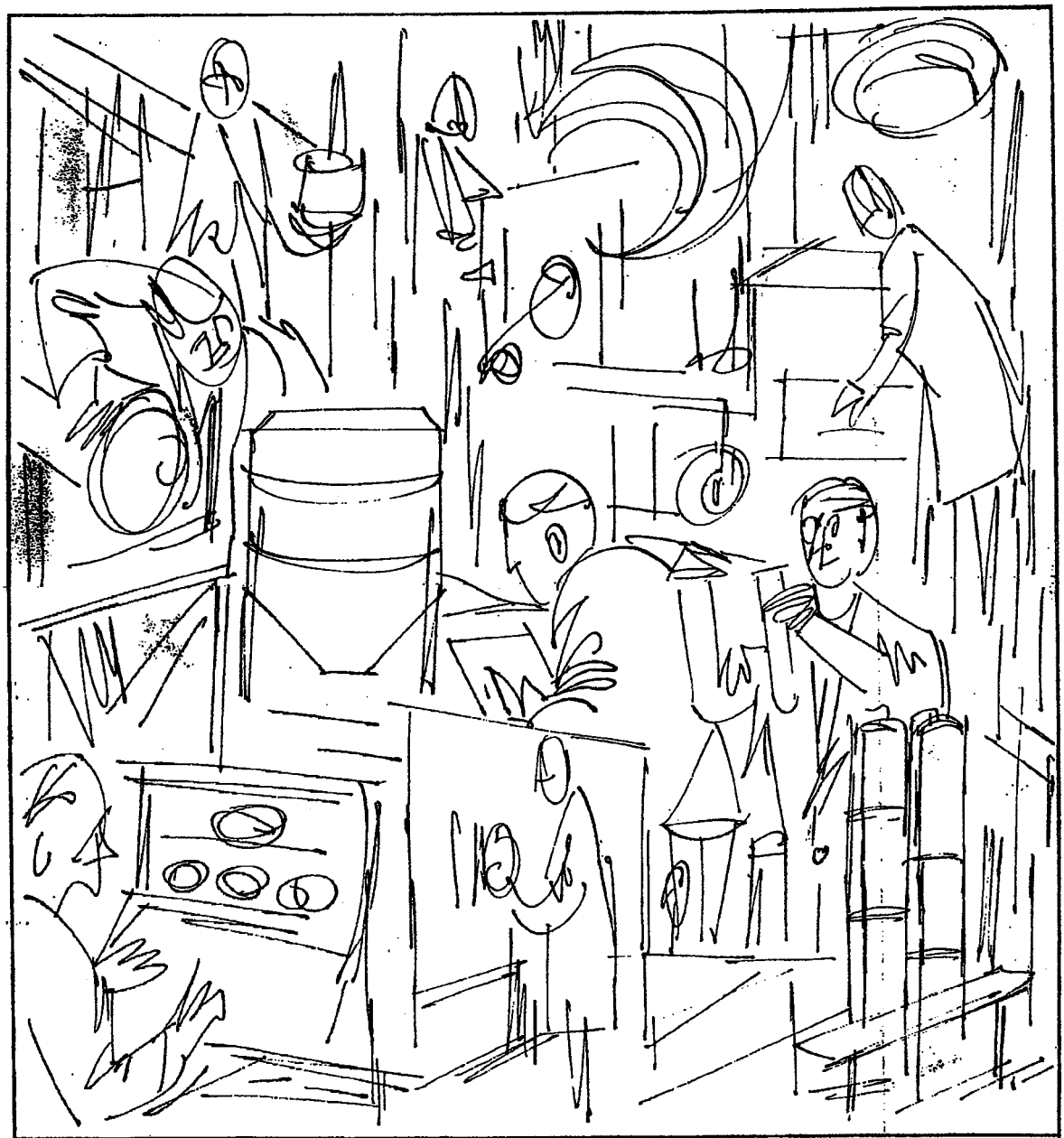

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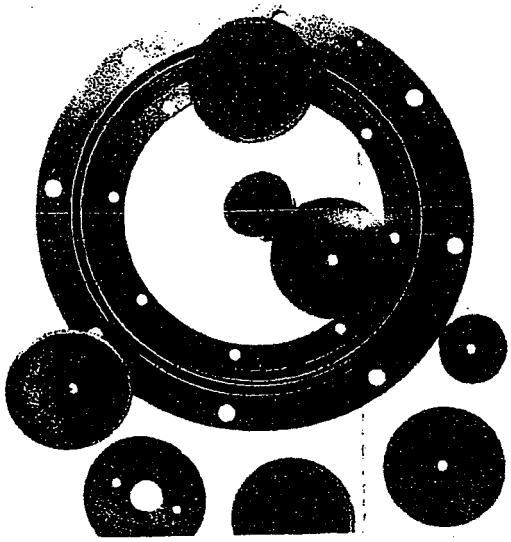
IN HIGH FASHION: Du Pont's Corfam has been moving into consumer shoe market as durable leather substitute.



IN PROCESS PLANT: Corfam packing and seals are out for equipment market held by leather and rubber goods.

Corfam Steps into the Plant

New material's durability adds to life of seals and packings in pumps, other equipment

Corfam, Du Pont's leather-like urethane-polyester composite, which has been winning a market as a shoe upper (*CW, May 1, '65, p. 45*), now has its foot in the door of the chemical plant. Its promise: improved durability, toughness and flexibility in packing and sealing applications for process equipment.

It has already won a job in an East Coast detergent plant as a packing in ceramic plunger pumps, which are used for highly abrasive detergent slurries. Where ordinary vee rings made of neoprene and duck had to be replaced every two or three days because of excessive wear, Corfam vee rings are replaced after one or two months of service. Moreover, Corfam rings do not show excessive wear, are replaced as part of a regular preventive-maintenance program.

Corfam is being tested with excellent results as a packing and seal material in a paint plant for water-, ketone- or acetate-based paints. It is used in plunger pumps for fire-resistant hydraulic fluids (water- or oil-based) in metal processing plants—in one case, increasing packing life from about a week (with neoprene) to five months.

And tests now under way at Du Pont's engineering laboratories show that Corfam will make an excellent sealing material for rotary shafts (for example, centrifugal pump shafts).

Stepping In: Du Pont's Kenneth Johnson, product manager of industrial fabrics sales, does not see Corfam's industrial sales rivaling its market in shoes and consumer products. And in the industrial sales area, automotive seals could well turn out to be a larger market than plant process equipment. But there is no question that plant process equipment will begin to take a portion of Corfam's production if more potential users have the good results from it that the pioneer users have had.

The same properties that make it attractive shoe material — durability, toughness and flexibility — are main reasons for its success in industrial trials so far. And Du Pont has added to these properties by impregnating the Corfam with other materials. In fact, "straight" Corfam hasn't been used industrially, and probably won't be because the impregnated material has improved properties, according to Johnson.

Du Pont describes Corfam as a coriaceous (tough, leatherlike) poromeric material. It is a nonwoven sheet of urethane polymer base reinforced with polyester. The sheet contains fibers deposited in a random manner and held together with a binder to obtain uniform strength in all directions. Each cubic inch of sheet contains millions of pores that can be saturated with elastomers, resins and waxes. The sheet may also be coated.

The first material Du Pont has used for impregnating Corfam is Adiprene, its urethane-based elastomer, which has good resistance to abrasion, oil, fuel, weather and ozone. In addition Adiprene has good tensile strength, high load-bearing and elongation capacities. When vulcanized, it remains flexible at temperatures below –80 F and retains hardness and strength at temperatures to 250 F. It also has good

moisture and steam resistance, properties not often found in other urethanes.

When impregnated with the urethane elastomer, the Corfam substrate becomes stronger and is no longer permeable.

Durability Tests: Du Pont's Engineering Test Center carried out tests with packing cups of Adiprene-impregnated Corfam on pistons that were reciprocated in cylinders containing mineral oil and water-oil emulsions to determine wear as it might be found in applications of hydraulic packing. In honed cylinders, Corfam packing outlasted other materials, such as impregnated leathers and neoprene-coated duck, and gave indications that rougher cylinder walls might be used, reducing the cylinder finishing operations.

In general, leather packings are limited to cylinders with 64-microinch roughness and rubber to those with 32-microinch roughness. Corfam outlasted other materials by as much as three to one in cylinders of 35-40-microinch roughness and as much as 17 to one in cylinders of 90-100-microinch roughness.

Moreover, the Corfam packing cups honed the cylinders, reduced the roughness as much as 25% after 1 million cycles. But Du Pont cautions that extensive field tests should be run to confirm the laboratory results.

The hydraulic cylinder tests were run at 3,000 psi., indicating that the Corfam seals can probably withstand higher dynamic pressures. And in static pressure tests, Corfam has withstood pressures above 5,000 psi. In general, Corfam is similar to other reinforced packings where the substrate prevents excessive extruding and blowing out at high pressures.

Less Drag: Most engineers express concern about "breakaway" force and friction when considering any new seal for rotating shafts. And often the seals must be coated to reduce friction, enable shafts to be started without too much effort. Du Pont says that no problems have been encountered with Corfam seals that have been impregnated with Adiprene, which has a low coefficient of friction. It has also experimented with silicone coatings and suggests Teflon coatings could help keep operating temperature down in addition to reducing startup torque.

But Robert Phelps, Sr., president of Phelps Packing & Rubber Co., Inc. (Baltimore), indicates that Adiprene-impregnated Corfam may be more than satisfactory. Phelps, which probably has sold more Corfam packing and seals for industrial applications than any other packing supplier, makes hydraulic seals of 24.5-in. inside diameter for machines that cut large metal parts. These machines which hold the work stationary, rotate the cutting wheel at high speed, had been using graphite-impregnated neoprene. But the Adiprene-impregnated Corfam seals produced for less drag.

Phelps adds that Corfam's tensile and tear strengths and good elongation properties have helped its use as diaphragms in 150-psi. air service, replacing nylon and neoprene.

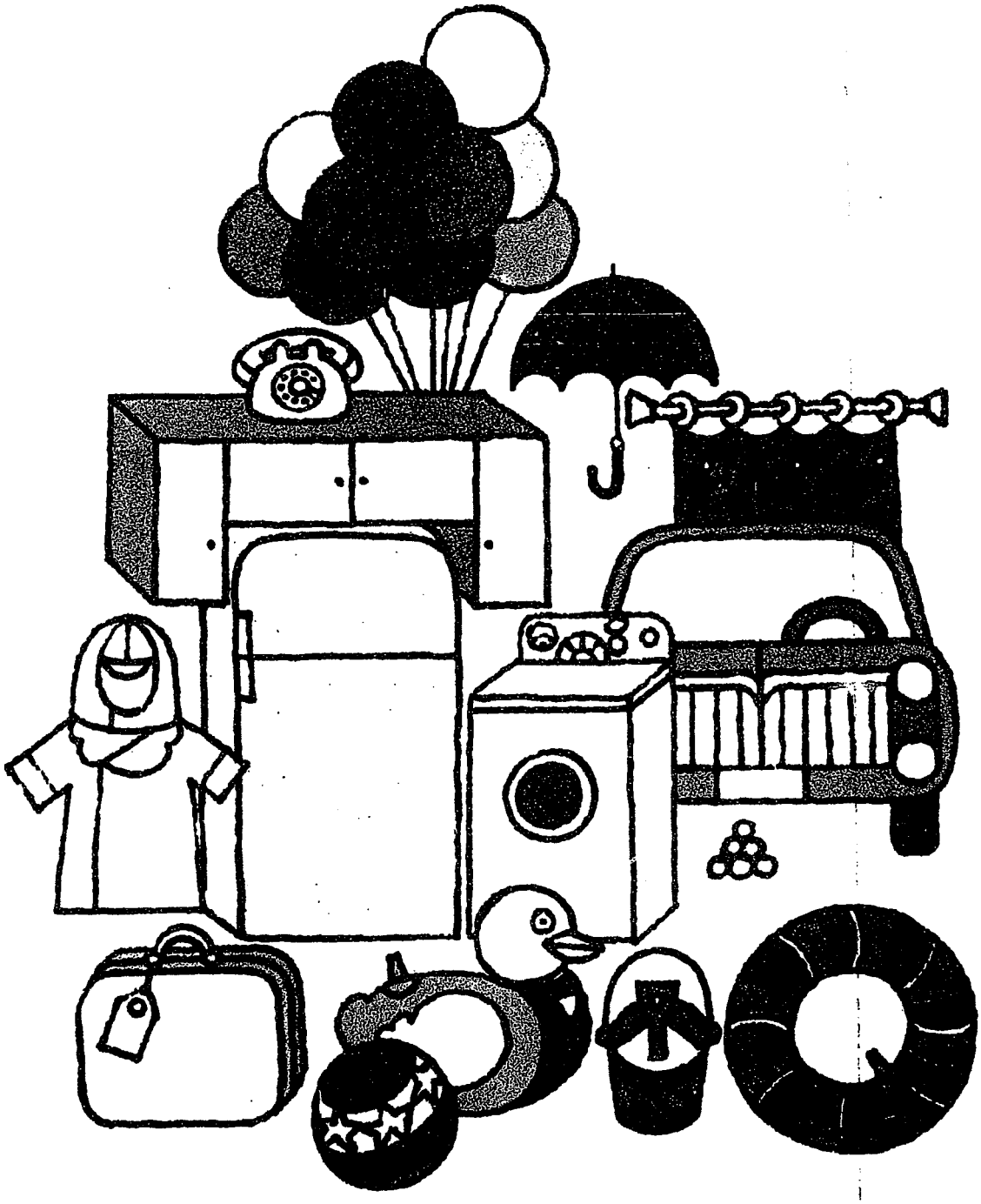
Cost Savings: Cost comparisons with other materials are difficult to make. For example, leather costs are rising, and very thick or very thin sheets of leather often cost more than sheets of intermediate thickness. Moreover, it is not possible to make direct comparisons of many seal materials because different thicknesses, depending on the material, may be used for the same seal application.

Du Pont lists Adiprene-impregnated Corfam prices at $3.05-1.50/sq.ft., depending on quantity and thicknesses ordered.

Corfam may cost more than twice as much as other sheet packings. However, Phelps Packing says that 50% more would be a better figure for most applications. And, when service life of Corfam may be 20 times longer, the higher initial cost may not be significant.

But Corfam will not be the answer to all packing and seal problems. For example, Corfam has not been tested in many chemical environments, may not be superior to some of the rubber-coated and homogenous-rubber materials already being used. And Teflon, despite cold-flow and permanent-set problems, has superior chemical and temperature resistance. Also, Corfam cannot be made into a braided packing, although sheet forms might replace braided packing in some applications.

Moreover, in many cases the less-expensive packing and seal materials do a satisfactory job. But where more durable packings and seals are needed, Corfam will rate a trial.



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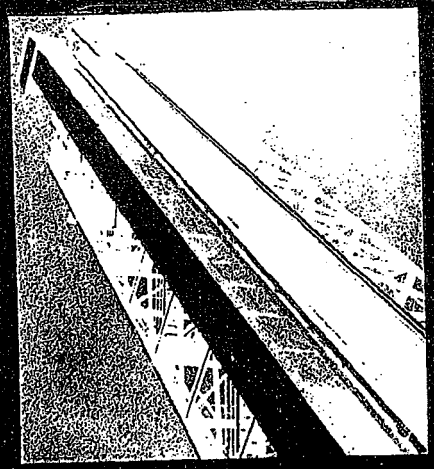
Mattel, Inc. scores another first in toy marketing: A Talking Package! Thanks to a new, super-tough polypropylene film from Hercules Incorporated, shoppers can reach into the side or back of the shrink-wrapped carton to operate the toy . . . see how it acts through the crystal-clear window . . . hear how it sounds . . . yet never touch the product.

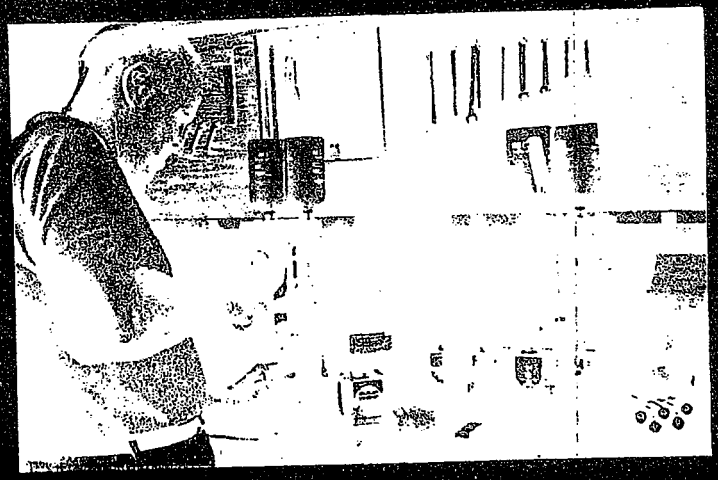
This new balanced polypropylene film for shrink wraps is called 150 gauge BC120. Made only by Hercules, it is three times thicker and three times stronger than conventional shrink films. It provides triple-strength seals, with puncture resistance that virtually eliminates film breakage in shipping and retailing.

Producers of many types of hard and soft goods have found that Hercules polypropylene shrink wraps, in one gauge or another, are the ideal solution to their packaging problems. Tough in any gauge, they run just right on sealing and shrink equipment . . . yield tight, non-relaxing wraps . . . give uniform shrink without wrinkles.



MEET DEMAND FOR NITROGEN—

This new 160-foot prilling tower is part of a multi-million-dollar expansion program at Hercules, California. With the addition of Herco-Prills® prilled ammonium nitrate, the complete line of Hercules fertilizers is now available on the West Coast. These include anhydrous and aqua ammonia, nitrogen solutions, HPC® ammonium nitrate-ammonia solutions and ammonium nitrate-ammonia/urea solutions, UN-32* and UN-28* urea ammonium nitrate solutions, and Nitroform® ureaform plant food.



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Armour's McCorkle and Gardner check plans for new amines plant.

Betting on Beta's

The green light for construction of a commercial plant to make a new series of amines has been flashed by James Gardner, president of Armour Industrial Chemical Co., and Miles McCorkle, vice-president and technical director. The new semiworks unit will turn out several million pounds/year of the new beta-amines after it goes onstream at McCook, Ill., in March '67.

The products making the lab-to-plant transition differ in several respects from conventional fatty amines sold by Armour and a number of other producers. They are derived from petroleum-based materials rather than from naturally occurring raw materials, and are made by a new catalytic process (patents have been applied for in the U.S. and abroad).

The new route gives a saturated long-chain hydrocarbon containing an amine or diamine group on an interior carbon atom — predominantly at the *beta* position. Conventional products are alpha-amines.

The beta-amines have greater liquidity, solvency and stability than do alpha-amines. Like alpha-amines they are strongly cationic surface-active agents. They are expected to show cost advantages when used in competitive applications.

Large-scale uses are anticipated in the paper, petroleum, plastics, rubber, textile, metalworking, paint, steel and pesticides industries. McCorkle declares that fatty nitrogen chemicals are now a $100-million/year industry, and concludes, "The beta-amine breakthrough, we feel, opens up an equally big new business field."

Among the other producers of fatty amines: ADM Chemicals, Dow, Cargill, General Mills and Humko Products. Fatty amide condensates and fatty nitriles are also part of the fatty nitrogen chemicals family.

Amines and Diamines: Four beta-amines and a pair of diamines have been tested since '64, and a series of derivatives joined them in '65. The amines are dubbed Armeens L-7, L-9, L-11 and L-15, the number indicating the number of carbon atoms in the chain. The diamines are Duomeens L-11 and L-15.

Exceptionally low melting and cloud points are said to make these amines easy to handle and store, especially when used outdoors at temperatures

down to 0 F (e.g., in mineral beneficiation, petroleum processing and road building). They are also highly soluble in a variety of solvents, including acetone, isopropyl alcohol, ethylene glycol, kerosene, mineral spirits and mineral oil.

The beta-amines have an electrostatic attraction to most natural and synthetic materials, displacing moisture from surfaces and coating them with a hydrophobic film.

They serve as effective emulsifiers for quick-breaking emulsions and are also able to kill microbes, algae and fungi. Oil- or water-soluble salts can also be formed (e.g., oleate or acetate, most of which are liquids at room temperature).

Derivatives: Three types of derivative are planned, but many more are possible. Initially there will be dimethyl beta-amines (Armeen), quaternized beta-amines (Arquad) and ethoxylated beta-amines and diamines (Ethomeen and Ethoduomeen).

The dimethyl compounds are suggested for use as reactive alkaline chemical intermediates, especially in the manufacture of quaternary ammonium salts, amine oxides and other coordination compounds. They are more soluble than the corresponding tertiary alpha-amines and thus produce more concentrated reaction products.

The quaternized and ethoxylated products are good emulsifiers for a wide variety of products. The quats are water soluble and are effective bactericides, fungicides and algaecides. The ethoxylated amines are offered in a range of compositions to allow selection of the hydrophile-lipophilic balance best suited to a particular application.

Delivered tank-car prices for the beta-amines are 35.5-50¢/lb.; similar figures for the derivatives are 50¢/lb. for the dimethyl compounds, 39.25-45¢/lb. for the quats and 38.75-41.75¢/lb. for the ethoxylated products.

Single-drum prices would average about 8-9¢/lb. higher. The company says these are commercial development prices and indicates that large-volume production may reduce them further.

Armour's willingness to put out the new line in competition with its own standard line of amines backs up its contention that the beta-amines will be an important new offering.

Whatever the size, whatever the type

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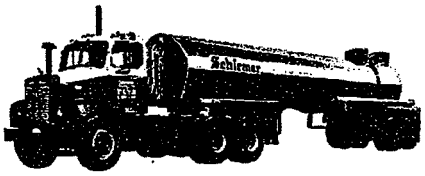

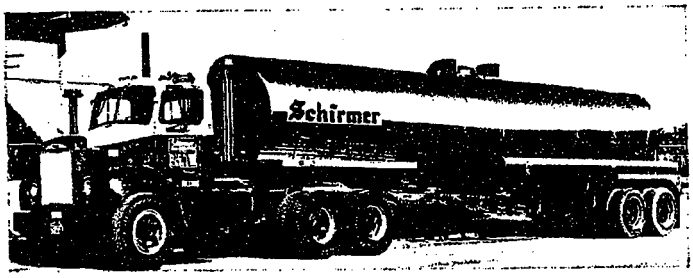

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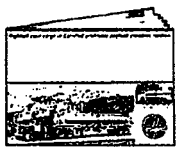

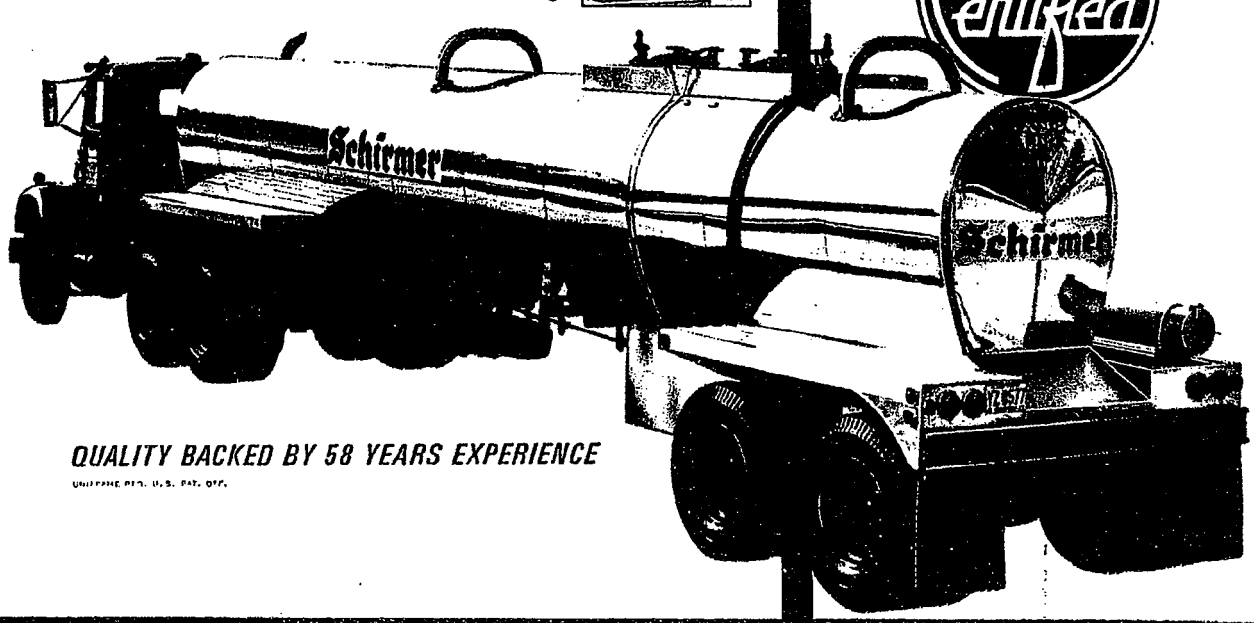

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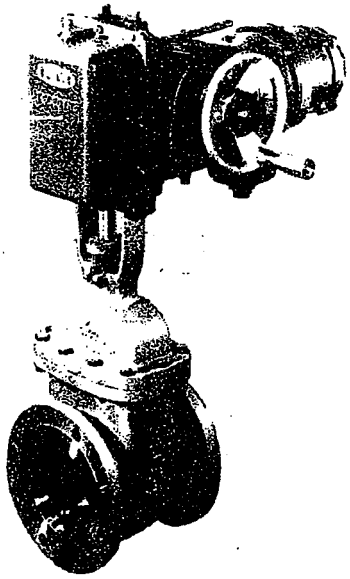

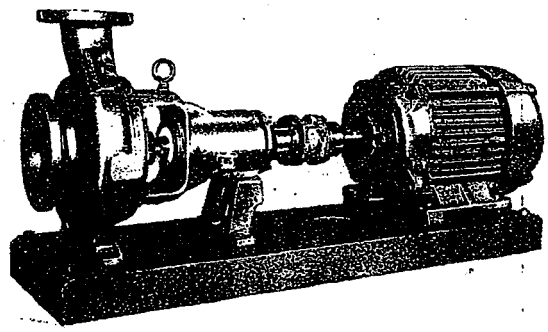

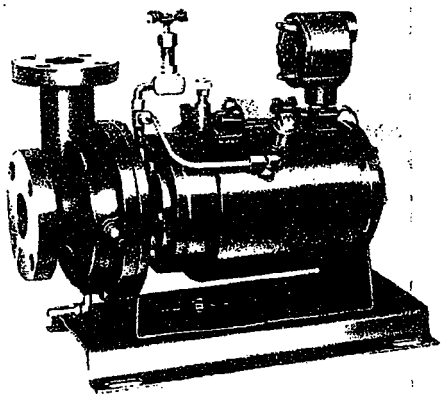

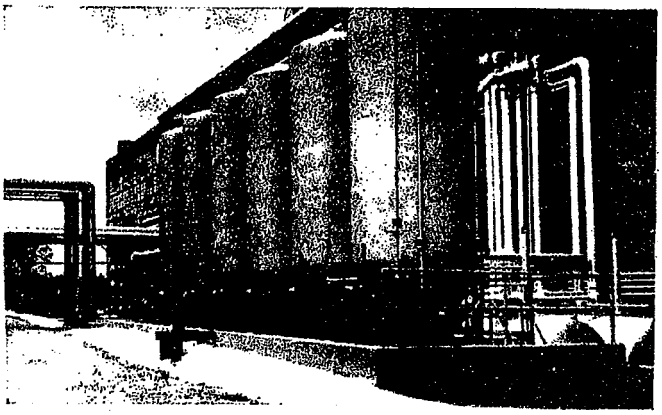

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Tallowate from steers like these Herefords is used in new syndet manufacturing process.

Brighter Sucrose Ester Prospects

A new 'transparent emulsion' process opens way to sugar esters in surfactants

What do cattle have to do with the choice of a synthetic detergent process? If the State of Nebraska gets its way, the relationship will be plain. Nebraska, big producer of both cattle and sugar beets, is seeking patents on a new process for making surface-active agents from sucrose and beef tallow. And it's willing to offer the process royalty-free to processors who'll build in the state.

The process has been worked out for Nebraska by Lloyd Osipow and William Rosenblatt of the consulting firm Foster D. Snell, Inc. (New York). And while the process is yet to be piloted, Osipow is convinced that it not only overcomes the major drawbacks of previously offered sugar surfactants processes but also will be economically competitive with processes based on petroleum derivatives.

The technique is so new that industry evaluations have not been made. But studies on a forerunner of the new processes, made for the Sugar Research Foundation, bear out estimates that sugar-based syndets can compete on a cost basis with present commercially available synthetic detergents.

Big on Biodegradability: One big selling point is that the surfactants are both edible and biodegradable. They are nonionics, compatible with other anionics. They could be used for food additives (e.g., as emulsifiers) and in cosmetics, as well as for conventional surfactant jobs—in paint drying oils, printing inks, and for a range of household and industrial detergents. Nebraska officials feel the "biodegradability question" regarding household detergents is far from answered, even though industry has switched from alkylbenzene-based sulfates and sulfonate to linear alkyl sulfonates.

Several Switches: Osipows and Rosenblatt's method incorporates several changes from earlier sugar-using processes. The big switch is in avoidance of a solvent in order to bring together the sugar and "tallowate" reactants.

The new process employs a solvent for the sugar, but its twist is to form a transparent emulsion of the tallowate—making the tallow product into droplets smaller in diameter than one-quarter the wave lengths of lights. These can be dispersed in propylene glycol solution of sugar. And, according to Osipow, the tallowates in this form react with sucrose much as they would if the two products were dissolved in a mutual solvent (dimethyl formamide has been used commercially as a mutual solvent).

Although the glycol must be recovered by distillation, this is a fairly simple step. This dispenses with possible trouble with the U.S. Food & Drug Administration, which apparently feels dimethyl formamide can't be fully removed, and that solvent residue is a hazard to users.*

Tallowates (the mixture of methyl stearates, plus some palmitates and oleates derived from tallow) are put into the highly dispersed form by mixing with a soap or detergent and stirring with the glycol. The micelles of soap carry the tallowates into the ultrafine suspension. Among suitable suspending agents: alkyl sulfates and other organic syndets—e.g., sodium oleate. The oleate can be recovered as oleic acid if needed; in other cases—such as in making household syndets—the agent need not be removed.

While transparent emulsions have

*In Japan, Dia Nippon Sugar Co. sells sugar esters for food use with no governmental complaint.

been known for some time, Osipow and Rosenblatt say in their patent specification that they are the first to use water-free transparent emulsions in a chemical reaction—i.e., the esters of the tallow fats react with sugar dissolved in propylene glycol.

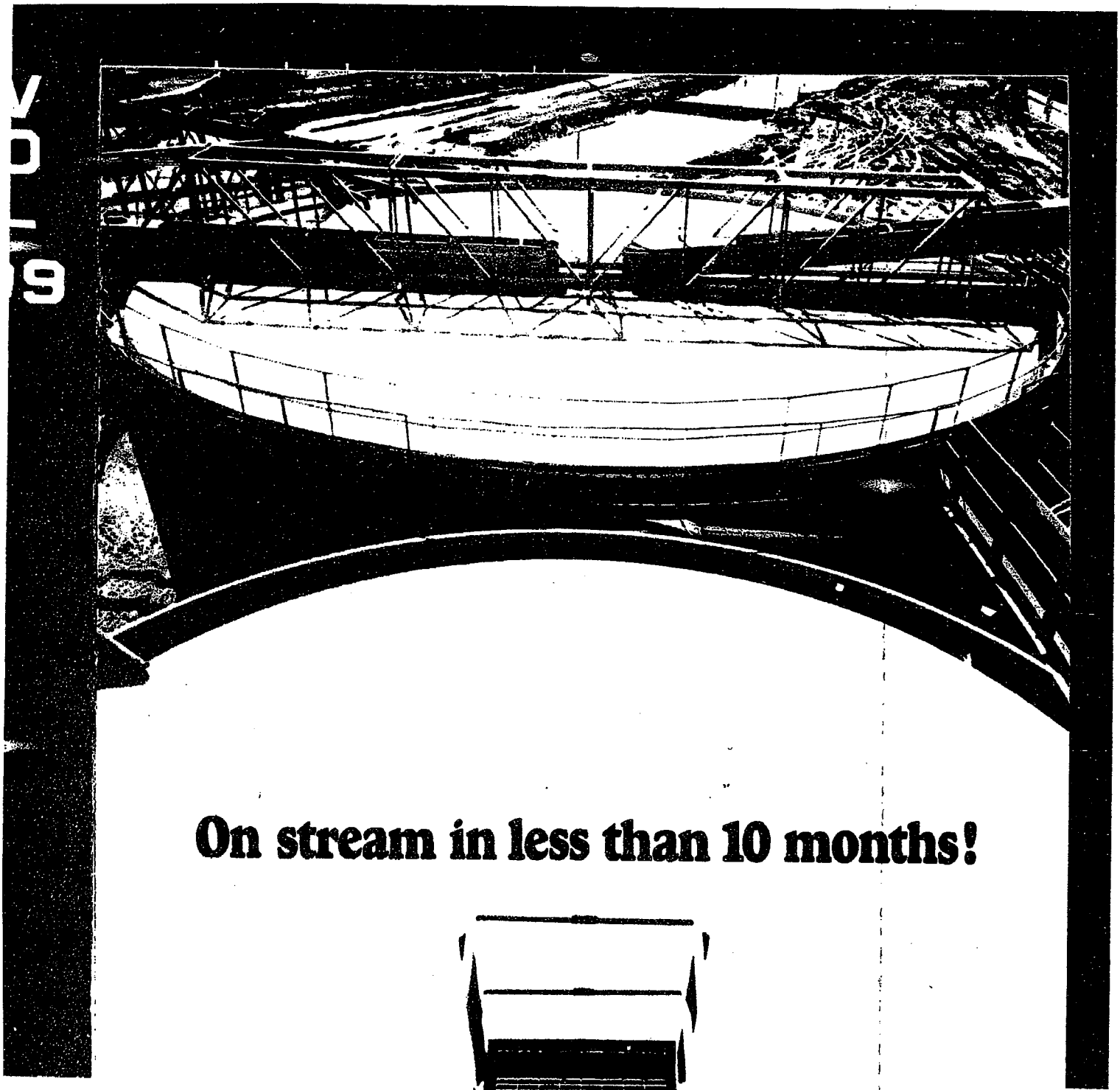
Another important factor in the Osipow-Rosenblatt process: the sucrose ester formed by the reaction between the fatty ester and the sugar is usually a surfactant with emulsifier properties. Thus the product of the reaction can form additional soap micelles, which also act to incorporate the dispersed fatty ester into a transparent emulsion. The patent application says that this is observable: a temporarily turbid emulsion will become transparent as the reaction takes place.

In adapting their process for food and cosmetic applications, Osipow and Rosenblatt suggest potassium or sodium soaps of fatty acids. These soaps are inexpensive and nontoxic; they can be removed by the use of ion exchange resins; and they can be converted by acidulation of fatty acids that have entirely different solubility characteristics than those of the soaps.

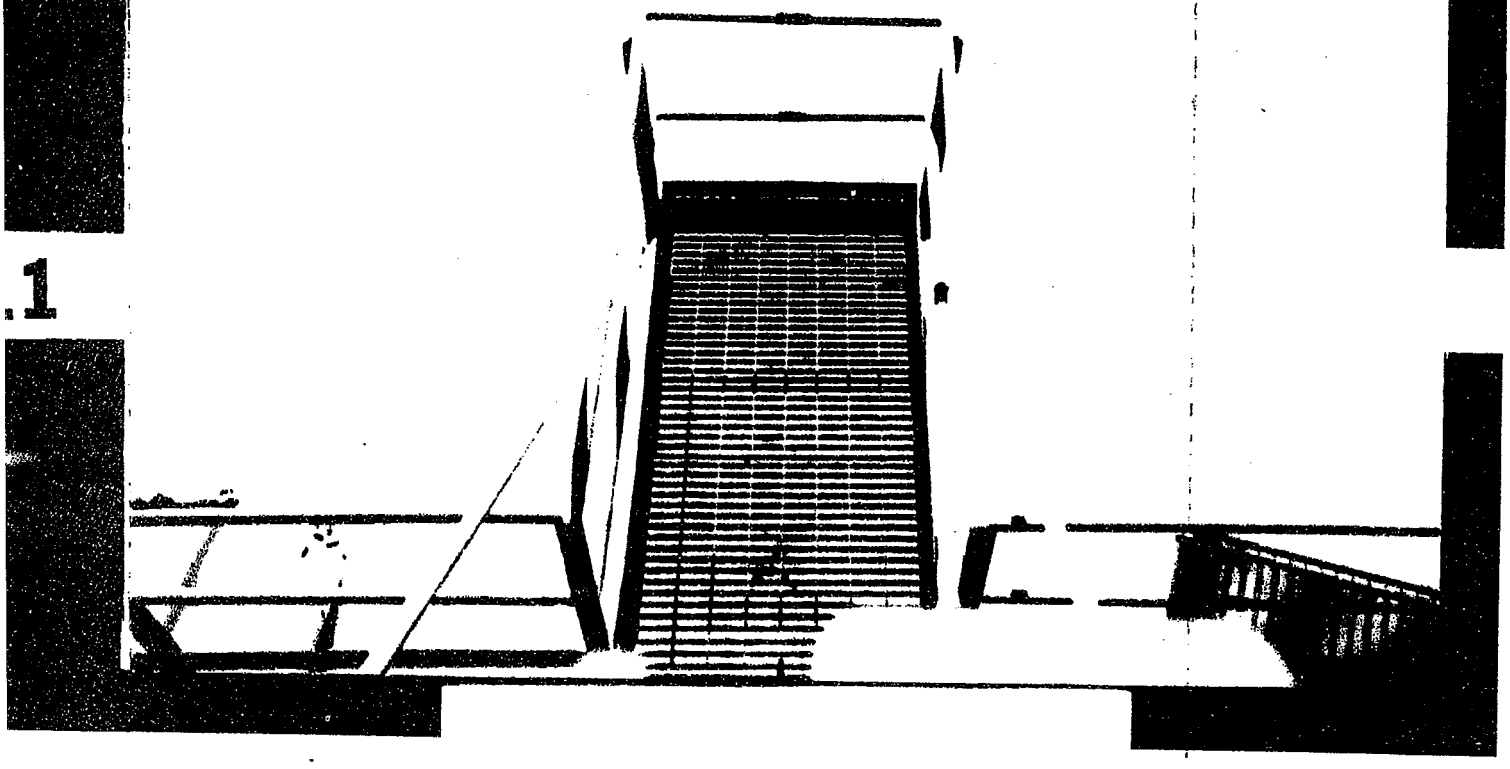
Distillation Reaction: According to examples in the patent application, the State of Nebraska's new process could most readily be expanded from laboratory to plant scale by means of a batch-type distillation tower operating out of a reaction kettle. The soap, tallowate and sugar are mixed with propylene glycol to form the transparent emulsion, and then the propylene glycol is vacuum distilled out of the mixture.

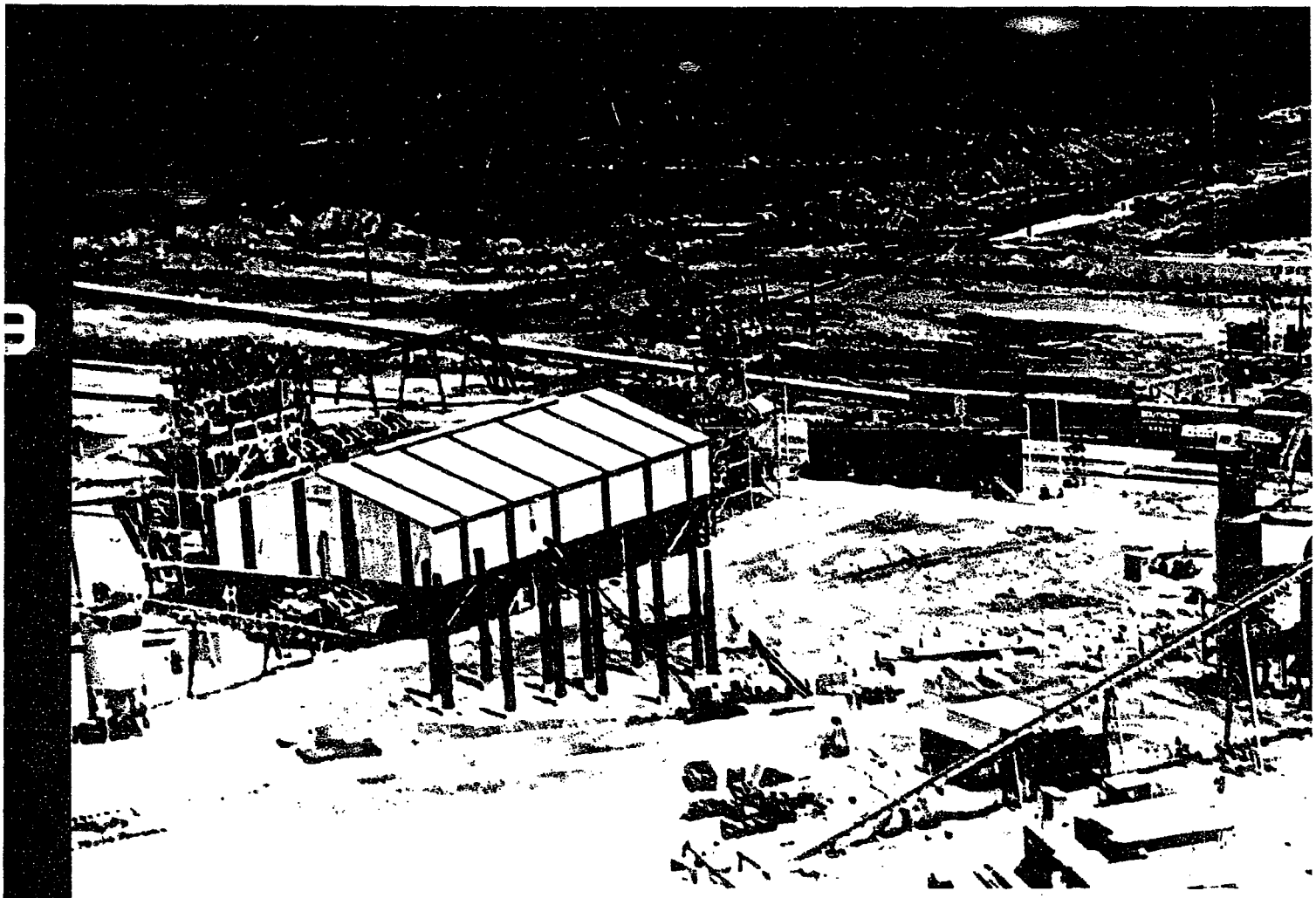
Osipow and Rosenblatt theorize that the actual formation of the sugar ester occurs during the distillation of the last 10% of the propylene glycol. Hence it is necessary to distill out all of the propylene glycol to obtain good yields. Once the propylene glycol is removed, the starting soap may be separated from the sucrose ester product by conventional extraction.

In one patent example, propylene glycol (63.6 wt.%) is used to form a transparent emulsion containing sodium oleate (8.4 wt.%), sucrose (21.7 wt.%) and methyl stearate (6.4 wt.%). The transparent emulsion is formed by stirring and heating to about 270 F. Then the system is put under vacuum, and the propylene glycol distilled out

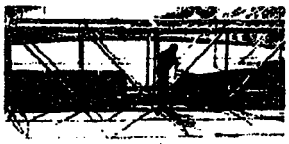


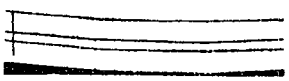
On stream in less than 10 months!

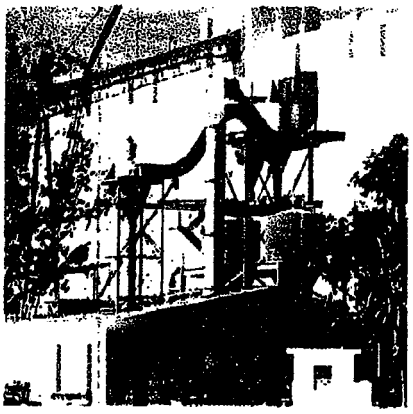


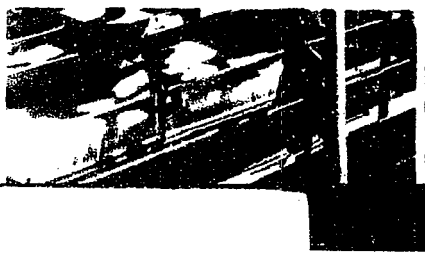


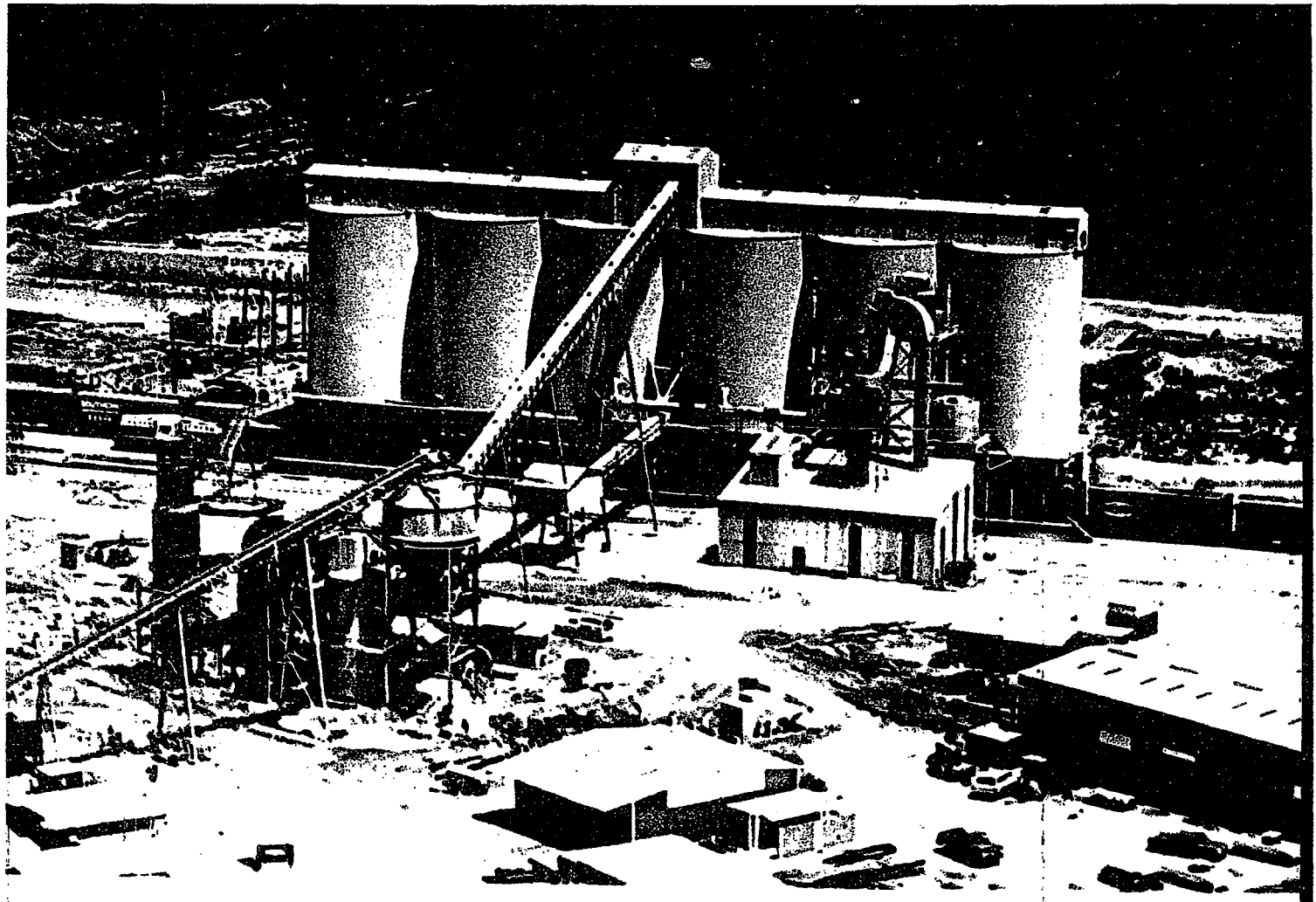
Occidental's 1.5 million ton per year rock beneficiation plant turnkeyed by Dorr-Oliver

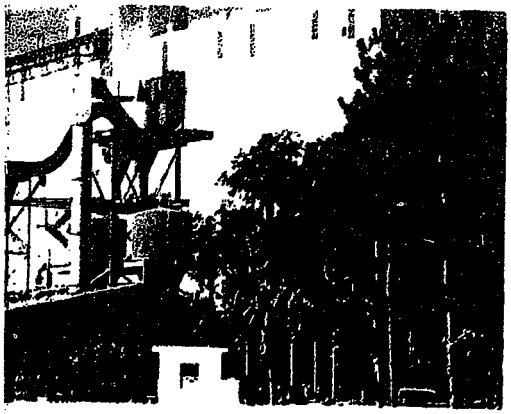


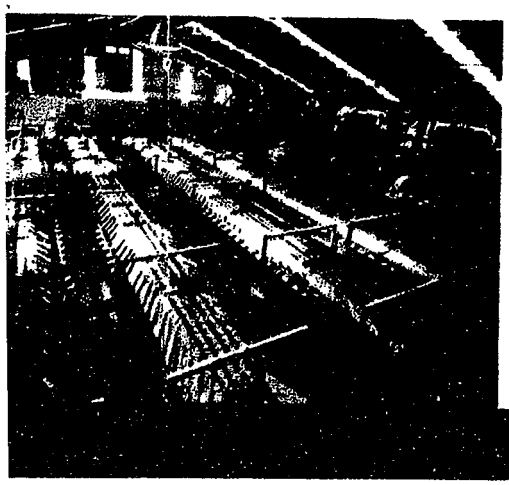


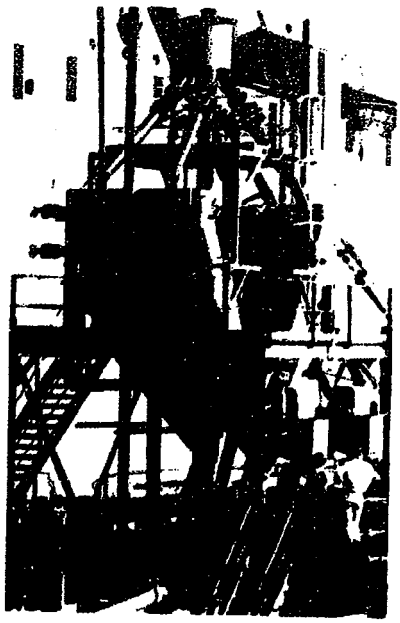












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under reflux, as the pressure is gradually reduced to one millimeter of mercury and the temperature brought to a final 350 F.

There remain many processing hurdles before such bench-scale processes can be brought to the most economic commercial design, and Snell is now working on this.

Bids on Biodegradability: Nebraska's big hope is for a commercial plant to use sucrose esters in production of household detergents. One measure of the potential comes from a manufacturing cost estimate prepared by The Lummus Co. (New York) and a '64 market study prepared by Com-Dev., Inc. (Philadelphia), for the Sugar Research Foundation (New York), which sought to commercialize a previous Osipow process.

Lummus calculations assume sugar supplied at 10¢/lb. and methyl tallowate at 12¢/lb. A detergent mix containing 10% of the sugar tallowate (sucrose ester)—and said to equal commercial packaged syndets in effectiveness—could be manufactured at 13.5¢/lb. in a plant having capacity for 10 million lbs./year. Cost would drop to 7.74¢/lb. in a plant having a capacity for 100 million lbs./year. Snell says it expects its new process to be even less expensive than the process evaluated by Lummus.

According to the Com-Dev. report, the nonionic sucrose ester detergents are compatible with anionic surfactants, which make up as much as 30% of over 2 billion tons/year of detergents produced in the U.S. And the sucrose ester detergents are far more easily broken down in sewage treatment processes than are the alkylbenzene sulfonate detergents.

Since Com-Dev. made its report, however, the soap and detergent industry switched from alkylbenzenesulfonate, adopted linear alkane sulfonate (LAS) as the basic component of the detergent mix.* Now there are reports that LAS is not completely broken down in the oxygen-starved conditions prevalent in most household cesspools. Sugar and tallow detergent proponents hope that this will open the way to widespread commercialization of sucrose syndets.

Long Island Test: One study of

*In addition to the LAS material the compounded detergent contains such other chemicals as sodium polyphosphates, sodium silicate, sodium sulfate, etc.

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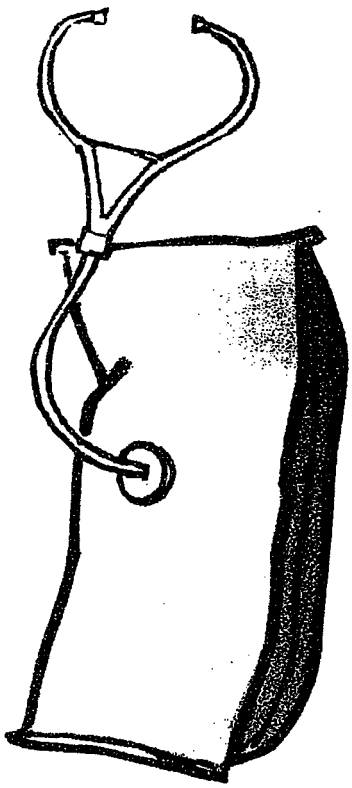

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ENGINEERING

LAS products is being carried out by the Public Health Dept. in New York's Suffolk County Center at Riverhead, near the eastern tip of Long Island. A number of commercial products are being observed under typical household conditions to discover: if the detergents are broken down; whether they can alter the effectiveness of waste disposal systems; and whether lack of syndet biodegradability can lead to contamination of water supplies.

Some industry observers are expecting dramatic disclosures from the Suffolk work. But, because of the complexity of the waste it's likely that the Suffolk studies will not provide any specific data for or against any products.

So the future of sugar tallowate detergents seems tied to the work now being done to make the products and processes commercially attractive.

Wet-Acid Purifier

Toyo Soda Manufacturing Co., Ltd., has developed a new solvent process for concentrating and purifying wet-process phosphoric acid. The firm now has this technique in operation and is offering it for license. The process makes an acid that is about 85% wt. % phosphoric acid (H_3PO_4) and is claimed to be pure enough for processing to food additives, detergents, etc. Thus, it appears that the route is a competitor of the conventional furnace process.

So called furnace acid is widely used in the U.S., primarily to make sodium phosphates in detergents; and capacity for phosphorus furnaces continues to grow at over 10%/year, although the furnace process is fundamentally more expensive than the wet process used in making fertilizer-grade phosphorus acid.

The additional expense of the furnace method stems primarily from the cost of electric power (about 5,240 kwh/ton of phosphorus pentoxide), of carbon (0.60 tons/ton) and of silica (1.27 tons/ton). However, the high purity of the acid—which results from burning the elemental phosphorus produced in the furnace and then hydrolizing this phosphorus pentoxide to the acid—gives furnace acid an edge over wet-process acid in nonfertilizer applications. And since the phosphorus fur-

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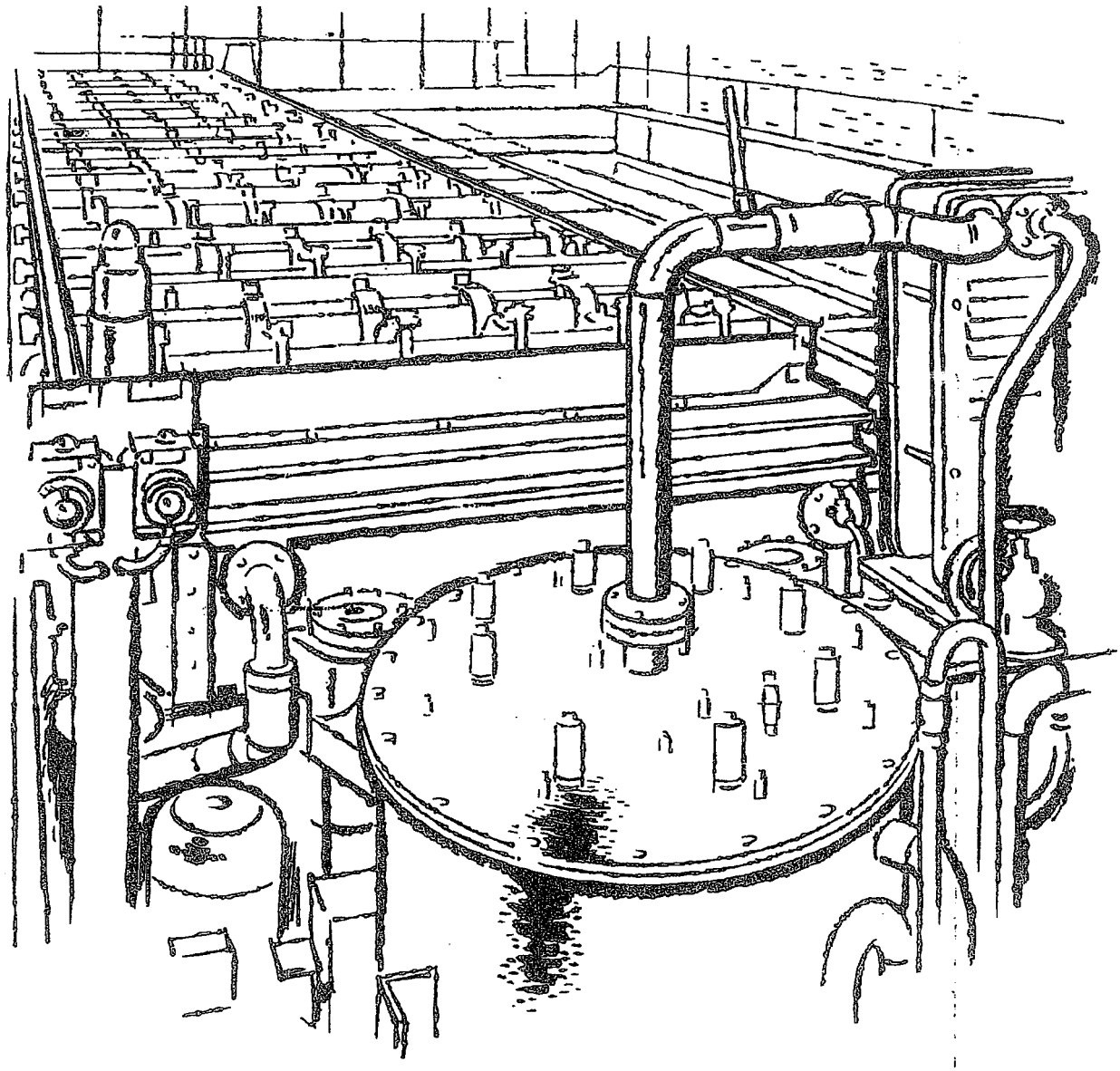

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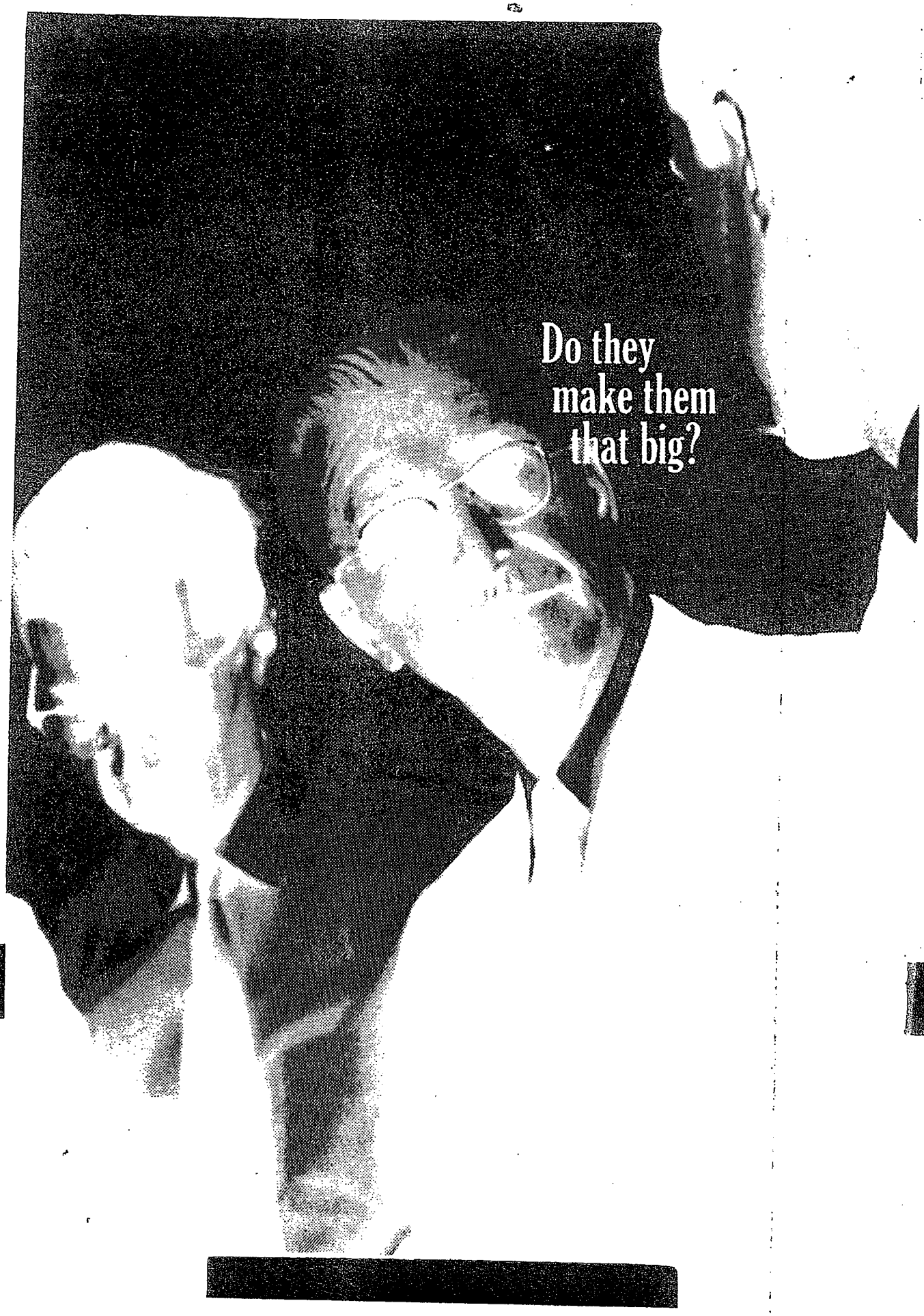
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naces must operate at full capacity for optimum economy, the furnace acid actually competes with wet-process acid in fertilizers.

Solvent Solutions: The key to Toyo Soda's new route is a parallel solvent recovery system that lets it extract phosphoric acid from the unconcentrated "green acid" (31.7 wt.% H_3PO_4) produced by the conventional wet process.

Although Toyo Soda has not disclosed its solvent—it says the process is proprietary—the company is known to have licensed from Israel Mining Industries the extraction techniques covered in U.S. patent 2,880,063. IMI uses aliphatic alcohols as solvents for extracting phosphoric acid from solutions of calcium chloride.

According to flowsheets released by Toyo Soda, its solvent is used to separate two grades of phophoric acid—a fertilizer grade and a food grade—and is recovered from dilute solutions of solvent and phosphoric acid in water.

In the over-all process, crude, wet-process acid is first decanted to settle out impurities brought from the wet-process plant.

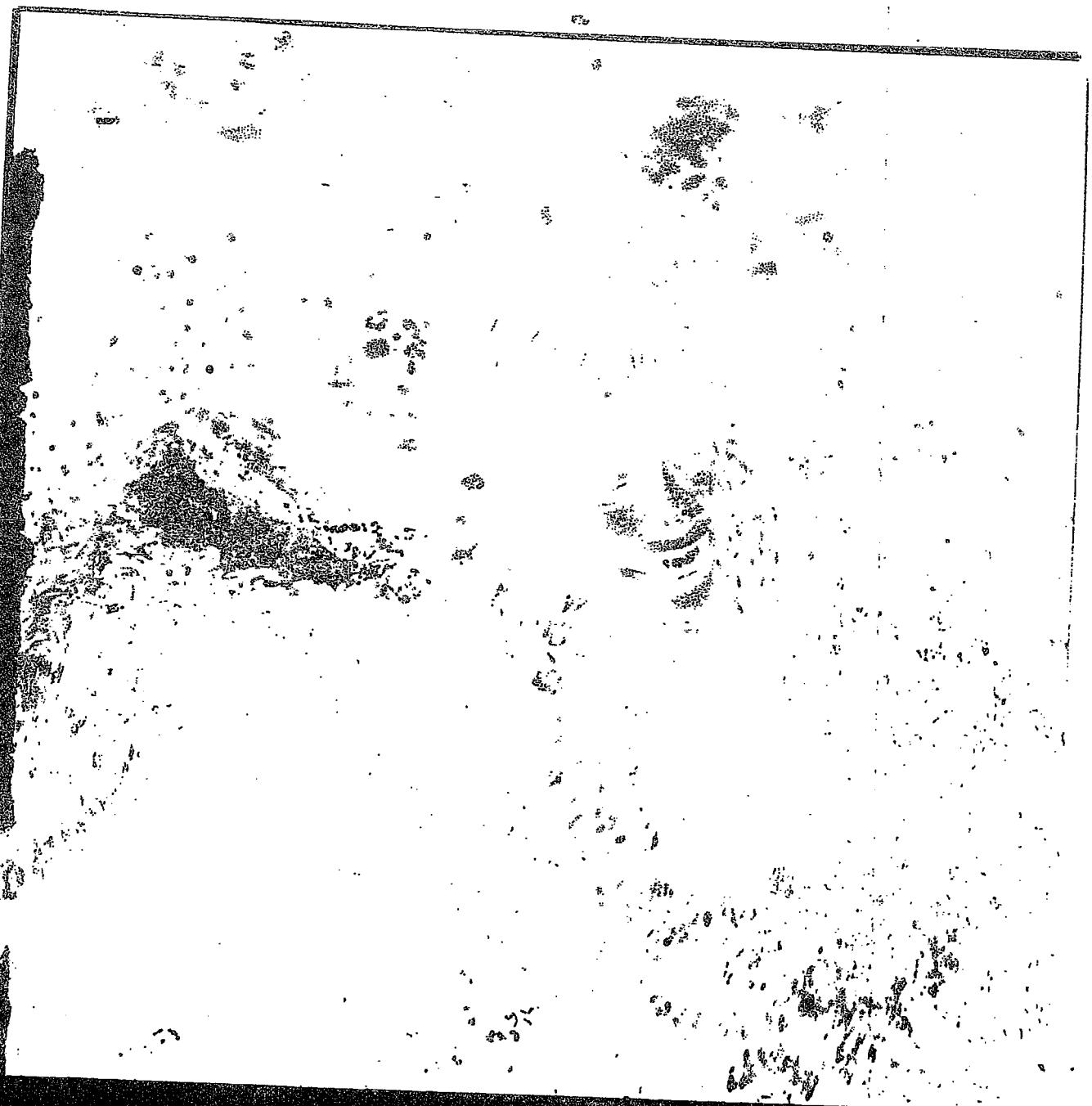
Then the clarified acid is fed into the first stage of extraction, where it is brought into contact with the recycling solvent.

Here, the solvent extracts the bulk of the phosphoric acid. At the same time, some of the solvent also dissolves in the crude, water- and acid.

Solution of solvent in crude dilute acid is sent to a solvent recovery system (believed to employ activated carbon) and the recovered solvent is recycled as the dilute crude acid is sent on to processing for fertilizer uses.

Meanwhile, the extract of phosphoric acid in solvent is washed with pure water. This results in a purified solution of phosphoric acid and solvent in the water. And this solution can be treated in the parallel recovery system to separate solvent for recycle from a purified acid, which is then evaporated and finally purified to the food-grade product. Over-all yields of purified and crude acid are on the order of 97%.

Although investment costs are not revealed, operating costs appear to be nominal.



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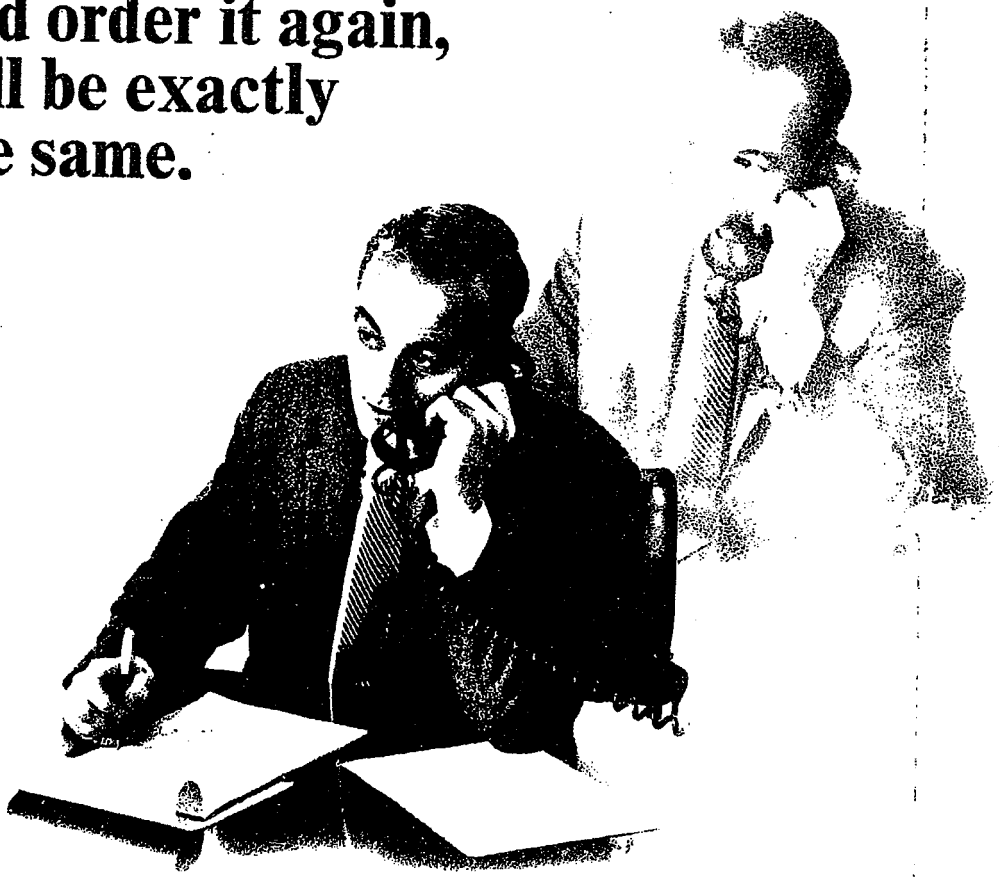

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WORLD ROUNDUP

Soviet gas industry shows rapid growth

According to information monitered from Soviet sources by Radio Liberty, output of natural gas in the U.S.S.R. has risen from 2.3% of the world's total in '55 to 15.6% in '65, making it the world's second largest producer.

Use of this gas, the Soviets claim, has saved the country 8 billion rubles ($8.88 billion at the official exchange rate) or double the amount now invested in the industry.

Japanese plan two big styrene centers

Two Japanese chemical groups plan giant styrene monomer production centers. One of 68,000-100,000-metric-tons capacity will be built by four members of the **Mitsui** group: **Toyo Koatsu Industries, Mitsui Petrochemical Industries, Toyo Rayon** and **Electro-Chemical Industrial.** The four firms had originally planned to build separately, as they generally do, but opted for the economy of scale.

At the same time, **Mitsubishi Petrochemical** is planning to build a styrene monomer plant of 80,000-tons/year capacity. Details haven't been ironed out yet.

Arabia moves on sulfur; Kuwait exports fertilizer

Three companies now conducting feasibility studies for a possible sulfur extraction plant in Saudi Arabia estimate that 250,000 tons/year could be extracted. Value, at present world prices, would be $12.5 million. Two U.S. companies, **Occidental Petroleum** and **Allied Chemical** would market the sulfur, while the third member of the consortium, Saudi Arabia's **Petromin,** would supply sour gas at no cost.

Occidental would receive a management fee as operator of the project. It expects the sulfur to be used mostly for the manufacture of phosphate fertilizers in the Mediterranean area, Europe, Australia and the Far East. Long-term supply contracts to be negotiated would serve as the basis for financing the $19-million project.

The first export shipment has been made from Kuwait's new $33-million fertilizer complex at Shuaiba. It went to Iraq under an agreement made earlier this year by the plant's operator, **Kuwait Chemical Fertilizers Co.** The company is 60% owned by the Kuwait government and private interests and 20% each by **Gulf Oil** and **British Petroleum.** Its entire output for the present year is already committed, with deals concluded with Cyprus, Pakistan, and Sudan and other African countries. Present capacity, already due for expansion, is 400 tons/day of ammonia, 550 tons/day of urea, 500 tons/day of ammonium sulfate and 400 tons/day of sulfuric acid. KCFC handles its own sales to neighboring areas, with sales further afield handled under a three-year agreement by a group consisting of **Olin Mathieson (UK), R. G. Shaw** (London) and **Woodward & Dickerson** (Philadelphia).

Chemicals pace Italian recovery

Italy's economy continues its slow, steady recovery. Official statistics for the first six months of '66 show that industrial production as a whole registered a strong 11.2% growth rate over the similar period a year earlier. But chemical output rose 15.2%. This compares with a chemical rise (all are first-half figures) of 5.5% in '65 and 9.6% in '64, and a rise for industry as a whole of 0.4% in '65 and 3.7% in '64.

Production of artificial and synthetic fibers was up 19.7% the first half of this year, compared with a 3.1% drop in '65 and a 25.2% gain in '64.

Reason for the surge is increased domestic buying. But exports (including heavy sales of fertilizer to Red China) also played a big part.

BP will double capacity of Australian ammonia plant

Kwinana Nitrogen Co. Pty. Ltd. (80% owned by **BP Australia, Ltd.**) is blueprinting a 100,000-tons/year ammonia plant at Kwinana, Western Australia, instead of the 50,000-tons/year unit originally planned. The $11-million refinery associated with the project should be onstream within 18 months. A 90,000-tons/year nitric acid plant and a 110,000-tons/year ammonium nitrate unit will complement the ammonia plant. Planned ammonia capacity was doubled as a result of market surveys indicating a greater-than-anticipated demand for nitrogenous fertilizers in the region.

Four Japanese PVC plants scheduled for South Korea

Four Japanese polyvinyl chloride plants having total capacity of 37,600 metric tons/year and costing more than $14 million will be built in the Republic of Korea. Construction of each plant will be undertaken by the Korean firm that buys it, with technical guidance and equipment to be supplied by the Japanese. Japan's **Chisso Corp.** will help **Korea Plastics Co.** build a $3.6-million, 6,600-tons/year plant. **Shin-etsu Chemical Industry Co., Ltd.,** has a deal with **Kongyung Vinyl Co.**

WORLD ROUNDUP

for a $3.4-million, 6,000-tons /year unit. **Nippon Carbide Industries Co., Inc.**, will build a 15,000-tons/year plant for an unidentified Korean firm. A fourth Japanese chemical company, to be chosen by the Japanese trading firm **Toshoku Ltd.**, will build a $3.7-million, 10,000-tons/year plant for **Samchok Industry Co.**

Because South Korea has no naphtha-cracking center, the first three companies will use their own carbide processes. The fourth will take a petrochemical route using a combination of ethane dichloride and acetylene methods.

Canadian mining venture to include Japanese capital

Nippon Mining Co. has received approval from the Japanese government to enter a joint venture to develop copper and molybdenum deposits in southern British Columbia, Canada. Borings are being taken by the Canadian interests; results will be disclosed next March. Nippon Mining would invest $170,000 for 15% of the company's initial capital stock. The remainder would be owned by Canadian mining interests.

Euratom facing sizable deficit in fast-reactor research program

The Euratom Commission has informed the European Economic Community's Council of Ministers that its research program for fast reactors will have a $7-million deficit by the end of '67. The deficit will be entirely in the French and German operations. The Belgian and Dutch research activities are minor. Italy has dropped one project and has worked out no new program.

EEC recommends that the French and German gaps be closed by turning over a $3.5-million surplus from earlier programs and getting the remainder of funds from the two governments.

EEC capital-goods market strong in France and Italy

Capital-goods makers selling to France and Italy should find business brisker this year than last, but producers marketing in West Germany will encounter a slowdown. That's the gist of the Common Market's first semiannual investment survey. Its next study will include Belgium and Luxembourg but not the Netherlands. The biggest shift in investment plans has been in Italy, where spending dropped in '64 and '65, but will be up 10-20% this year. French industrial investment after two years of stagnation, is expected to rise 4% this year. In West Germany, however, while investment will continue rising this year, the increase will be at a slower rate—6% this year, compared with a rise of 16% in '65. Reduced profit margins and tighter credit and capital are blamed.

The Common Market has also published the guidelines under which exclusive distributor agreements will be permitted by EEC's antitrust department. Effect of the regulation will be a sweeping one-shot authorization of some 25,000 of the 32,000 agreements that have been certified to the Euratom commission, with the remainder to be determined case by case. Some of the contracts may be rewritten so they will come under the exempt category. Qualifying for exemption will be exclusive dealer agreements containing prohibitions against carrying competing products or prospecting for customers outside an exclusive sales territory, and an obligation to use certain trademarks. No automatic approval will be granted agreements containing export prohibitions, agreements on trademarks, or price fixing that would hamper exports.

Border Chemicals to build U.K. acrylonitrile plant

Border Chemicals Ltd. will build a new acrylonitrile plant in Britain, expanding its capacity to 100,000-120,000 long tons/year at Grangemouth. The company—owned jointly by **British Petroleum Distillers Co., Ltd.**, and **Imperial Chemical Industries**—will build the unit alongside its recently commissioned 40,000-l.t./-year acrylonitrile plant. Cost of the new project is expected to exceed $17 million; completion is set for early '69.

The company's rapid step-up of capacity stems from inability of the initial Border plant, the first in Britain, to keep up with soaring demand. About $5 million worth of acrylonitrile will be imported this year, and imports may rise to $20 million by '69. Border now sell acrylonitrile to **Courtaulds** and **Chemstrand.**

South American oil firms discuss joint petrochemicals

State-owned oil companies of Venezuela, Colombia, Chile, Ecuador and Peru will meet to discuss programs for joint petrochemical industries. The meeting, at Caracas, follows a conference in Bogota last month of the presidents of Venezuela, Colombia and Chile and representatives of Peru and Ecuador. The presidents of the countries' central banks have discussed reciprocal credit agreements.

TWO NEW CHEMICAL 'FIRSTS' FOR MEXICO

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First of its kind in Mexico, this plant is designed to produce 60 million pounds per year of ethylene with a purity of at least 99.9%.

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McKee continues to serve Mexico's Process Industries

The two new plants at Reynosa, connected by a seven-mile, storage-type pipeline, were placed in operation early in 1966. These are the latest in a long list of projects for Mexico's petroleum, chemical, iron and steel, and mining industries for which McKee engineers have supplied a diversity of services since 1944.

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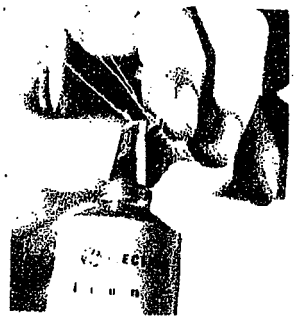

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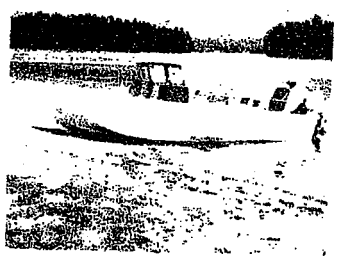

A great selling surface, with beauty that lasts, contributes to the popularity of the Boston Whaler, produced by Fisher-Pierce Co., Inc. The exceptionally tough, durable and color-fast SHELL coats containing CAB-O-SIL are produced by Advance Coatings, Westminster, Mass.

A Good Year for Fertilizer in Canada

Unless the rail strike interferes with the shipments of wheat now being harvested in the Western provinces, Canadian growers should have a good year. And this means increased fertilizer sales next spring.

Canada expects a record 750-million-bu. wheat crop this year, already has firm export sales of 500 million bu. — including 112 million to the U.S.S.R., 90 million to Red China, and 250 million to traditional markets (e.g., Britain).

Fertilizer consumption by prairie farmers had been estimated at 585,000 tons for '66, but a boxcar shortage during last spring probably will keep the figure at 550,000 tons. Fertilizer demand has been rising at a 20% annual rate for five years — from 137,000 tons in '60 (in terms of nutrient content: 21,700 tons of nitrogen, 44,800 tons of phosphoric acid), to 463,800 tons in '65 (84,200 tons of nitrogen, 135,200 tons of phosphoric acid). Early season estimates for '66: Manitoba, up 38% to 103,000 tons; Saskatchewan, up 25%, to 172,000 tons; Alberta, up 23%, to 310,000 tons.

Three new ammonium phosphate plants went onstream last fall: Western Co-operative Fertilizers Ltd.'s unit at Calgary, Alta., Sherritt Gordon Mines' installation at Fort Saskatchewan, Alta., and Cominco's plant at Regina, Sask. But the additional capacity of 385,000 tons of fertilizer (including some co-op ammonium nitrate) didn't result in any oversupply.

Much fertilizer output in Western provinces is for export to the U.S. Also, Sherritt Gordon's production was limited by defective equipment in its new ammonia plant.

Price Cutting: Both Cominco and Sherritt Gordon complained in their midyear reports that reductions in selling price hurt earnings. Said Sherritt Gordon: "Our fertilizer marketing arrangements with the grain companies have worked very satisfactorily, and by the end of the fertilizer year our in-

ventory was negligible. Price cutting by some of our competitors resulted in a general reduction in the price of ammonium phosphate fertilizers and in our opinion did not result in any increase in the total quantity sold in western Canada."

One source says most of the price cutting was started by one of Cominco's major customers, Imperial Oil Ltd. The Standard Oil Co. (New Jersay) affiliate is a major entry in the prairie market (as is Shell Canada Ltd.), working with some 300 distributors. There are persistent reports that either Imperial or Shell will be the next fertilizer maker on the prairies.

Price discounting varied, but cuts exceeded the usual $5/ton discount for bulk fertilizer. Whether '67 will see a repetition of this price cutting is a moot question. The only new producer will be Simplot Chemical, whose Cornwallis, Man., plant should be operating by year-end. Most of the production (220,000 tons of ammonium phosphate, 35,000 tons of urea, 90,000 tons of nitrogen) will be marketed in the U.S. But some will be sold in Manitoba and Saskatchewan.

The only other fertilizer plant on the horizon is a much-discussed unit that would be built in the Regina area in conjunction with a pyrites-to-sponge-iron installation by Hudson Bay Mining & Smelting Co.

How Big a Future? Best estimates are that wheat acreage will expand 4%/year, while fertilizer demand should continue to climb 20%.

D. A. Sim, chief executive officer of Western Co-operative Fertilizers Ltd., said in a talk last year that fertilizer use on the prairies could reach 3 million tons by '75. He predicts 550,000 tons in '66, 700,000 tons in '67, 850,000 tons in '68 and over 1 million tons in '69. "Should this trend continue," says Sim, "projections for '75 are in excess of 2 million tons." If the trend follows the pattern that developed in the U.S., use in '75 could reach 3 million tons, he adds.

Sim points out that farmers in the U.S. border states that have similar climatic and soil conditions are averaging 5-10 times more fertilizer per acre than are the Canadian farmers.

Dean C. F. Bentley of the University of Alberta told the Canadian Fertilizer Assn. last August that he could "see

no prospect of fertilizer sales increasing to the level of 1.6 million tons by '75" unless there were some entirely unexpected influences on the price of Canadian wheat.

His view is that '75 sales would approximately double those of '65 and that if the "super crop of '65 is followed by other lush crops and small delivery quotas, fertilizer sales by '75 may be only 50% greater than in '65."

Saskatchewan is the key to increased fertilizer sales to prairie farmers, and D. A. Rennie of the University of Saskatchewan argues that yields per acre in that province could be increased an average of about 50% by full utilization of technical information concerning moisture conservation, greater use of fertilizers, soil management and control of weeds and diseases.

More Wheat — If: There are differences of opinion on whether Canadian wheat production can continue at the record rate of 750 million bu. One observer says Canada has been fortunate to have good moisture conditions four years in a row. Even if acreage is upped and more fertilizers and chemicals are used, lack of moisture could mean reduced yields. On the other hand, Rennie has predicted that Saskatchewan alone will eventually increase production by 188.6 million bu. by expanding acreage, decreasing the amount of fallow land by about 5 million acres and increasing stubble-seeded crops by 10 million acres.

U.S. and Canadian representatives at the "Kennedy Round" of trade-tariff talks at Geneva have clashed over wheat demand and supply. I. R. Hedges, a key U.S. trade negotiator at Geneva, is said to be demanding that Canada adopt controls on acreage, production and marketing and agree to minimum and maximum prices. Canada doesn't have extensive support programs like those in effect in the U.S. (the Canadian government pays for some storage, crop insurance and subsidizes rail shipment to the East). Canada feels it avoids overproduction by refusing to take for storage any grain not committed to sale.

Recent rains have made this year's crop look good, and the big export markets seem firm for some years to come. All conditions promise a big fertilizer market next year — if the trains run and it doesn't hail.

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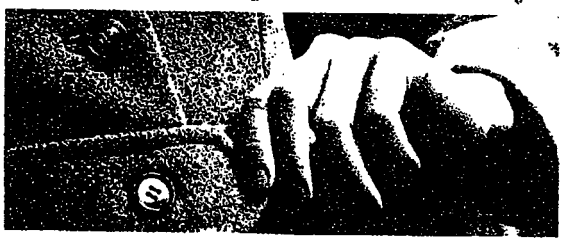

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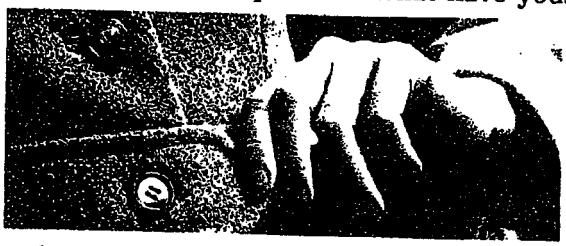

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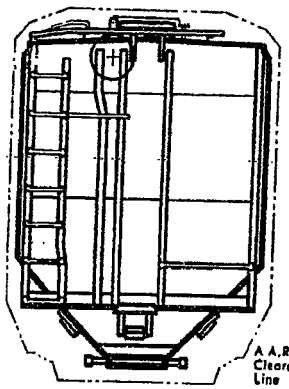

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MARKET Newsletter

Alpha-olefin prices have been slashed sharply by Gulf Oil. Products having chain lengths varying from C_6 to C_{20} will sell for 14¢/lb. under Gulf's new schedule. The same tag will apply to any combination of C_6-C_{20} fractions as well as to the C_{22}-C_{30} fraction. Previous prices of individual olefins and fractions ranged as high as 25¢/lb. No change, however, was made in the 6.25¢/lb. price for C_4 product.

Commercial application of alpha-olefins in detergents, polymers and specialty chemicals is expected to be stimulated by the new price cut. Intensive developmental work is already under way on alkenyl sulfonate detergents derived from alpha-olefins. Alkenyl sulfonates may ultimately compete on a price-performance basis with linear alkylate sulfonate, now the major household surfactant (*CW Market Newsletter, April 30*).

•

Phenolic resin price increases continue to spread. Reichhold Chemicals will boost phenol formaldehyde resin tags 1¢/lb., effective Oct. 1. The increase, to be prorated on a resin solids basis and will apply to most of Reichhold's line, follows similar hikes recently posted for *p*-tertiary-butylphenol, *p*-phenol and phenolic molding resins.

•

Lithium carbonate prices are holding at 38.5¢/lb. for most contracts despite confusion in recent weeks concerning packaging differentials (*CW, Sept. 3, p. 83*). Some months ago Foote Mineral established a price of 37¢/lb., but only for packaged-carbonate shipped on yearly contracts of 200,000 lbs. or more. In addition, a 35.5¢/lb. bulk price (hopper cars, delivered) was established for the large orders. By now, both prices are standard in the industry for big orders.

•

Efforts to block sale of stockpiled nickel on a bid basis are being made by the National Assn. of Metal Finishers. The House of Representatives is now considering legislation that would release 24.5 million lbs. of nickel through the General Services Administration. Metal finishers are fearful that the bid disposal would duplicate the difficulties that arose when cadmium was sold two years ago. The association charges that relatively little cadmium reached the metal-plating business, although large lots were acquired by speculators.

The metal finishers are urging Congress to restrict the nickel disposal to users in the U.S., prohibit resale and to restrict distribution to domestic nickel producers and established distributors. In addition, sale at the prevailing market price (rather than bid selling) is suggested. Nickel scarcity has forced some shops to purchase nickel from black-market sources at twice the normal 80¢-$1/lb. price.

MARKET Newsletter

Two Wulff process acetylene plants will go onstream this month in Great Britain. They will be the first in the world to use naphtha feedstock. The units—one to be operated by British Oxygen at Maydown, Northern Ireland, and the other by British Geon Ltd. (Barry, South Wales)—each have a 30,000-long tons/year capacity. British Oxygen's output will be sold "over the fence" to Du Pont; by-product ethylene from the plant will probably feed a 50,000-l.t. year ethylene dichloride unit slated for Maydown. British Geon will use its new ethylene source for vinyl chloride. Monomer output will be upped to 130,000 l.t./year by '67. Hedon Monomers Ltd. (a Distillers-Celanese venture) is also building a Wulff plant at Hull.

Considerable economies are expected to stem from the naphtha-based Wulff units. Some British sources estimate that the initial United Kingdom acetylene cost from naphtha will be 7-7.5¢/lb. Acetylene from the old carbide route costs 8.5-10¢/lb., depending on depreciation factors. Future British naphtha prices, however, are a question mark; in the past year the naphtha price increased from $18 metric ton to over $22/ton because of growing demand as a manufactured gas feedstock. Natural gas from the new strikes in the North Sea (*CW, Sept. 3, p. 26*) may ease the price pressure, although if exceptionally large strikes are found the one-stage flame process may upstage the Wulff-naphtha route.

•

Full-scale cumene production has resumed at Gulf Oil's 300-million-lbs./year plant at Philadelphia. The plant was extensively damaged by fire last May. Repairs and reconstruction, says Gulf, were completed several weeks earlier than expected. Loss of Gulf's output contributed greatly to tightness of supplies of phenol and acetone and helped spark price increases.

•

Shell Chemical will increase epoxy-resin prices, effective Oct. 1. The tag on liquid Epon resins 815, 820, 826, 828, 830 and 834 will go up 2.5¢/lb. Tank-truck quantities of Epon 828 will sell for 50.5¢/lb., under the new schedule. Solid-resin prices will be hiked 1¢/lb. for Epon 1001, 1002, 1004, 1007 and 1009. Comparable changes will also be made in solution prices. Price differentials between bulk, truckload and less-truckload quantities, however, are not being changed. Epoxy-resin prices have fallen precipitously over the past 14 months, and a recent attempt by Ciba to partly restore the cuts was unsuccessful.

•

Shipping price differentials for high- and low-density polyethylene will be revised by Monsanto next month to reflect the trend toward bulk movement and to obtain minimum freight costs. The minimum prices category for truckload bag shipments will be increased from 20,000 to 30,000 lbs. for high- and low-density product. Boxed shipments will command a 0.25¢/-lb. premium. The 1.25¢/lb. discount for 100,000-lb.-minimum hopper-car shipments will be trimmed to 1¢/lb. The 1.25¢/lb. discount, however, will be offered on shipments of 160,000 lbs. and greater.

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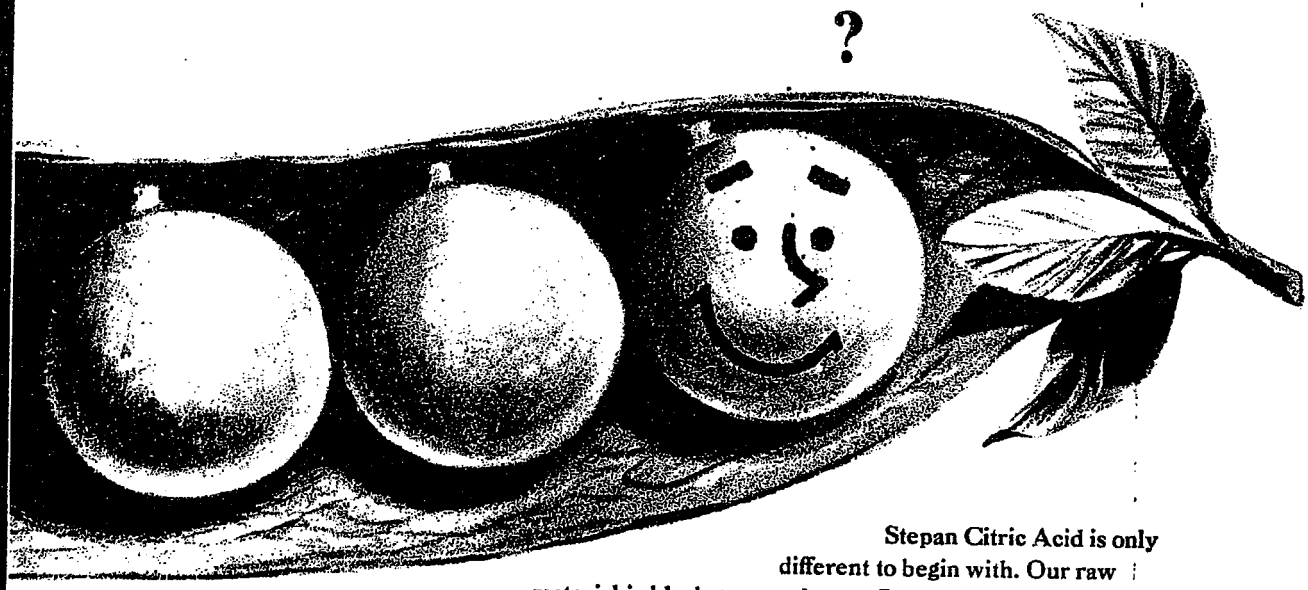

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Park Ave.'s

Stauffer's move spotlights a midtown saga

Manhattan's posh Park Avenue, once known for its debutantes rather than for its directorates, is becoming a chemical process stronghold. A two-block area just north of Grand Central Station (between 47th and 49th streets) has attracted 16 CPI organizations* in less than a decade. And Stauffer Chemical will join them as soon as the 42-story tower at 299 Park Ave. is completed.

"Chemical Row" was born when Union Carbide acquired the old Marguery Hotel at 270 Park Ave. and tore it down for its headquarters offices. Carbide President Kenneth Rush tells why:

"We were headquartered in the old building on 42nd Street but were spread out in 13 other buildings around town. We needed to house 4,000 employees, and after extremely careful consideration this seemed the best way to do it."

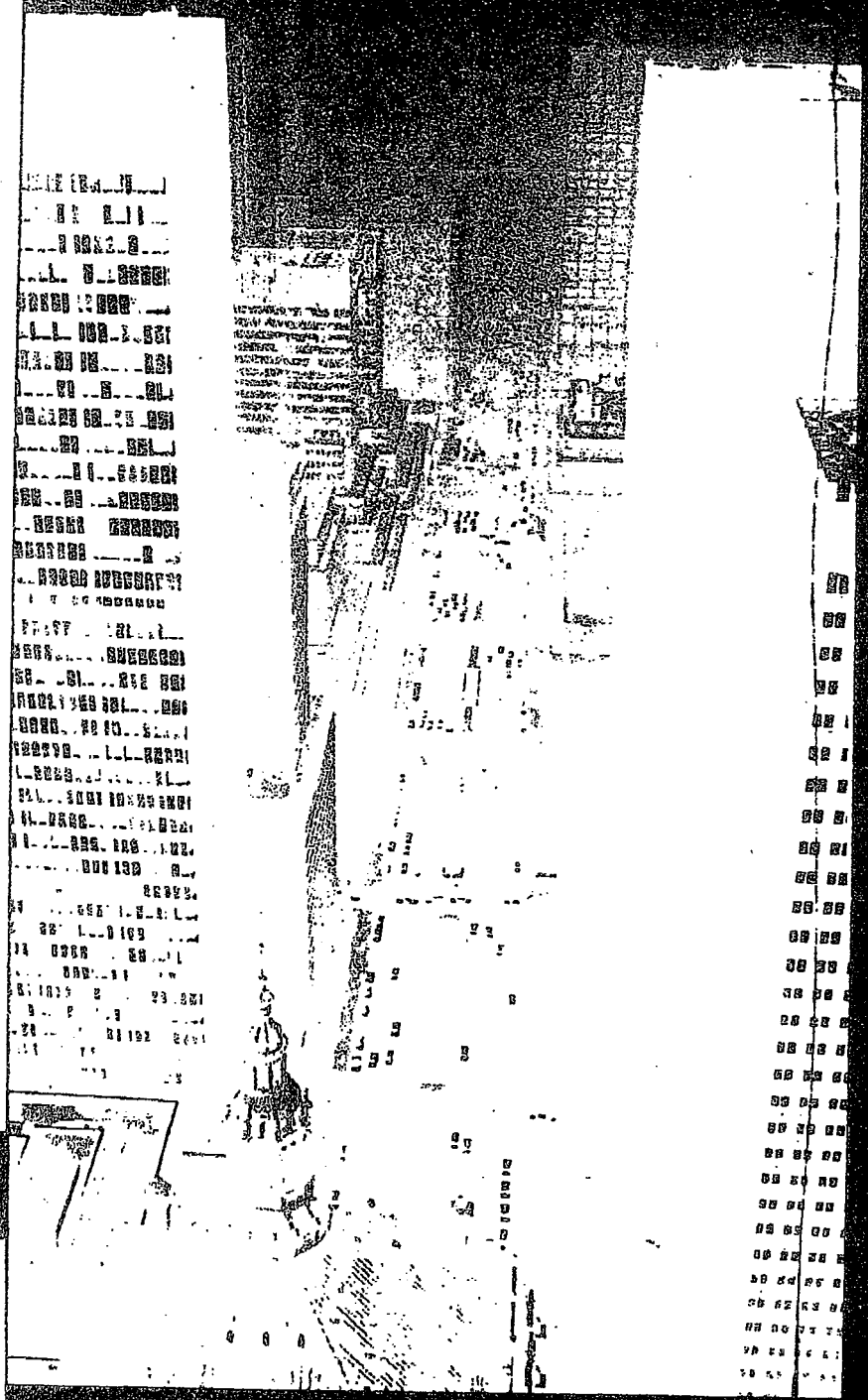
Rush adds that the choice wasn't easy, recalling: "We bought the old Butler estate in Tarrytown, N.Y., and gave very serious thought to building our headquarters there."

But Carbide needs a lot of secretarial help, ready accessibility to customers and business associates, uncomplicated commuting and travel facilities (it is near the Pan Am heliport†), and these were most readily available in the heart of the city. All this plus ample, well-lighted, pleasantly decorated offices on the wide, bus- and neon-sign-free avenue have, since lured others.

Any regrets? None at all, says Rush. Corporate growth was anticipated and the building already occupies as much space as is practical. If Carbide outgrows this building it may put up an additional one or lease additional space. Where, it won't say. But don't

*The roster of headquarters or major sales offices includes: Glidden, Vanderbilt, Economics Laboratory, Great Lakes Chemical, Society of the Plastics Industry, W. Alee Jordan Associates (chemical public relations), American Maize, Union Carbide, Grow Chemical, Hooker Chemical, B. F. Goodrich Chemical, Monsanto, Mitsubishi, Witco, Hess Oil & Chemical and Westvaco. Lever Bros. and Colgate-Palmolive are just up the street.

†Operated by N. Y. Airways Helicopter Service.



Seen from atop the Pan Am building is the Carbide building (left) and Hooker offices (right center). Under way: 299 Park (right).

CPI Row

rule out Park Avenue as a location.

Carbide ($2 billion sales) has acquired large neighbors — e.g., Hooker Chemical ($244 million sales) and Witco ($146 million) — and small ones: Grow Chemical ($13.3 million).

And the neighborhood seems far from crowded.

Only Carbide owns the building it occupies. But Grow, Hooker, B. F. Goodrich Chemical, Monsanto, Mitsubishi and Witco have offices in the similarly styled and relatively new Chemical Bank New York Trust Co. building across the street.

When Stauffer moves into 209 Park it will have as a neighbor Westvaco, which is switching over from 230 Park.

This spring, Great Lakes Chemical moved its sales offices from Fifth Ave. into 250 Park. Travel is critical at Great Lakes: its president is stationed in Los Angeles, research is located in Indiana, and plants are in Arkansas and Michigan.

Equalizer Ruling

The International Chemical Workers Union is calling a new Equal Employment Opportunity Commission ruling "a veritable Magna Carta for Southern workers."

EEOC has sustained the first complaint ever filed by a union under the equal-employment provisions of the *Civil Rights Act of '64*. Earlier, EEOC stirred nationwide interest when it agreed to consider ICWU's complaint (*CW, May 28, p. 49*), after first declining to do so.

EEOC says Planters Manufacturing Co. (Clarksdale, Mass.) violated the law in a number of ways, most notably by paying Negro workers lower wages than paid to white workers.

The next step is to conciliate the differences between Planters and the union. ICWU President Walter Mitchell says he is "willing to meet with the company any time to work out an agreement."

Before the commission had handed down its ruling, the union filed a suit in federal court accusing Planters of discrimination. The suit is still pending.

KEY CHANGES

Robert W. Sterrett to general manager in charge of Zonolite Division, Dewey and Almy Chemical Division, (Cambridge, Mass.), W. R. Grace & Co.

C. H. Gehret to vice-president and general manager, Minerals/Refractories Division (Conshohocken, Pa.), Howmet Corp.

G. Keith Brewin to director, International Dept., T[illegible] Glidden Co.

Alan T. Knight to chief executive officer and chairman, Catalytic Construction Co. (Philadelphia).

John Corcoran to president, **C. Howard Hardesty, Jr.**, and **L. James Huegel** to executive vice-presidents, Consolidation Coal Co. (Pittsburgh).

O. R. Wiebe to vice-president, and **L. E. Quiram** to executive assistant to the president, Central Farmers Fertilizer Co. (Chicago).

Thomas M. Smylie to vice-president, Ethyl Corp. (New York).

John A. Witting to treasurer, Mead Johnson & Co. (Evansville, Ind.).

E. O. Rohardt to assistant general manager, Hostachem Division, American Hoechst Corp. (Mountainside, N.J.).

Walter G. Gibbons to general manager, The Montrose Co. (New York), division of Millmaster Onyx Corp.

Morton M. Grub[illegible] to assistant to the president, **Joseph R. Weschler** to manager of marketing, Marketing Dept., Resin Division, Ciba Products Co. (Summit, N.J.).

Harold G. Mangelsdorf to board chairman, Crown Central Petroleum Corp. (Baltimore, Md.).

Robert D. Evans to vice-president and technical manager, Vectra Co. (Odenton, Md.), fibers maker.

William H. Collins to vice-president of sales, Trent Tube Division, Crucible Steel Co. (Pittsburgh).

Richard C. Richter to vice-president, Superior Zinc Co. (Bristol, Pa.) and Nopco Chemical Co. (Pittsburgh), subsidiaries of Nopco Chemical Co. (Newark, N.J.).

Edward W. Callahan to manager of business development, Allied Chemical Corp. (New York).

Edward V. Hagopian to general manager, Hoover Chemical Products Division, Hoover Ball and Bearing Co. (Whitmore Lake, Mich.).

Louis S. M. Armandias to director of business development in European countries, ACF Industries Inc. (New York).

Joseph A. Paciello to assistant to the president, Berkshire Color Division (Reading, Pa.), Tenneco Chemicals, Inc.

Irvin R. Linnard, Frank Markoe, Jr., and **Thorwald H. Smith** to senior vice - presidents, Warner - Lambert Pharmaceutical Co. (Morris Plains, N.J.).

Ralph E. Davies to vice-president of administration, Applied Radiation Corp. (Walnut Creek, Calif.).

Donald H. Hartmann to vice-president of Dresser Industries (Dallas) and president of Magnet Cove Barium Corp. (Houston).

John A. Kennedy to president, American Mineral Spirits Co., Western (Los Angeles).

Dwight N. Wait to executive vice-president, Consumer Products Division, Union Carbide Corp.

James B. Prendergast to president and **Edward J. Korbel** to executive vice-president, Nitrogen Division, **Wesley E. Gatewood** to executive vice-president, Barrett Division, Allied Chemical Corp. (New York).

William A. Smithers to vice-president and general manager, Pittsburgh branch, Fisher Scientific Co.

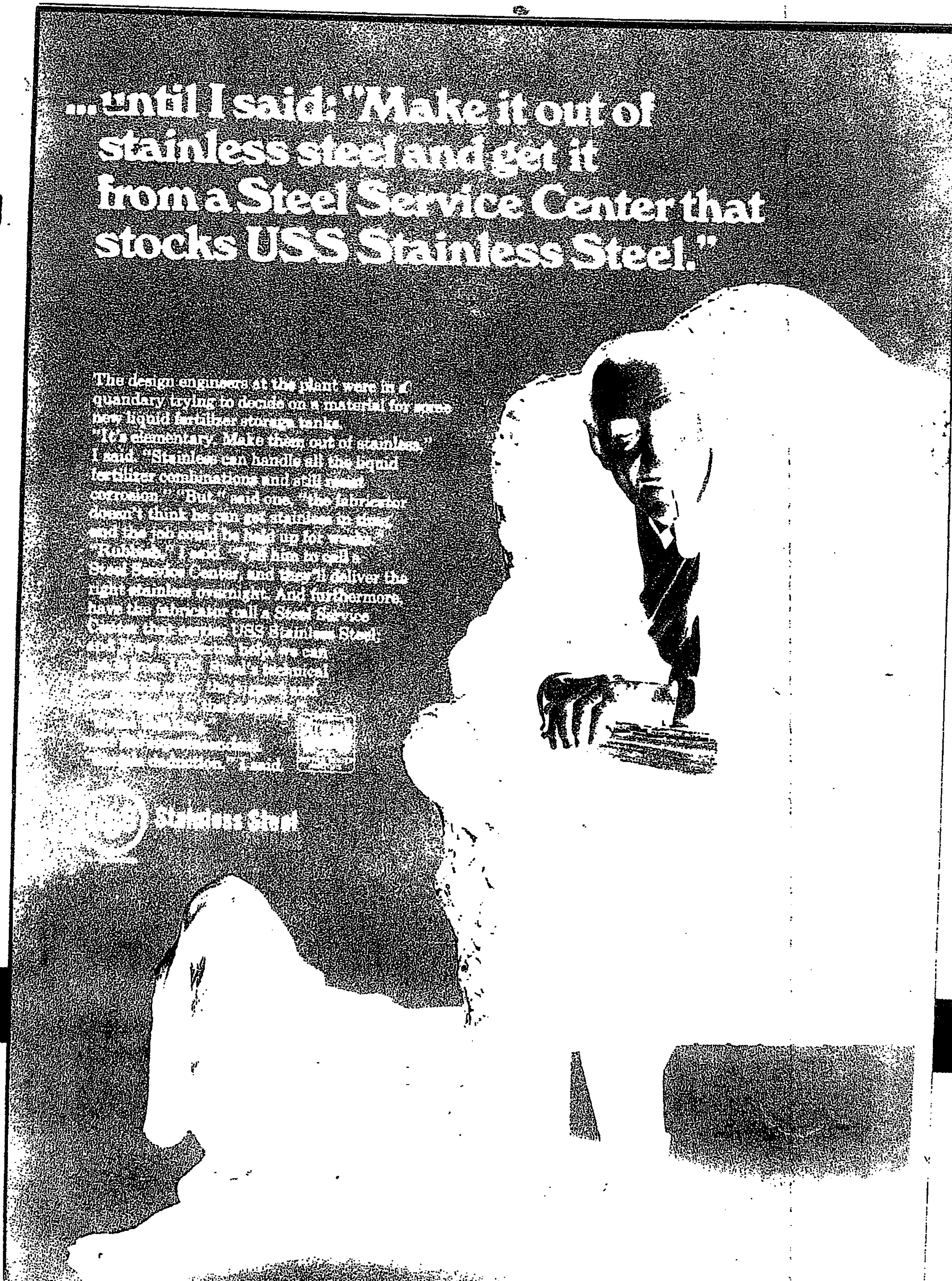
Charles E. Peck, Franklin R. Winnert and **Richard E. Trumbull** to vice-presidents, Owens-Corning Fiberglas Corp. (Toledo, O.).

Fred Dwyer and **Martin Solomon** to vice-presidents, Thermoformed Plastics (Flushing, N.Y.), division of Loral Corp.

Edward J. Bolka to vice-president and treasurer of Vancouver Plywood Co. (Portland, Ore.), subsidiary of Skelly Oil Co.

Charles G. Goebel to corporate technical director, **H. Fred Ochlschlaeger** to director of research, Organic Chemicals Division, Emery Industries, Inc. (Cincinnati).

I was a nobody


...until I said: "Make it out of stainless steel and get it from a Steel Service Center that stocks USS Stainless Steel."
The design engineers at the plant were in a
quandary trying to decide on a material for some
new liquid fertilizer storage tanks.
"It's elementary. Make them out of stainless,"
I said. "Stainless can handle all the liquid
fertilizer combinations and still
corrosion." "But," said one, "the fabricator
doesn't think he can get stainless
and the job could be held up for
"Rubbish," I said. " him to call a
Steel Service Center, and they'll deliver the
right stainless overnight. And furthermore,
have the fabricator call a Steel Service
Center that carries USS Stainless Steel.

[redacted]

TECHNOLOGY Newsletter

A new process for making aromatic derivatives of fatty compounds, developed by Archer Daniels Midland (Minneapolis), will sharply cut the price of phenylstearic acid and will bring a number of new chemicals onto the market—e.g., phenol, thiophene and naphthyl acids; aryl alcohols, amines, quaternaries and some esters. ADM plans to sell phenylstearic acid made by the process for less than $1/lb. Present price: $4-5/lb. The material is used in semifluid all-weather lubricants, to which it imparts stability to temperature and moisture extremes. ADM has applied for patents on its new process, which yield both crude and refined products.

•

A 300-kilogauss magnet, the world's biggest, is being designed at the National Magnet Laboratory at Massachusetts Institute of Technology. Coil material for the huge electromagnet will be Amzirc zirconium copper, a high-strength, high-conductivity copper alloy made by American Metal Climax. Power needed will be 41 megawatts. Superconductive magnets would eliminate this power requirement, but the largest magnetic fields obtained from them are about 100 kG. The National Magnet Laboratory has 14 magnets that can produce fields ranging from 100-225 kG. Five others, including the 300-kG. unit, are in design.

•

Penicillamine may find use in treatment of arthritis, rheumatism and other collagen diseases, according to University of Southern California researchers, Lucien Bavetta and Marcel Nimni. In their animal studies, the two physicians used the chemical to render collagen in the skin less fibrous and more soluble. This reverses the trend taken by the material (found in tissue, bones and teeth) during aging or disease. No adverse effects have been noted. The USC team is investigating how the penicillamine causes the change in the collagen molecule. The work is supported by the National Institutes of Health.

•

Pressures of centrifugal compressors keep moving up. Nuovo Pignone (Florence, Italy) has successfully completed a three-week continuous test run under industrial conditions with its new Model 2 BCL 306 'b operating at 290 kg./sq.cm. (4,125 psi.). Ordered by Norsk-Hydro (Oslo, Norway), the compressor was operated on synthesis gas (hydrogen and nitrogen) at the ANIC ammonia plant at Ravenna, Italy. While compressor manufacturers have had the ability to design special centrifugal units for pressures up to 5,000 psi. *(CW, May 9, '59, p. 106)*, most units operating at pressures this high have been reciprocating type. One reason: tremendous volume of gas moved by centrifugals were not needed. Decisions to build giant ammonia plants provided the break for centrifugals, although most of the big plants required synthesis gas compressed to only 2,000-2,500 psi. Under these conditions centrifugal compressors became the economic choice *(CW, Oct. 9, '65, p. 79)*.

TECHNOLOGY Newsletter

Several U.S. compressor makers have been testing centrifugals in the 5,000-psi. range with success, although at least one is believed to be experiencing some problems.

Questions remaining in the minds of process designers concern the operating safety of the new units and the improvements in process that will be needed to justify their cost.

•

More technology on the production of melamine from urea is revealed in a recent Canadian patent 737,474 to Stamicarbon, N.V. According to one claim of this patent, the technology appears to cover improving yields by quenching a hot melamine-containing gas mixture (from a urea-to-melamine reaction) in a virtually constant amount of water. Water is vaporized, and makeup water is added to compensate. After the melamine is condensed, the remaining gas mixture is discharged from the cooling zone with at least 90% of the ammonia supplied.

This processing step appears to run parallel to quench technology revealed in Canadian patent 737,475 to Chemical Construction Corp. Stamicarbon, along with Chemico and Osterreichische Stickstoffwerke AG, is offering new melamine-from-urea processes that are said to reduce the manufacturing cost of melamine to about 10¢/lb. *(CW, Aug. 27, p. 100).*

•

A novel ceramic-faced lightweight body armor has resulted in a $1.8-million contract for U.S. Rubber from the Army Materiel Command's Natick (Mass.) Laboratories. The contract covers front and back torso armor for Army pilots and air crewmen.

The ceramic, composed of aluminum and silicon oxides, is said to completely stop shells rather than fragmenting them, as do older types. The armor is backed with fabric of glass-fiber-reinforced polyester resin.

•

General Electric is girding to go after process control computer business even more actively than it has already. The company has set up a separate Industrial Process Control Division to take care of the fast-growing business formerly handled by groups within GE's big Information Systems Division.

GE took over Bunker Ramo's share of the process control computer market in May '65 by buying access to BR's patents and know-how when BR closed up shop. At that time, BR had an estimated 80% of the petroleum and chemical process control computer business.

Now GE is one of the leading vendors in this segment of the computer industry—but, although business is booming, the company has been losing money on its process control equipment. Indications are the new division will soon be operating in the black.

MIX-MULLER

THE PRACTICE OF MULLING

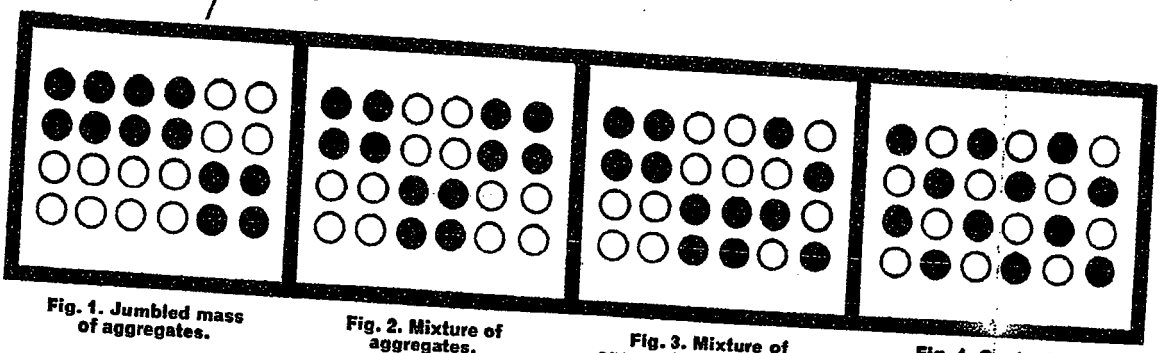


Fig. 1. Jumbled mass of aggregates.

Fig. 2. Mixture of aggregates.

Fig. 3. Mixture of aggregates and ultimate particles.

Fig. 4. Controlled dispersion of ultimate particles.

Does your mixing problem look like this?

Mixing Has Been Defined—

as "the manipulation of a heterogeneous mass of two or more materials so that a homogeneous product is obtained which is uniform both as to analysis and structure."

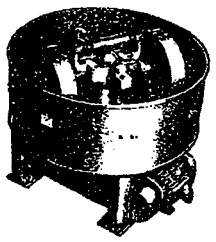
Put another way, an ideal mix of solid/solids or liquid/solids is one which has intimate, uniform *controlled dispersion* of properties. Aggregates and clusters are broken up and one material is actually combined, or *coated*, with another.

Aggregates, Ultimate Particles.

Fig. 1 shows a random mass of aggregates as introduced into a mixer. Fig. 2 shows this same mass of aggregates mixed. But, the aggregates have not been released or combined into the ultimate particles necessary. In Fig. 3 some of the aggregates have been combined with the ultimate particles. Fig. 4 illustrates the ideal, controlled dispersion of ultimate particles.

Intensive Mixing—

as produced by friction and pressure forces, sufficient to break down the aggregates, is necessary to achieve the controlled dispersion indicated by Fig. 4. Of all mixing methods now in use for solid/solids blending, *mulling*, alone, combines the mechanical principles needed to *combine* aggregates or agglomerates . . . rather than placing them *next* to each other.



Simpson MIX-MULLER® (Batch)

Simpson Mix-Mullers are available for either batch or continuous processing in 12 sizes, ranging from 24 inch to 10 ft. pan diameters and in productive capacities up to 300 tons per hour.

Simpson MULTI-MULL® (Continuous)

In A Simpson—

mulling is accomplished on the pan. Muller wheels roll over and through the material to produce an intensive kneading, smearing, *spatulate* action. Plows turn and fold the batch into the path of the mullers. Discharge is by action of the plows alone, through a bottom door. No power is wasted in "hefting" heavy material burdens.

The result? A strictly uniform mix—homogeneous and thorough. A mix without "hot spots," balling, uneven and wasteful dispersion. Power requirements are low, wear [illegible] of parts is exceptional.

Controlled Dispersion.

If your present mixing methods are giving you less than uniform, controlled dispersion, you're wasting valuable raw material. Why not ask for a test at the *National Performance Laboratory?* Without investing a cent in new equipment you can find out, in advance, exactly what a Simpson Mix-Muller® or (continuous) Multi-Mull® can do. A new booklet fully describes this new service. Write for it today.

NATIONAL ENGINEERING COMPANY 642 MACHINERY HALL • CHICAGO, ILLINOIS 60606

SIMPSON MIX-MULLER DIVISION

Send for Lab. Test Brochure

Emerganics

Can your low temperature plasticizer system pass the "frigid guillotine" test?

The T-bar samples (below) that failed this test (described at right) were made from a vinyl that cost a few cents less but which could cost a fortune in lost customers.

If you're not sure of the low temperature performance of your vinyls, you should take a good look at the test sample at the top of the photo. Plastolein® 9058 DOZ Plasticizer helped this vinyl retain its flexibility down to a chilly −60°C and below!

In addition, Plastolein 9058 DOZ is the only low temperature plasticizer offering this fine balance of properties:

- longer lasting LT flexibility
- good compatibility
- low volatility
- superior heat and light stability
- outstanding extraction resistance
- fine hand and drape

All these qualities that influence your customers to buy again and again are yours at less than a cent per pound more than formulations using average low temperature plasticizers. Isn't this a paltry premium to pay for customer satisfaction every time?

If you haven't already added the safety factor of Plastolein 9058 DOZ to your vinyl formulations, why not send for evaluation samples and complete information today? Use convenient coupon.

ASTM D746 BRITTLE POINT TEST

T-50 samples are cut from 75 mil plastic sheeting. A Scott Brittleness Tester is employed, using methanol cooled with dry ice as the heat transfer medium. Five samples at a time are clamped in tester holder and immersed in the fluid for 2.5 minutes at the given test temperature. After immersion, a solenoid activates a guillotine which delivers a single impact blow to the samples. The samples are examined for failure, failure being defined as breaking of the sample. Temperatures are selected to produce a range between no failure and complete failure. Brittleness temperature is defined as that temperature where 50% of the samples break.

PLASTOLEIN PLASTICIZERS

9051 DHNZ	9055 DGP	9057 DIOZ	9058 DOZ	9066 LT	9078 LT	DOP
Plasticizer Concentration, phr						
45	45	50	45	45	45	50
Brittle Point, °C						
Below −60	Below −60	Below −60	Below −60	Below −60	−57	−29

Significant developments from Emery oleochemical research

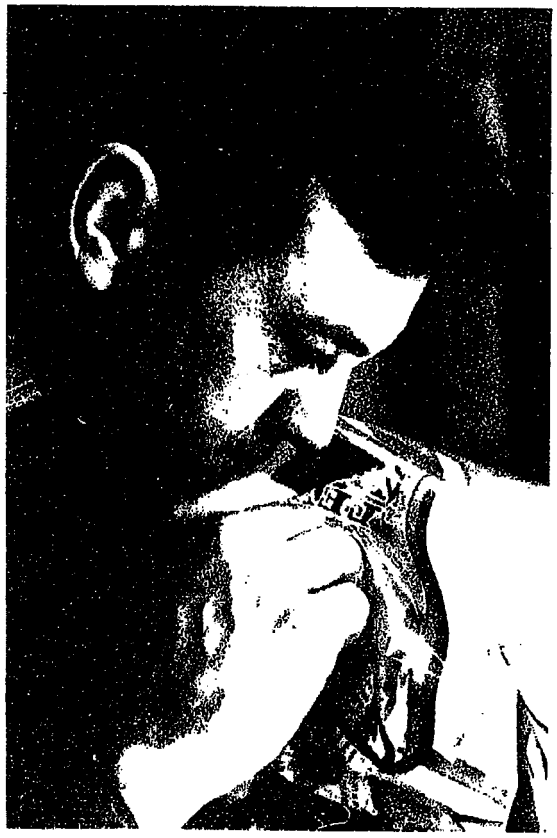
Emery offers low odor polyamide resins for printing inks

There's no longer any need to "special order" low odor polyamide resins for flexographic or rotogravure inks. Low odor is a uniformly dependable characteristic of *all* Emerez* Polyamide Resins.

Film and foil printed with inks based on Emerez 1538, 1535, 1530, and 1540 show superiority in the resin odor test, shown below, prescribed by the Flexographic Technical Assn., Inc.

In addition to low printed film odor, Emerez Polyamides offer excellent color; improved wet-pack resistance and adhesion to polyolefin films; rub, blocking, and smearing resistance; high gloss; and good compatibility with other film-forming resins.

For detailed information, write for Technical Bulletin 446, "Emerez Polyamide Resins in Flexographic and Rotogravure Inks".



Quality Esters for textile lubricants

Emery oleate esters, widely used in specialty lubricants, reflect the outstanding color, odor, and oxidation stability of the Emersol* Oleic Acid from which they are derived.

Emery's methyl, propyl, and glyceride esters, because of their oily, non-corrosive nature and low pour points, are used in textile oils, as bases for sulfurized lubricants, and in the compounding of specialty lubricants. When sulfated, they exhibit interesting surface active properties which have led to their use as wetting agents.

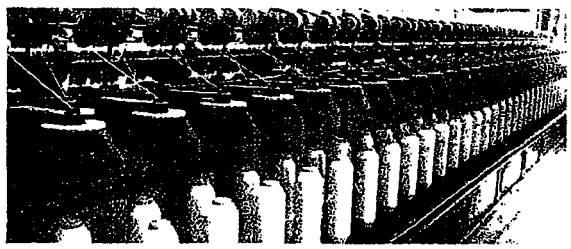
Another Emery ester, glyceryl mono-oleate, is a long chain mono-ester. With its unique oil solubility, small amounts of glyceryl mono-oleate add rust preventative properties to mineral lubricating oils. Technical Bulletin 434A contains specifications and properties of Emery Oleate Esters.

Three additional Emery quality esters are well worth investigating for use as textile lubricants and as components of textile softeners and finishing compositions:

Emerest 2322 Butyl Stearate. Very low odor and water white color. Request Data Sheet No. 104.

Emerest 2320 Butyl Stearate. Priced below 2322 for applications having less stringent odor and stability requirements. Request Data Sheet No. 104.

Emery 3989-D Ethylene Glycol Distearate, a white, moderately high-melting wax, exhibits good light, heat, and odor stability. Request Data Sheet No. 105.



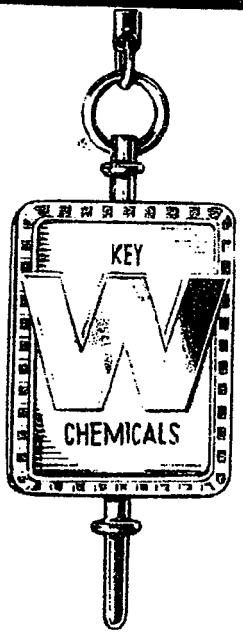
Emery INDUSTRIES, INC.

Organic Chemicals Division
Dept. 137, Carew Tower
Cincinnati, Ohio 45202

Western Operations,
Santa Fe Springs, California
Emery Industries (Canada) Ltd.,
London, Ontario
Unilever-Emery N.V., Gouda, The Netherlands
Export Division, Cincinnati

Please send:
- ☐ Plastolein 9658 DOZ evaluation sample
- ☐ "Plastolein Plasticizers" brochure
- ☐ Technical Bulletin 446, "Emerez Polyamide Resins in Flexographic and Rotogravure Inks"
- ☐ Technical Bulletin 434A, "Emery Oleate Esters"
- ☐ Data Sheet 104, Emerest 2322 and 2320 Butyl Stearate
- ☐ Data Sheet 105, Emery 3989-D Ethylene Glycol Distearate

Name_____ Title_____
Company_____
Street_____
City_____ State_____ Zip____



CAUSTIC

Pretty ordinary stuff? That's the way most makers tend to treat it. We don't. At Wyandotte, caustic is a key chemical. This makes it mandatory for us to think of caustic as something special. And to treat it accordingly. That's why we're so fussy about its quality . . . about the economy, efficiency and speed of its distribution. Why we are continuously expanding our manufacturing facilities to pace our customers' needs for quality caustic. And that's why we put our technology at your disposal, help you get the most from our products and experience. That's the key chemical concept. All Wyandotte customers benefit from it. We don't take anything for granted. Send in the coupon . . . we'll provide complete price and shipping information, as well as technical consultation.

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I use [ ] anhydrous caustic; [ ] 50% liquid; [ ] 73% liquid. Please send me [ ] Caustic Soda Book. [ ] Have your representative contact me.
Send price and shipping information for [ ] carload; [ ] truckload; [ ] less-than-carload quantities. This request is for [ ] immediate use; [ ] use within next 6 months; [ ] reference only.

Second Try for DMSO?

A meeting to be held early next month in Washington may help decide the pharmacological fate of dimethyl sulfoxide (DMSO). The chemical has been widely praised as a miracle among miracle drugs; but clinical testing of DMSO was virtually halted late last year by the Food & Drug Administration after researchers here and abroad reported some adverse side effects in animals treated with the material.

On Oct. 5, officers of the Dept. of Health, Education & Welfare will meet with several medical researchers who have had laboratory and clinical experience with DMSO. The conference was arranged at the request of Representative Robert Duncan (D., Ore.), many of whose timber-country constituents are keenly interested in the fate of DMSO. Reason: in the U.S., DMSO is a wood chemical. It's derived commercially from the lignin waste produced in pulping wood chips.

FDA won't say what sort of discussion it expects at the coming meeting. A spokesman for FDA Commissioner James Goddard comments only that "We'll listen to what they have to say."

But one of the physicians who plans to attend, Dr. Arthur Scherbel of the Cleveland Clinic, tells *CW* he expects "a thorough review of DMSO—its history, the problems that led to the discontinuation of testing, and what we can do to get it back into clinical testing."

A thorough review of DMSO is a big order. During the three years since the first reports of its extraordinary behavior in living organisms, DMSO has been the subject of considerable controversy and considerable ballyhoo. It has also been credited with an almost unbelievable spectrum of medicinal actions—from relieving headaches and alleviating schizophrenia symptoms in humans, to enhancing the efficacy of antibiotic and nutrient materials applied to fruit trees.

The singular property of DMSO is its ability to pass through biological membranes: it can be applied externally, then penetrate deep into the body of an organism. For example, doctors have reported successful treatment of the pain of bursitis or rheumatism simply by swabbing DMSO onto the skin near the affected joint.

Moreover, DMSO seems able to carry other substances with it as it courses through living tissues. Finally, the permeating action of DMSO seems to be completely reversible—i.e., there is no permanent effect on membranes once the DMSO has passed through them.

All of this was noted by the men who did the initial research on DMSO: Stanley Jacob, a surgeon on the faculty of the University of Oregon Medical School; and Robert Herschler of Crown Zellerbach Corp.'s (San Francisco) Research Center at Camas, Wash.*

First reports of these extraordinary properties of DMSO appeared in '63, in news releases from the University of Oregon. Early in '64, the first reports in medical journals came out.

Six drug houses help CZ produce medicinal-grade DMSO: American Home Products, Geigy, Merck, Schering, Squibb and Syntex. (CZ has an agreement with the university whereby the company and the school will share equally all royalties from sales of medicinal DMSO by licensees.)

By Jan. '65 the popular press had discovered DMSO and doctors curious about the "miracle" began trying it on a great variety of afflictions.

Physicians not affiliated with any formal testing program were experimenting with the drug, with neither the knowledge nor the supervision of FDA or the drug companies.

And laymen who had read of the "miracle" and had become convinced that it could help them were treating themselves with industrial-grade DMSO.

By '65, more than 1,000 doctors in the U.S. were trying DMSO; and —as even the staunchest supporters of the drug concede—the situation had gotten out of hand.

Then several reports of adverse reactions to DMSO caused alarm in Washington. Most important of these: researchers here and in England had found that heavy doses of DMSO caused changes in the lenses of the eyes of experimental animals. The doses used were much larger than

*CZ holds a number of DMSO patents, covering production and use. The chemical is used industrially as a solvent for a wide variety of materials, including polymers; synthetic fiber producers use it in quantity.

those being tried on human patients, and no lens effects in these patients had been reported; nonetheless in Nov. '65 FDA ordered a halt to testing of DMSO on humans. At that time, it's estimated, nearly 50,000 persons had been treated with the drug in the U.S. alone.

It has become clear that FDA's crackdown on DMSO is one of the most unpopular moves the agency has ever made. Physicians who believe that the compound has great clinical promise are afraid that large-scale testing may never be resumed. They also question whether FDA is any longer in a position to make an objective assessment of DMSO.

However that may be, DMSO is on the shelf for now. Some small test programs are still operating, under FDA supervision. Five "sponsors" are being allowed to use DMSO on some 100 patients who have life-threatening diseases—e.g., multiple sclerosis and scleroderma.

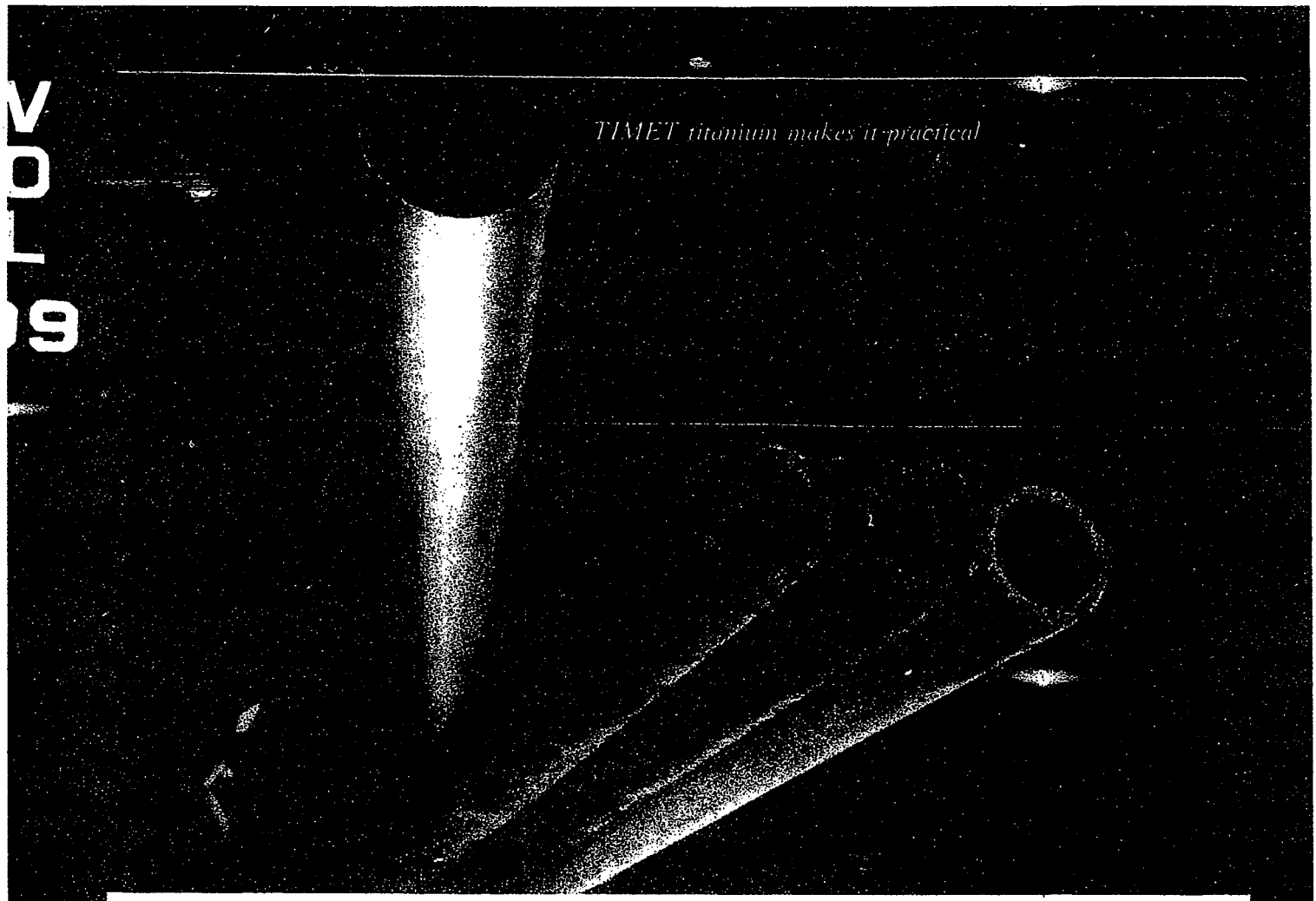
FDA won't tell who these sponsors are, but one is Cleveland Clinic's Scherbel. He tells *CW* that he is using the material on some 40 scleroderma patients. (Scleroderma in a condition that affects collagen, a fibrous component important in the structure of skin and bones. Changes in the collagen render the skin and other soft tissues rigid, the joints stiff.)

According to Scherbel, his patients have received frequent eye examinations in the course of DMSO treatment, and none has shown "any ocular abnormality thought to be related to DMSO."

But last week an FDA spokesman said the agency knows of no evidence of sufficient significance to support wider use of DMSO as an experimental drug. And there the matter stands.

Stanley Jacob—now engaged in animal experimentation on the use of DMSO an an adjunct in the treating of arterial diseases—says he hopes some "washback" of data and clinical experience from Europe may help bring a break in the present stalemate.

Indeed, Europe will be holding the attention of DMSO experts in the months ahead. Early in November a conference at the University of Vienna will be devoted to the drug and to European doctors' experience with it. More important, by year's end DMSO will have reached the market as a prescription drug in West Germany and Austria.



This light-wall titanium tube will outlast cast-iron tubes three to one—see text

Titanium replaces cast iron in Solvay ammonia stills for lower costs, longer service, reduced maintenance

Titanium replaced 4-inch diameter x 5/16-inch wall cast iron tubes in ammonia stills and enabled Allied Chemical to significantly reduce costs in four soda ash plants. Titanium readily withstands the severe corrosive attack of ammonia, ammonium chloride and hot brine.

Allied selected titanium to replace cast iron because of titanium's projected three-times-longer service life.

This is expected to reduce retubing labor costs, extend header sheet life and minimize downtime.

Maximum economic performance is vital in soda ash manufacture, with its high fixed investment and tight profit margins. After an intensive metals evaluation program Allied specified titanium tubes in ammonia recovery on a company-wide basis. Where header sheets are in good condition cast iron pipe is replaced with 0.030" wall titanium. Where header sheets need replacement, the heat exchangers are redesigned around the properties of 1½" OD x .030" wall CodeWeld titanium tubing. Redesigned titanium heat exchangers have higher heat transfer efficiency, are more compact, cost less to install and maintain.

Bonus Savings in Steam. Tests at Allied's Syracuse, N.Y. plant suggest that titanium tubes will offer a 2% savings in process steam—worth $1500 per month—because of its superior heat-transfer.

One half million lineal feet of titanium tubing . . . this is the use of titanium in the soda ash industry to date.

You too can engineer your way around tough corrosion problems with titanium. Titanium Metals Corporation of America's Application Development Center can assist you with chemical, metallurgical, or engineering data, a testing program, prototype fabrication, and technical assistance to your commercial fabricator. All you have to do is ask. Ask too for TMCA's Design Data Book for the Chemical Processor.

TIMET® titanium

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What happens
when you buy
from Eastman!

1

Countdown

10. Notify Production of impending order
9. Inform Shipping of need for tank truck
8. Start order processing
7. Inspect truck for correct hosing and cleanliness
6. Load truck
5. Run analysis on shipment
4. Check applicable freight rates
3. Get proper approvals
2. Determine best routes, bridge limitations
1. Roll out

Three hours from notification to roll out. That's all the time it took for Eastman people to process the urgently needed order of NIPA (n-isopropylaniline), a new product recently marketed. While the truck's motor was being warmed up for the cross country run, orders were signed, approvals obtained and the material loaded.
Next day, as promised, the shipment was at the customer's plant, almost 750 miles away. Only twenty-nine hours after the order was received.

With Eastman service, all systems are "GO."

Interested personal service—always—when you buy from Eastman

Eastman
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Subsidiary of Eastman Kodak Company

SALES OFFICES:
Eastman Chemical Products, Inc., Kingsport, Tenn.; Atlanta; Boston; Chicago; Cincinnati; Cleveland; Dallas; Detroit; Greensboro, N.C.; Houston; Memphis; New York City; Philadelphia; St. Louis.
Western Sales Representative: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Seattle; Salt Lake City.

With more than 400 industrial and specialty chemicals, Eastman serves these industries:

Adhesives • Agricultural chemicals • Chemical specialties • Cosmetics • Drugs • Foods • Industrial chemicals Packaging • Paints, Varnishes and Lacquers • Petroleum • Plastics • Printing Inks • Rubber • Textiles

For properties and shipping information on Eastman industrial and specialty chemicals, see *Chemical Materials Catalog*, page E-1, or *Chemical Week Buyers' Guide*, page 101.

Procter & Gamble gives "red stamps"

You won't find P&G's "red stamps" at your local store. But in terms of value, they represent our very real concern for your chemical order. It's the kind of concern that provides continuing service from the time the order is received until shipment is delivered. At P&G, service is a word that's put to work.

We believe that the most important part of service is keeping you, our customer, informed. That's why we send out a formal acknowledgement of each and every order we get, spelling out the terms in detail. It's why we follow through on orders placed with plants to make sure no order is misplaced, mishandled or forgotten. It's why our chemicals order department gives you personal, professional attention.

Service is easy to say. It's a little harder to provide. We provide it. Just join our "red stamp plan" and see. Write Procter & Gamble, Industrial Chemicals Sales Dept., P.O. Box 599S2, Cincinnati, Ohio 45201.

Service isn't extra, it's just part of P&G.

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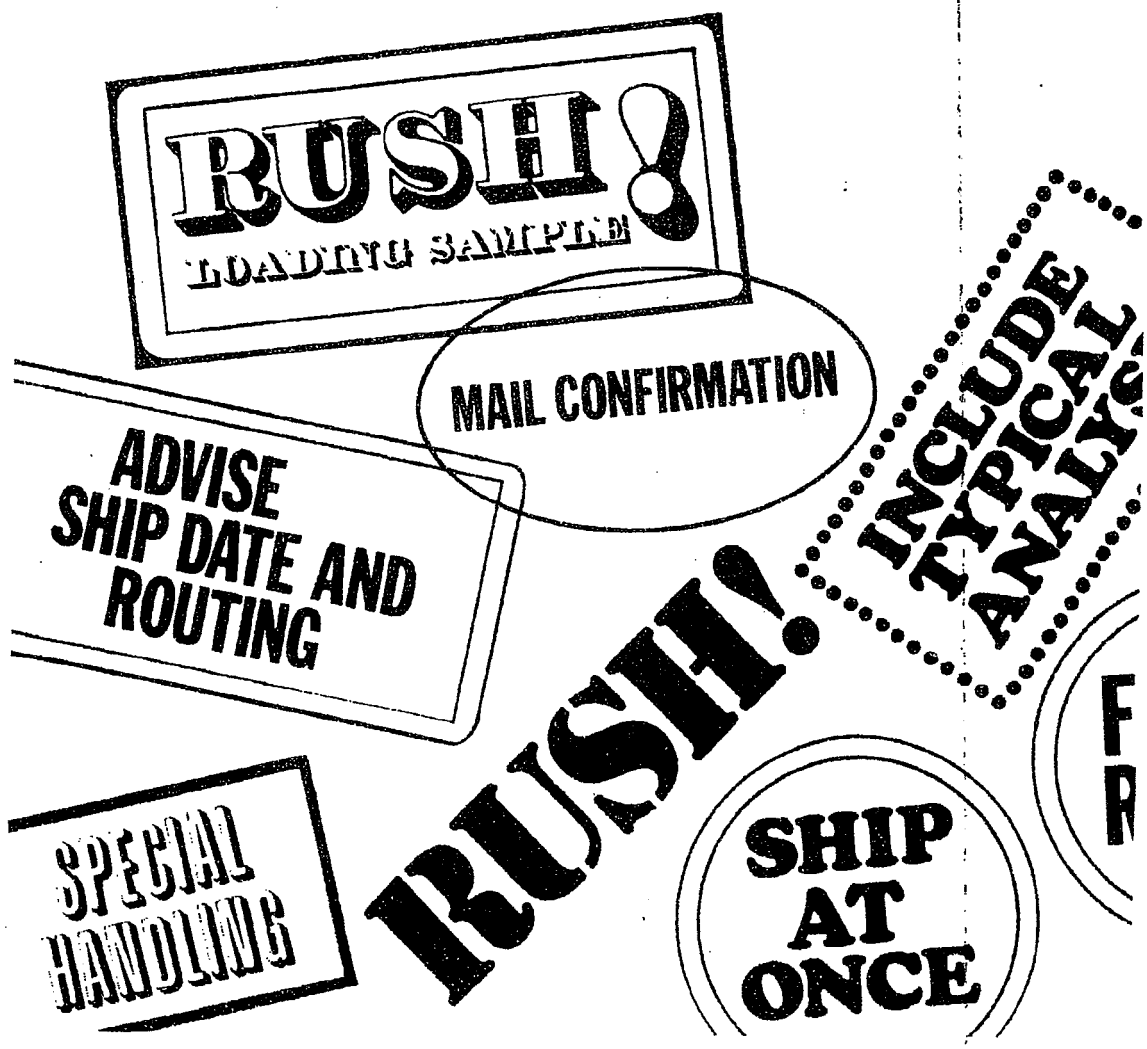
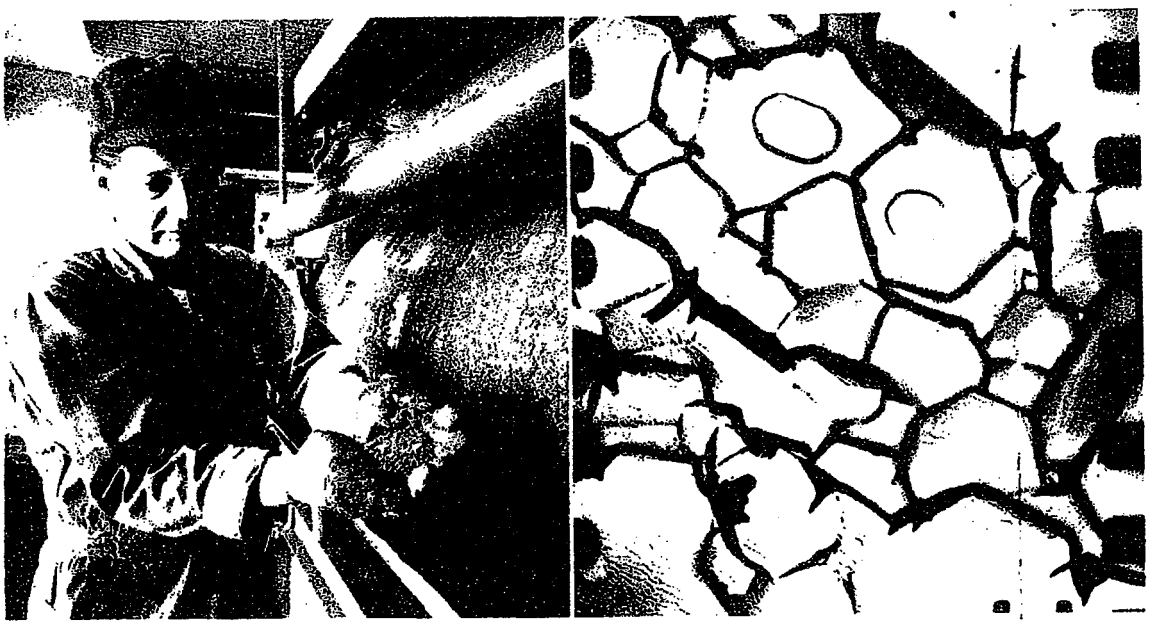




Flaky, dry ferrite from revolving drum appears as 'clinkers' enlarged 13,000 times.

Magnet Makers Turn Up the Heat

Auto industry sets the pace in growing market for permanent magnets, particularly ceramics

Thanks mainly to zooming sales of electronic equipment and electric motors for auto use, producers of the permanent magnets used in such devices are in an expansion phase that shows few signs of ending. Sales of the magnets, made of special alloys and ceramic ferrite compounds,* are expected to double within the next 10 years from the present $50-million 'year level.

Getting ready for this sales spurt are:

• Crucible Steel Corp. (Pittsburgh). It produces both the relative new ceramic magnets and the well established alnico metal types, and has just dedicated a new multimillion-dollar permanent magnet plant at Elizabethville, Ky. Management has already approved plans to expand the ceramic facilities of this plant in the fall, and again next spring.

• Westinghouse Electric Corp. (Pittsburgh), sole producer of sulfate-modified strontium ferrite ceramic permanent magnets. It is completing an expansion at its Blairsville, Pa., plant. This will hike its magnet capacity from approximately 1.5 million to 4 million lbs./year (*CW Market Newsletter, Oct. 23, '65*).

• Stackpole Carbon Co. (St. Marys, Pa.). This company has roughly doubled its magnetic powder plant capacity at Kane, Pa. Stackpole sells both ferrite powders and sintered barium ferrite magnets.

• Indiana General Corp. (Valparaiso, Ind.). IGC, which claims to be the largest manufacturer of magnetic materials, and first to produce ceramic magnets commercially in the U.S., is doubling permanent magnet capacity.

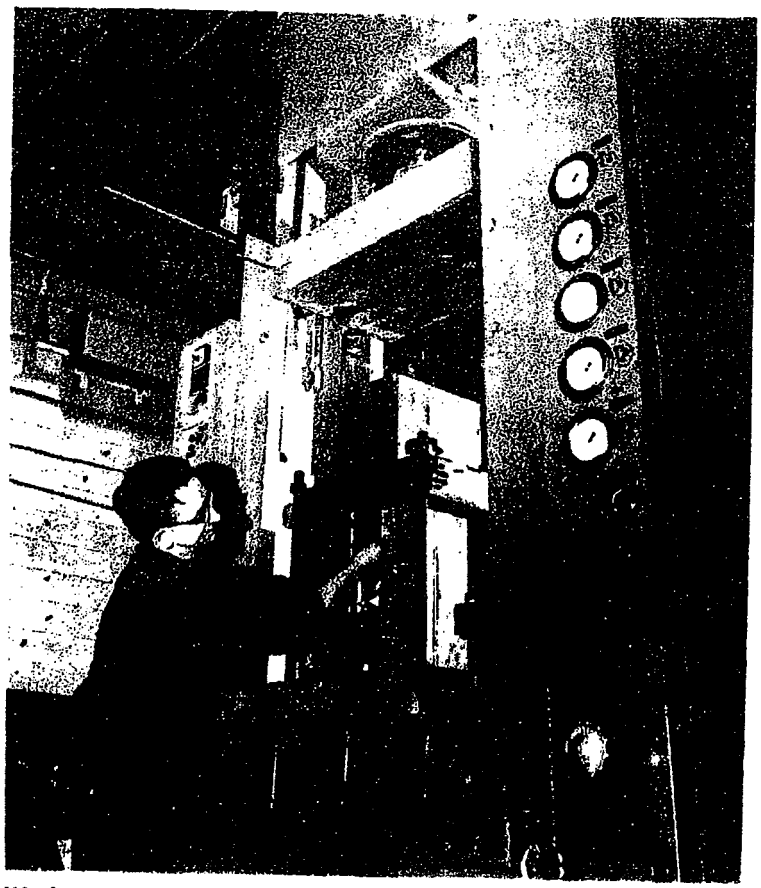
These expansions are all to boost output of ceramic magnet materials; not for enlargement of alnico plants. Alnico, a castable metallic alloy, has been around for over 30 years, has perhaps 60% of the market. Ceramic magnets, made by pressing and sintering powdered ferrites, his commercial stride about five years ago. By opening new markets in a range of products—power tools and kitchen appliances to office equipment and automobiles—they have shared 40% of PM sales already. Sales of ceramic magnets are now estimated at $15-18 million year.

The boom is gaining strength largely because of the automotive industry. When Detroit's industrialists began using small electric magnet motors in autos a few years ago, most magnet people foresaw no big market potential. But the auto makers have recently committed themselves to more motors in autos—there were 19 different magnet motors in some '65 Chryslers—to operate car windows, fans, seats, washer pump motors, etc.

Also, ceramic magnet motors are replacing many "electrofield" motors—those that depend on electromagnets. The new motors have greater

*Ferrites are a class of material usually containing iron and oxygen atoms along with barium (hard ferrites), manganese, zinc (soft ferrites) or other divalent ion. Ferrites are the pre-size particles (clinkers) that result from calcining these materials. Hard ferrites are used for ceramic permanent magnets; soft ferrites are used for memory cores in computers, antenna rods, and in color TV sets.

Pressed slab of ceramic magnetic material is ready for kiln.



Workman prepares new 200-ton press for operation.

efficiency, simplicity and lighter weight, are smaller, cheaper and make it possible to make easily portable appliances and tools.

Each magnet type lends itself to different uses. Alnico magnets are selected usually where small surface areas and long lengths are needed; ceramics can be made into flat plates that have a large surface. The ferrites are brittle and lower in tensile strength; alnico is better for magnets that must operate at elevated temperatures and where shock resistance is a prime requirement.

Right now about 95% of ceramic magnets sold in this country are barium ferrite types. Although Westinghouse is going in heavily for a sulfate modified strontium type.

Both alnico and ceramic magnets are truly long lasting. Portus M. Wheeler, president of Crucible Steel Magnet Division, says "a PM retains more than 97% of its magnetism" practically forever. It loses about 1% of its magnetism as soon as it's energized, and 0.2% during the next 12 months, for a total loss of approximately 1.2% during the first year. And our best guess is that it loses only another 1% during the next 100,000 years."

Long After Lodestone: The naturally occurring iron ore, magnetite or lodestone, was the first known permanent magnet material. But the first man-made PMs were made commercially by magnetizing high carbon steel. Tungsten magnet steels were developed next, followed by chromium alloy steels. Next came cobalt steels.

The alloy element contents in these later steels add to their ability to remain magnetic: carbon steels are readily magnetized but lose their "force field" quickly.

Big improvement came in the '30s with development of alnico, a metallic alloy of aluminum-nickel-iron, with cobalt, copper or titanium added in certain cases. This alloy is cast in molds to near finished shape and ground to specific tolerances. Such alloys soon became the "wonder metals" of magnetism.

Until 1960, when the ceramic permanent boom began, alnico and permanent magnet were synonymous. This is no longer the case. The big reason for the ceramics' success is that they are cheaper. A ceramic material suitable for door latches costs about

$1.10/lb · a comparable alnico magnet, about $2.80/lb.

Keyed to Chemical Process: Ceramic magnets involve a true CPI process.

The processes for permanent ceramic magnets originated with a Dutch company, Philips of Eindhoven in '56, but North American Philips Co. (New York) owns the U.S. patents (2,762,777—nonoriented and 2,762,778—oriented), which it licenses to magnet producers in the U.S. NAP purchased all the Dutch firm's patents, including futures, which were put into trust in the U.S. by the Dutch company in '39. Westinghouse has a U.S. patent on the sulfate-modified ferrites.

The ceramic types are made from alkaline carbonates (e.g., barium, strontium, lead), mixed with iron oxide and calcined for about three hours. The resulting ferrite is then ground to a fine powder, pressed into shape and fired in a kiln at 2000-2300 F.

So-called oriented grades are ground into powder with water and wet-pressed; partlyoriented and nonoriented grades are dry-pressed, then fired. Oriented means controlled position of the molecules (all point the same way) in the magnet; nonoriented is random. When the ferrite powder is wet- or dry-pressed into the designated shape in a die, the grains of the magnetic compound are aligned in a magnetic field.

The ability of a permanent magnet to support an external magnetic field results from locked-in positions of small magnetic "domains." These locked-in positions, once established by initial magnetization, are held until acted upon by forces exceeding these locked-in forces. "Coercive force" of a magnet reflects its resistance to demagnetization.

A magnet's coercive force is measured in oersteds. In alnico magnets, coercive force values are 400-1,800 oersteads; in ceramics, 2,000-4,000.

Gauss is the unit term for residual induction, on a square inch basis "BH max" denotes peak energy product. B stands for flux density; H, for coercive force (gauss and oersteds). Nonoriented ceramic magnets produce about a 1 million energy product (BH max), oriented consistently produces 3.5 million BH max.

Power Package: These high levels

of magnetic force mean motors made with ceramic magnets have high efficiency. These motors (up to ¼ h.p.) are operated on direct current and have made "cordless" battery-operated appliances a practical household reality. But PM motor application is not limited to DC operation. Where light weight and small size are important, a rectifier diode can be incorporated in the PM motor circuit so that AC can be used.

Since electric power in an auto is limited, and auto makers are very cost conscious, the relatively cheap ceramic magnetic motors have taken most of the car business. Ford Motor feels that ceramic magnets are so important to its operations that it may put in its own magnet-making facilities.

The shortage of copper now makes PM motors look even more attractive to the automotive people. In a window lift motor, for example, two-thirds of the motor's copper is in the stator coils that supply the magnetic field. Such copper-wound electromagnets can be replaced with ceramic magnets. The magnet is cheaper, and there's no labor cost for winding the field coil.

Ceramic Uncertainties: Not all ceramic magnet makers agree on the best recipe for a magnet. Westinghouse holds a patent (U.S. 3,113,927) for sulfate-modified strontium ferrite composition.

It claims magnets made of this have the highest coercive force of any of the currently popular production products. Westinghouse says that in laboratory experiments with sulfate-modified strontium ferrite, it has gone up to as high as 5,300 oerstads and repeatedly averages 4,500 oersteds.

Allen Bradley Corp. (Milwaukee) largely discounts the strontium ferrite magnet, at least for the near future. And it also rates lead ferrite, the third ceramic type of higher coercive, quite low. AB says the lead compound is difficult to handle, although it has high degrees of residual induction.

Size for size and weight for weight, the price of the basic raw materials (barium or strontium) is incidental, says Indiana General; processing accounts for costs. Arnold Engineering, which has worked with both barium and strontium ferrites, says both are competitive in price and magnetic properties. Prices are dependent on size and complexity of the piece part as well as on quantity desired by the user.

Magnets have to compromise between cost and properties. Some materials can make excellent magnets, but usually at too high a cost. Arnold Engineering Co. (Marengo, Ill.) makes a costly platinum cobalt magnet, for example, that is used for microminiature application.

Improvements Coming: The need for ceramic magnets will more than double in 10 years—potential is not nearly exhausted. In '65, ceramic magnet production was about 7 million lbs., including barium, strontium and lead ferrites. Better materials will help sustain magnet growth.

Indiana General says it has achieved, in laboratory samples, intrinsic coercive force of 12,000 oersteds—without strontium. Theoretically, maximum intrinsic coercive force has been calculated by Dutch scientists to be 17,000 to 18,000 oersteds—using barium or strontium ferrites. Ceramic magnets that are now being mass produced have a force of about 4,000 oersteds.

With or without improvements, the list of uses for magnets is growing, and ceramics go into most of the new products. One potential application: Use of opposing magnets to act as spring cars for trains. Ceramic magnets will never totally replace alnico; but the field of PMs would not be growing so fast now if is were not for the ceramic permanent magnets.

It all adds up to a long-time boom for magnetic materials.

Foam Control Agent

A Z Products Inc. (Eaton Park, Fla.), manufacturer of ore flotation reagents, has developed a new chemical defoaming agent. The new product, Defoamer 15-E, is a balanced liquid fatty acid blend reinforced with special additives.

It is suggested for control of foam in the manufacture of phosphoric acid by the wet process. It can be added to the acid train as 100% active concentrate or can be dispersed in water of any desired concentration.

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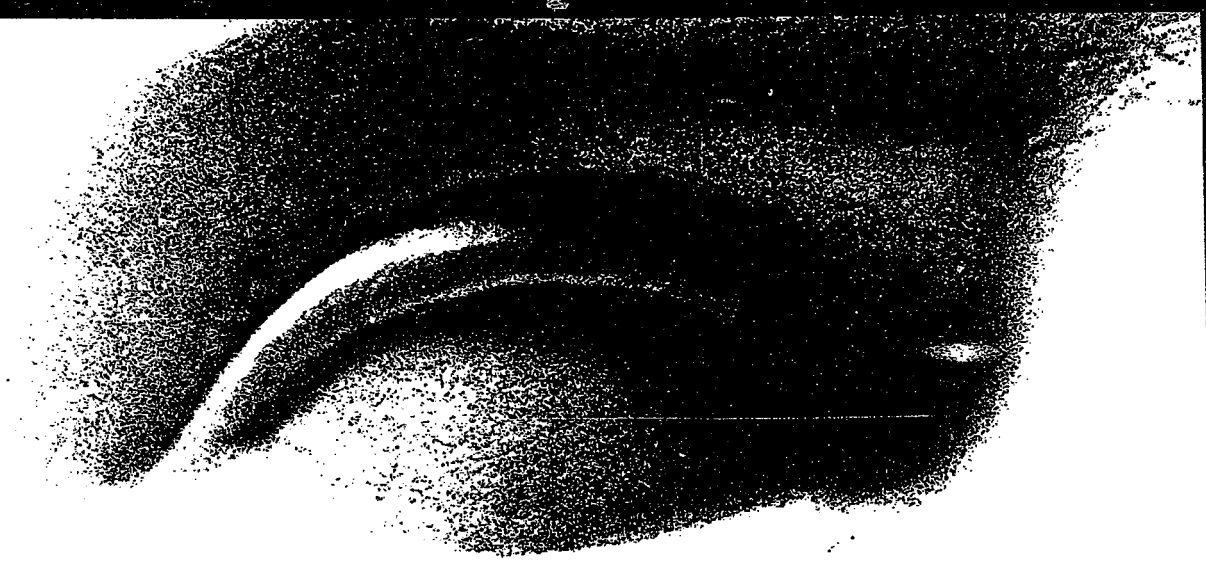

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COUNTDOWN

3-minute summary of this week's new products

NEW EQUIPMENT

SUPERVISORY CONTROL: Motorola Instrumentation and Control Inc. (P.O. Box 5409, Phoenix, Ariz. 85010) has developed a 10-command supervisory control system for plant, pipeline, electric and water utility applications. The packaged system enables installation by the user, eliminates custom engineering. The solid-state system, called TM—10, controls and monitors circuit-breaker and relay positions, reclosure actuators, alarms for pressure, level, temperature current, etc., positions for valves, operations of compressors and pumps.

FILTER HOLDER: Millipore Filter Corp. (Bedford, Mass. 01730) has come up with an improved-design Millipore filter holder for withstanding 10,000-psi. inlet pressure. Typical applications are filtration of ultra-clean liquids and gases in high-pressure lines. The unit holds a 47-mm.-diameter filter. Dimensions: 3⅜ in. diameter, $1^{13}/_{16}$ in. high.

CONDENSATE RECOVERY: Graver Water Conditioning Co. (Union, N.J. 07083) now has a new process for economical refining of condensate for reuse as boiler feedwater in installations where complete condensate demineralizers are not necessary. The system, called GRF, combines sodium cycle ion exchange and filtration to remove soluble and suspended impurities. The process removes water hardness, copper and iron at temperatures to 300 F. Cation resins have been developed to withstand these temperatures without breakdown.

COLD PIPE JOINT: Tube Turns Division of Chemetron Corp. (Louisville, Ky.) is offering a new pipe joint that permits aluminum and stainless steel piping to be used in the same installation. The joint is especially suited for cryogenic uses, is made of aluminum and stainless steel, which are metals that cannot be joined satisfactorily by conventional welding.

EPIDIASCOPE: Jarrell-Ash Co. (590 Lincoln St., Waltham, Mass. 02154) is the agent for Metals Research Ltd.'s (England) new epidiascope, which can be used with an image analyzing computer for examination of large, solid objects. Typical applications: the examination of brickwork, concrete and metals for flaws, porosity, granular size, the study of crack density in ceramics and analysis of fibers. It can also be used to analyze electron micrographs, photographs, negatives and transparencies. A large area can be covered and 25-lb. samples can be analyzed.

NEW SPECIALTIES

ENCAPSULANT: Emerson & Cuming Inc. (Canton, Mass.) is marketing a new two-part epoxy casting resin. Stycast 2050 is said to have low viscosity and long pot-life, can be cured at 140-150 F in three hours, or at room temperature in two or three days. The product is supplied in two-container kits, in 2-, 10- and 50-lb. sizes at approximately $1/lb.

BUTYL-BASE BEDDING ADHESIVE: A butyl elastomeric polymer compound is offered by Steelcote Mfg. Co. (3418 Gratiot, St. Louis,

COUNTDOWN

Mo. 63103) for bonding glass to wood or aluminum in windows and doors. The premium-priced compound is claimed to provide a waterproof seal and to withstand contraction and expansion. It is packaged in 1- and 5-gal. pails, and 55-gal. drums for use with pumping equipment.

POLYESTER SIZING AGENT: General Aniline & Film Corp. (140 West 51 St., New York 10020) is offering Polectron 130, a poly(vinylpyrrolidone/ethyl acrylate) copolymer emulsion for use in combination with latexes to make polyester filament yarn sizes. According to GAF, the new emulsion—a 40% solids content and submicron particle size—is stable to mechanical shear, has good freeze-thaw resistance, and is compatible with many commercial latexes, tolerates high levels of pigment and filler loading.

WATER-SOLUBLE LANOLIN: A water-soluble form of lanolin for toiletries, cosmetics and consumer product formulations is being marketed by Alcolac Chemical Corp. (3440 Fairfield Rd., Baltimore, Md. 21226). Sipon LLS, a blend of lanolin alcohol ethoxylate sulfate and lauryl alcohol ethoxylate sulfate, is said to give good foaming properties, hard-water stability and low cloud point. Sample, experimental or multidrum quantities are available.

ANTISTICK RUBBER COATING: National Milling & Chemical Co. (4601 Flat Rock Rd., Philadelphia 19127) has developed a new slab release compound that adheres to oil-coated rubber stock. JM-53 compound comes in an aqueous cream-colored paste that is diluted in water before use; the low-suds solution can be used for dipping, spraying or coating natural or synthetic stock. The compound is packed in 55-gal., open-head, lever lock-type nonreturnable drums.

NONSPREADING INSTRUMENT OIL: A new synthetic lube fluid, Fulchem Oil 461, that stays where it is applied in fine instruments, timepieces and electronic equipment, has been introduced by William F. Nye Inc. (P.O. Box G-927, New Bedford, Mass. 02742). Fulchem is a low-viscosity oil that flows easily at temperatures as low as —20 F yet will not migrate or creep at 200 F or higher. The oil is stabilized to prevent oxidation or gumming and inhibited to prevent corrosion of the metals used in instrument construction.

PLASTISOL MODIFIER RESIN: Goodyear Chemical Division (Niagara Falls, N.Y.) is marketing a new plastisol modifier resin for expanded vinyl compounds in which low plasticizer level is desired (e.g., in flooring and fabric coatings). According to the company, the low molecular weight of Pliovic M-50 gives plastisols low melt viscosities and low fusion temperatures. The new resin is also suggested for use in automotive caulks and sealants, rotationally cast dolls and other toys, etc.

HOT-MELT ADHESIVE: Instant Lok 34-2900, a versatile hot-melt adhesive for ice cream cartons, bacon cartons and bag lip seals, has been introduced by National Adhesive Division (750 Third Ave., New York 10017). Final bonds are said to withstand temperatures from subzero to over 140 F. The new adhesive, available in crushed form, is said to work well in almost all commercially available premelt-type applicators.

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Liquidating Sifters, Screens, Separators: Rotex ro-ball, ajax, robins patterson; 20"x48"; 20"x 84", 40"x60", 40"x84", 3'x11' others. First Machinery Corp., 2[illegible]th St., Brooklyn, N.Y. 11215.

Excellent Equipment from liquidations consisting of: 23,000, 3600, 1400 gal. SS LOX Tanks: SS and Glass lined reactors; 316 SS Heat exchangers; Centrifuges, dryers, columns, etc. Send for complete listings. Brill Equipment Company, 37-53 Jabez Street, Newark, N.J. 07105.

3.—Kemp Inert Gas Generators, Mod. 170-S 17000 SCFH @ 84" W/125 HP motor, 2300/60/3, W/Valves and controls, S/Nos. I-541, I-540, and I-539. 3—Henry Voght Waste Heat Boilers, 2200 lbs/hr, 300 PSIG, shell ¼" W/ Attached Valves S/Nos. H701A, H701B, and H701C. 11—Exchangers & 5 Re-boilers, various sizes. All above equipment is from Callery Chemical Plant in Muskogee and is in like new condition. Write for details. Yaffe Corporation, P.O. Box 916. Muskogee, Oklahoma.

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Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N.Y. Hanover 2-6970.

We Buy Surplus or Discontinued Chemicals, Pigments, Dyes, resins, plasticizers, solvents, etc. Eastern Color & Chemical Co., Inc., 117-19 Liberty Street, New York 6, New York.

Buying Spent Catalyst, Metal Residues and sludges. Submit details to New Jersey Metals Company, 11 Commerce St., Newark, N.J. 01102.

Spent catalyst wanted: chromium, molybdenum, copper, tungsten and others. Consistent consumer. Southern California Chemical Co., Inc., 8851 Dice Rd., Santa Fe Springs, Calif. Call 213-698-8036. California and Ohio location.

Submit Offers—Metal Residues Spent Catalysts Flue Dusts. Lloyd M. Parkans Co., 4189 Bellaire Blvd., Houston, Texas 77025.

MONEY SHORTAGE CUTS HOUSING STARTS

Residential building is in a sharp depression, says Charles Young, director of Economic Services and Market Research of the Western Wood Products Assn., even though demand factors for new homes — family formations and income — are good. Big reason for the drop: the shortage of mortgage money.

The main sources of mortgage money are savings banks and savings and loan associtions. But higher interest rates have attracted savers elsewhere. Result: savings deposits growth has declined at a rate of $20 billion year—from $8 billion in fourth-quarter '65 to less than $3 billion in second-quarter '66. And savings and loan associations have had net withdrawals in second-quarter '66.

Residential mortgages totaling $216 billion bring in annual repayments of $8-11 billion plus $10 billion in interest payments — a source of new loan funds.

And recent legislation has enabled the Federal National Mortgage Assn. to purchase $3-3.6 billion in Federal Housing Administration and Veterans Administration mortgages. However, compared with the $20-billion annual decline in deposit growth, this relief is relatively insignificant.

Other possible forms of government help include legislation providing additional home mortgage funds and federal rulings setting interest rate ceilings to divert savings back to deposits in savings institutions. The diversion could be accomplished by placing an interest ceiling on government securities and by changing bank reserve requirements.

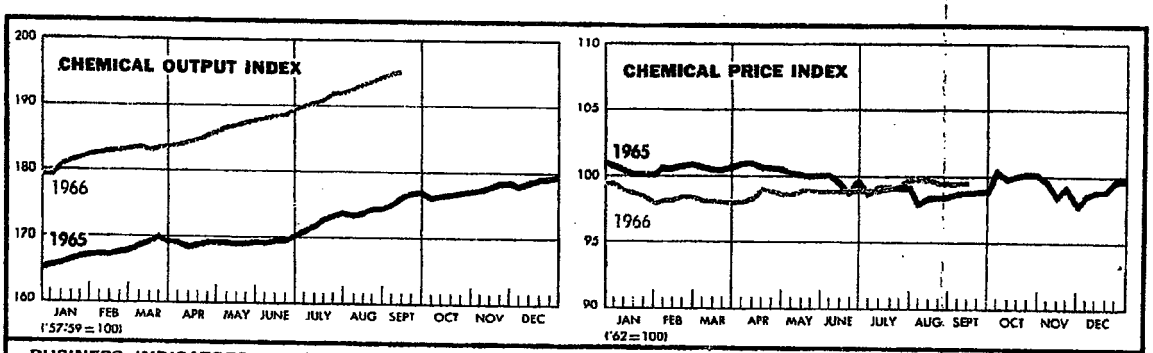
On the basis of the present mortgage-fund situation, Young estimates, housing starts in second-half '66 will not exceed 570,000, vs. 716,400 in the first six months. Thus, he sees a total for the year of not more than 1,287,000 and possibly a low of 1,250,000, vs. 1,520,000 last year. Excluding 35,000 publicly owned housing starts and 25,000 farm homes, private starts will total 1,190,000-1,227,000.

Since '66 totals include the effects of some earlier commitments for mortgages, the outlook for new housing starts in first-half '67 appears highly unfavorable. By next summer more funds should be available, and housing starts might total 1,140,000 for the year.

An increase in housing shortages will likely be the upshot of the combined maximum 2,420,000 housing starts this year and next. This will probably spur the market for mobile homes and the remodeling of existing homes. Mobile homes are already being produced at an annual rate of more than 200,000 units.

These developments are possible in a tight-money period because mobile homes and remodeling projects involve shorter-term and higher-yield loans than do mortgages, and funds are likely to be available for these loans even in highly competitive money markets.

THE CW INDEXES



BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CW output index	195.8	195.4	174.8
CW wholesale price index	99.6	99.6	98.7
Stock price index (12 firms)	55.88	56.90	69.60
Steel ingot output (1,000 tons)	2,560	2,501	2,414
Electric power (million kwh.)	22,828	23,698	21,269
Crude oil, condensate (daily av., 1,000 bbls.)	8,245	8,249	7,786

PRICE INDICATORS (Wholesale)	July '66	June '66	July '65
All commodities (other than farm, foods)	105.1	104.9	102.5
Chemicals, allied products	97.8	97.6	97.4
Industrial chemicals	95.9	95.8	95.0
Paint	106.8	106.8	105.7
Drugs, cosmetics	94.3	94.3	94.0
Fats, oils (inedible)	106.6	101.6	110.3
Fertilizer materials	104.2	104.8	103.3

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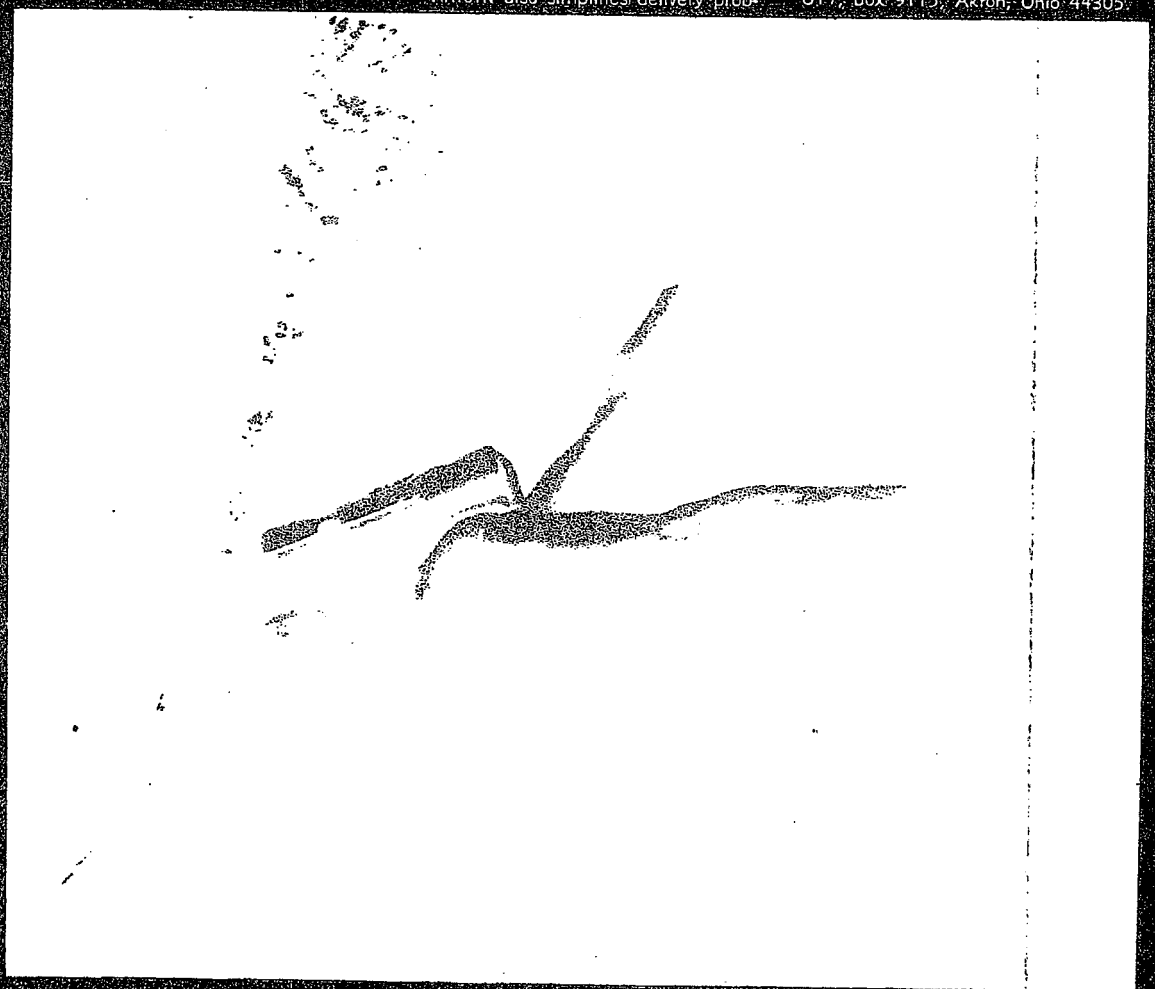

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