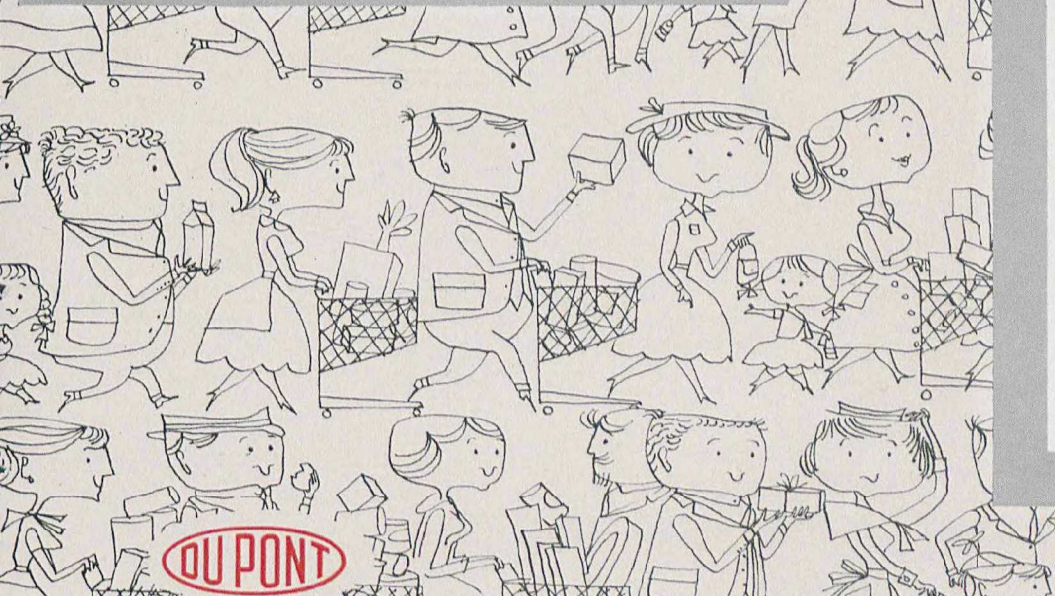
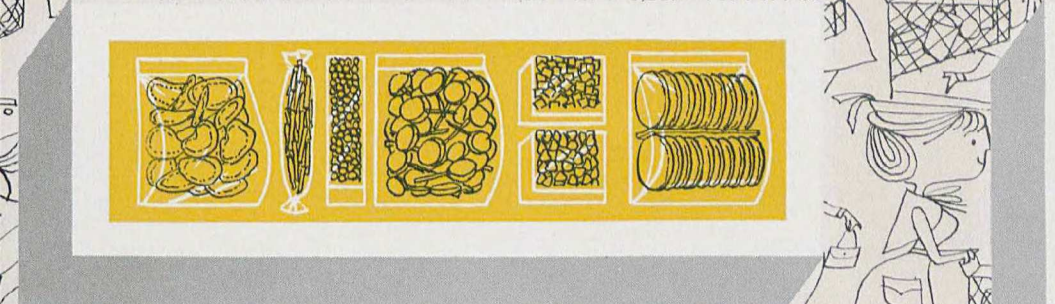
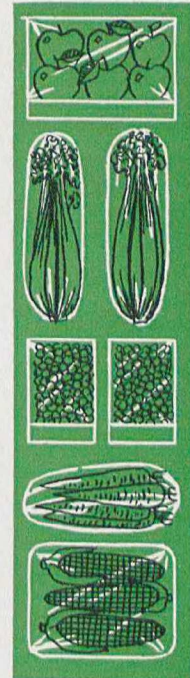
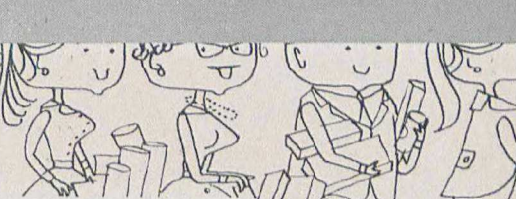
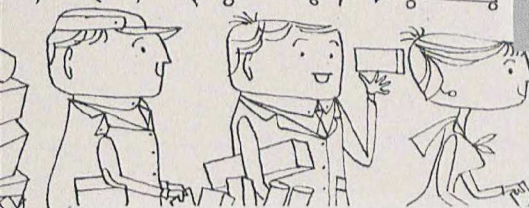
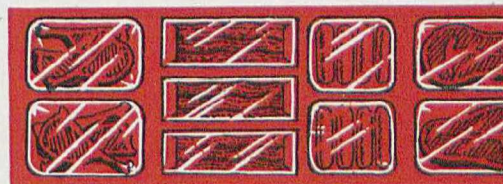
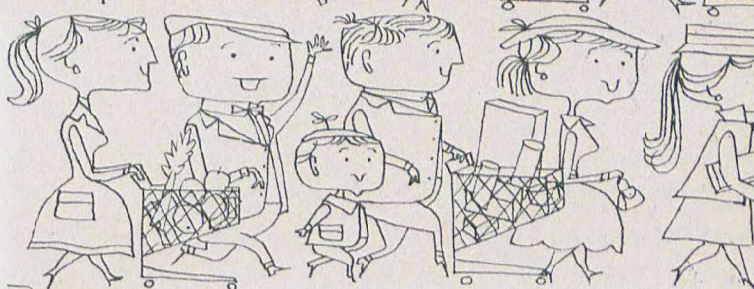
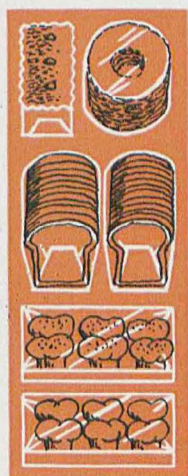


DU PONT

m a g a z i n e



DU PONT



HOW ABOUT A SHINE?



Just spread on DuPont New Car Wax, and wipe off for brilliant paste wax beauty. Your friends will notice the difference ... so will your wife. And you'll take a shine to the way it cleans, waxes and glazes in one easy application. New Car Wax takes the work out of waxing ... leaves you time for weekend rest and recreation. It gives long-lasting protection, too, plus extra weatherproofing with silicones. Look for it in the brown and yellow can wherever auto supplies are sold.

Treat yourself to these other DuPont beauty aids for easier care



Safe way to remove road oil and tar



Washes away dirt, but not protective wax coating



Makes chrome sparkle and removes rust



For fast, easy cleaning of white-wall tires



Color-enriching formula cleans bright as new

Du Pont No. 7 Products

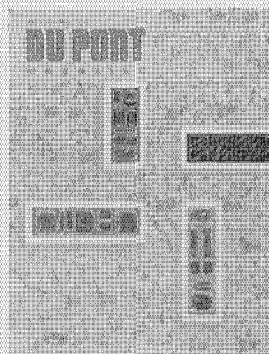


BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

OUR COVER

If you've pushed a cart through a supermarket aisle recently—or stood aside like a gentleman to let your wife do it—you may recognize yourself on Vince Hoffman's cover this month. He's been keeping tabs on you and your neighbors as you go about the serious business of stocking the family cupboard.

The fact that Du Pont makes cellophane—was the pioneer U. S. maker, as a matter of fact—inspired this supermarket cover. Cellophane and the supers go together like cheese and crackers. Our lead article, written for us by the editor of *Progressive Grocer*, wraps up in more detail the big part transparent packaging plays in the fast-moving world of supermarketing.



P. S.—DELETE ONE MORE

After the story on pages 14 and 15, "When do you drop a product?", had been completed and approved, Du Pont announced the sale of its long-established "Ventube" ventilating duct business.

"Du Pont will continue to manufacture the base material, 'Ventube' rubberized cloth," the press release said, "and Hanover Industries of Meriden, Conn., will manufacture and sell the finished products, flexible tubing for underground ventilation and bags for carrying explosives."

"The move," said Director of Sales Gordon T. Vaala, "is in line with the Company's general practice of supplying intermediate products for processing or fabrication by other manufacturers."

The list of Du Pont products, we again were reminded, can be as dynamic as a growing child. We got the feeling you had to move pretty fast just to keep up with current developments.

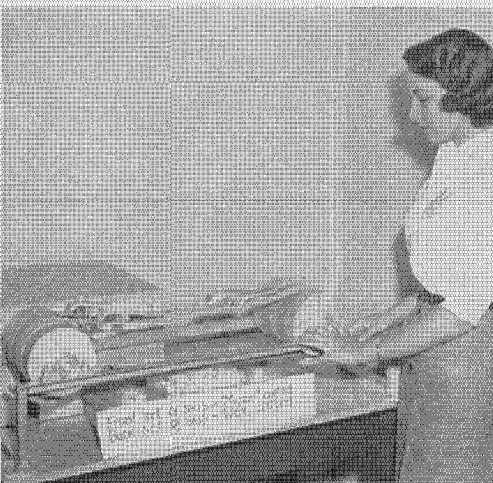
OPERATION UNFREEZE

Operation Deepfreeze, said press accounts reaching Martinsville, Va., was having trouble with airplane skis that froze fast in the snow down at the South Pole.

So Martinsville High School sophomore Jane Gregory took a hand in matters polar. She approached Julius Hermes of the Martin Processing Co., a film processor, who suggested that a surfacing of Du Pont "Mylar" polyester film might make the skis slide unchecked across the Antarctic wastes.

Experiments with several films bore him out. Jane's ingenious working model shows tiny belt-driven skis laminated with "Mylar" emerging cleanly from supercooled crushed ice, while untreated skis drag along chunks of "snow."

Last we heard, Jane and her model were off to Los Angeles and the National Science Fair, after having won state and area competitions handily.



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GORDON H. KESTER
Editor

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THE SUPERS SPRINT

Representing less than one in ten food stores, supermarkets now collect

two out of every three retail food dollars. They've achieved this success with the h

By ROBERT W. MUELLER

What besides apple pie and baseball is apt to strike a foreign visitor as typically American?

Many who come here from abroad will tell you promptly, "Your supermarkets. They reflect so many of the traits we associate with Americans."

Asked to elaborate, they might say: "It's because

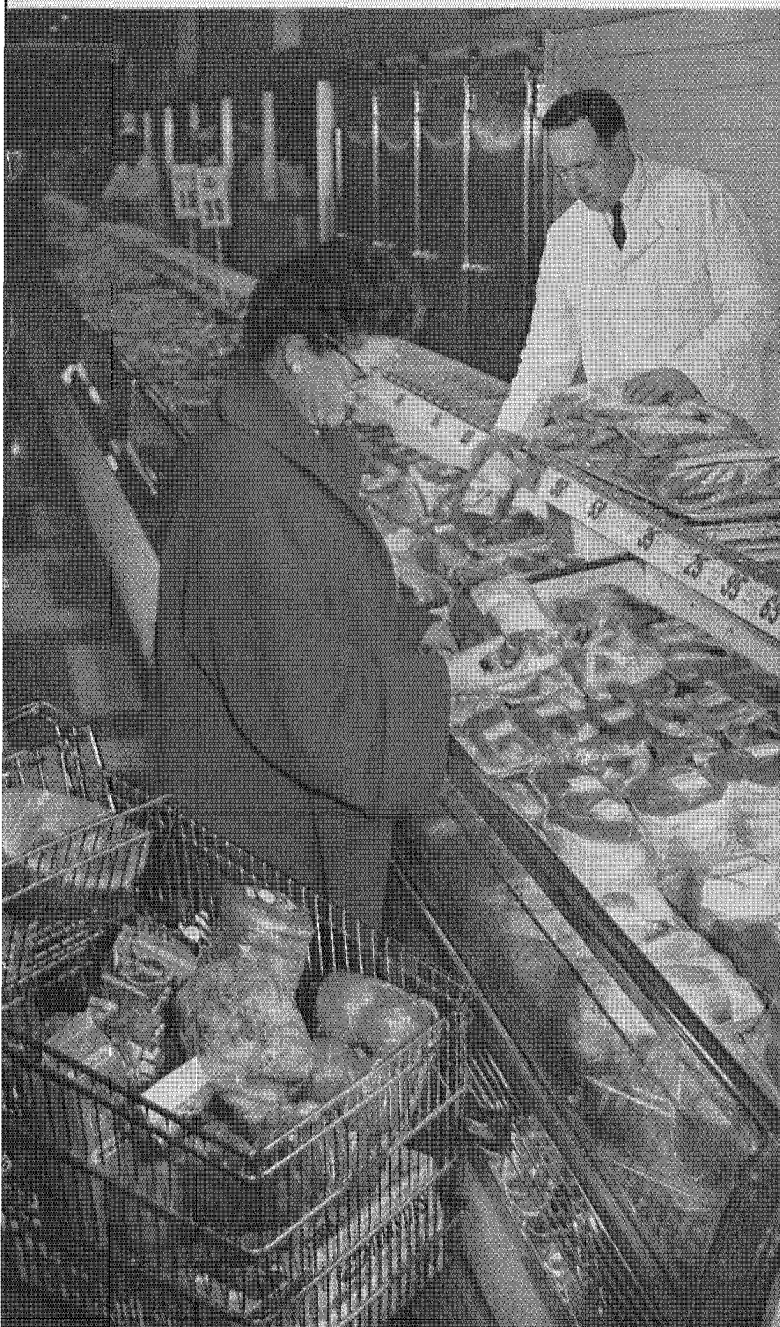
supermarkets are a bright idea and Americans love such ideas. The stores stand for good living, too—a staggering selection of foods beautifully displayed. They are friendly, yet aggressive, just like your own people. And your supermarkets, where people of all income levels push carts side by side, are democratic in a thoroughly American way."



The checkout counters: some 100 million Americans pass through them weekly in the nation's 27,000 supermarkets.

AHEAD

f self-service and packages of transparent cellophane



Shoppers can buy more meat in less time when it's wrapped in cellophane. The majority of supers sell meat on a self-service basis.



Cellophane wrap reduces produce spoilage, supermarkets find. About one-third of U.S. fruit and vegetables are prepackaged.

The supermarket, then, can be called a distillation of the American social and business character. Since the marketing techniques developed in its aisles also have a powerful impact on other kinds of retailing and manufacturing, let's take a closer look at this American phenomenon.

The most dramatic fact about the supers, as any housewife can testify, is their obvious success in winning customers. Accounting for only 4 per cent of total grocery sales in 1939, they now take in 62 per cent of all the money spent in the nation's food stores.

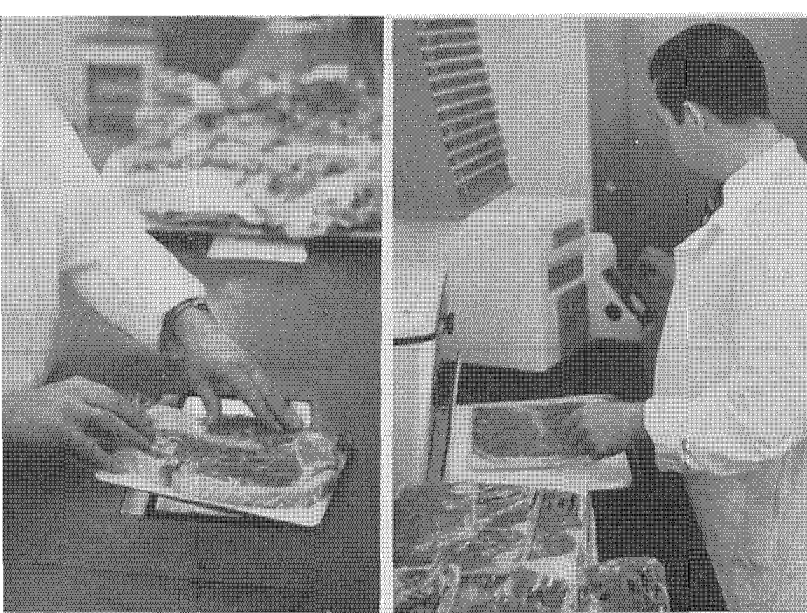
SELF-SERVICE THE KEY TO SUCCESS

This spectacular growth in share of sales looks even more impressive when you realize that there are only 27,000 supermarkets—a mere 9 per cent of the 310,000 grocery outlets in the U.S. Low prices, based on big volume, have helped the supers prosper. Heavy traffic, a shortage of on-street parking space, busier housewives—these factors have spurred their growth, too.

Behind the spacious parking lots and the trading stamps and the other shopping lures of the supers, however, stands one fundamental idea on which the success of the supermarket depends. It is self-service, the food retailer's unique contribution to the science of selling. Self-service began to revolutionize food retailing in the late 1920s, gathered speed in the '30s, gained wider acceptance during the war and has dominated the industry since '46.

Self-service has been largely responsible for expanding the inventory of the average store from 800 items in 1930 to 6,000 or more today, and for lifting sales per store employee from \$20,000 to well over \$50,000 a year in the same period of years.

One of the packaging materials that paved the way for today's self-service food merchandising made its debut in the '20s. It was Du Pont cellophane, in the beginning



Fresh meat is wrapped in Du Pont cellophane, weighed and priced behind scenes in Chicago supermarket. Prepackaging is a labor-saver.

a high-priced transparent wrap for boxed candy and perfume. Self-service food retailing, even of packaged groceries, was a nebulous idea in those days. Few dealers believed the shopper would wait on herself, even for well-known brands and products.

INVITATION TO IMPULSE BUYING

Then came Du Pont's development of moistureproof cellophane, an invention that broadened the film's use immeasurably. As cellophane production rose, its price declined. Here at last was an economical packaging material that protected food without hiding it from the shopper, that invited her to make the all-important "impulse" purchase. Sparkling, transparent cellophane—on bread, potato chips, cookies and dozens of other items—became a trademark of the new self-service supermarkets.

As self-service took over the grocery department, some retailers began to dream of it in perishables. After all, it had worked wonders in packaged goods—reducing handling costs, making lower prices possible and tempting the shopper to buy more. Why shouldn't it do the same for such products as fresh meat, fruit and vegetables?

World War II, in spite of the shortages of labor and material it caused, spurred many experiments in the self-service merchandising and packaging of fresh meats in Du Pont cellophane. By the late '40s self-service meat selling was accepted in principle by supermarket operators and meat packers. Time and again when a store changed from clerk-service to self-service with cellophane-wrapped meat, these things happened: Meat sales increased and the customer bought a wider variety of meat and more of it in a shorter space of time.

FILM-WRAPPED MEAT ON RISE

Today about 60 per cent of the nation's supermarkets sell meat on a 100 per cent self-service basis, using ton upon ton of cellophane and other transparent wrapping materials in the process. Self-service meat brings in more than \$4 billion a year at retail. That means the average family takes home 120 packages of film-wrapped meat a year. The trend continues, and it's estimated that even more fresh meat will be prepackaged and sold self-service in the years ahead.

The movement to prepackaged, price-marked, self-service fruit and vegetables also has stepped up sharply since World War II. One factor was Du Pont's introduction of a special cellophane that allowed produce to release its moisture gradually, minimizing condensation. Fresh fruits and vegetables, once bought by the shopper strictly on a pinch-and-squeeze basis, are now about 30 per cent prepackaged and the percentage is still climbing. Favorite items for prepackaging are lettuce, tomatoes, spinach, cauliflower, apples and carrots, although a number of leading supers package practically everything.

Supermarket operators find that the combination of transparent packaging and self-service cuts spoilage loss as much as 50 per cent, boosts sales and offers the customer cleaner, fresher produce. She reciprocates by buying more—again in a shorter time, since weighing and pricing are done for her in advance.

The American public and the business world, meanwhile, continue to expect new and significant developments from the supermarket industry. This confidence would seem to be well placed, for the ebullient supers already have sparked more changes in the past 25 years than food retailing experienced in the previous century and a half.

New ideas are breath of life to supers. Vending machine outside New Jersey market, left, offers customers 24-hour service, has cellophane packages for product visibility. Houston boasts drive-in market, right.



INTERMEDIATES, ANYONE?

Here are three new ones with intriguing properties. Chemists, please note.

All others, proceed with caution

Intermediates are the stagehands of the chemical industry, their names unknown and unpronounceable to most people. But their work backstage makes possible the stardom of better known chemical products.

This article is about three new Du Pont intermediates, and it's written with our technical readers in mind, as you'll soon discover.

NEWCOMER NUMBER ONE

The first of the intermediates is 2-diethylaminoethyl methacrylate, an aliphatic tertiary amine called DEAM for short. Its polymers, copolymers and their salts seem well equipped for roles as dispersants, flocculants, emulsifiers, stabilizers, protective coatings, bonding agents, adhesives, viscosity improvers and acid acceptors. What's more, products from addition reactions to the double bond retain the diethylaminoethyl grouping, a fact that may interest the makers of pharmaceuticals.

DEAM monomer is a clear, straw-colored liquid that polymerizes under the influence of peroxides, persulfates, hydroperoxides, azonitriles and heat or light. Solution polymerizations have been run in a variety of solvents, including ketones and aliphatic and aromatic hydrocarbons.

Aqueous solutions of homopolymer have been prepared by polymerizing the monomer as a salt (e.g., the acetate, hydrochloride and carbonate), or as a quaternary ammonium derivative (e.g., the methyl methosulfate) in water. Alternately, polymers prepared as free bases in non-aqueous systems can be converted to water-soluble derivatives by treatment with a mineral or organic acid, or a quaternizing agent such as dimethyl sulfate. Copolymers of DEAM can be prepared with a variety of monomers, including vinyl acetate, vinyl chloride, vinylidene chloride, acrylic and methacrylic acids, other acrylates and methacrylates, styrene and butadiene.

Laboratory results like these illustrate the possible advantages of DEAM in a wide variety of applications: Carbon black remained 100 per cent suspended after four days in kerosene containing a copolymer of lauryl methacrylate/DEAM; poly DEAM carbonate rapidly flocculated normally slow-settling suspension of kaolin or silica in water; heat-cured films of poly DEAM salts of weak acids—poly DEAM acetate was one—were tough, transparent and water-insoluble.

NUMBER TWO

Still with us? Then let's try 4, 4'-diaminodiphenylsulfone, an intermediate that shows promise as an epoxy resin curing agent. It can be used in casting, laminating and adhesive formulations.

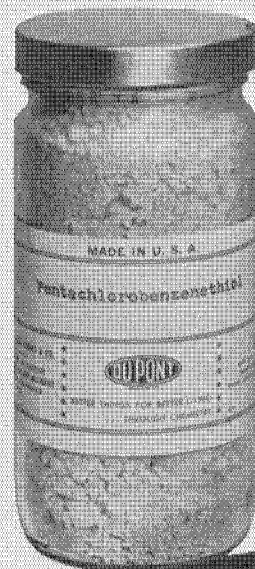
In laboratory tests, unloaded, sulfone-cured resins exhibited unusually high heat distortion temperatures. Also, a laminate containing a sulfone-cured resin showed a much higher modulus at elevated temperatures than a similar laminate prepared with a m-phenylenediamine-cured resin.

... AND NUMBER THREE

The third member of the trio is pentachlorobenzenethiol. This aromatic thiol readily forms metallic salts with hydroxides of alkali and alkaline earth metals. It can also be converted to a disulfide, a trisulfide, various thiol esters and other derivatives characteristic of aromatic thiols.

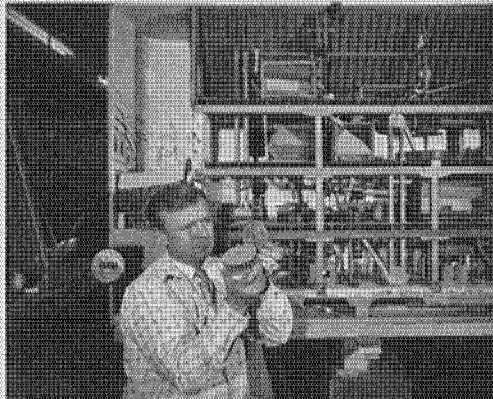
Pentachlorobenzenethiol's chemical structure suggests uses as a corrosion inhibitor, antioxidant, and polymerization modifier, as well as an intermediate for agricultural chemicals.

If you're interested in knowing more about any of the above, write to the Du Pont Organic Chemicals Dept., Nemours 2420-5, Wilmington, Del., or to any of that department's district offices. If you represent a commercial or academic research laboratory, samples of the chemicals are yours for the asking.





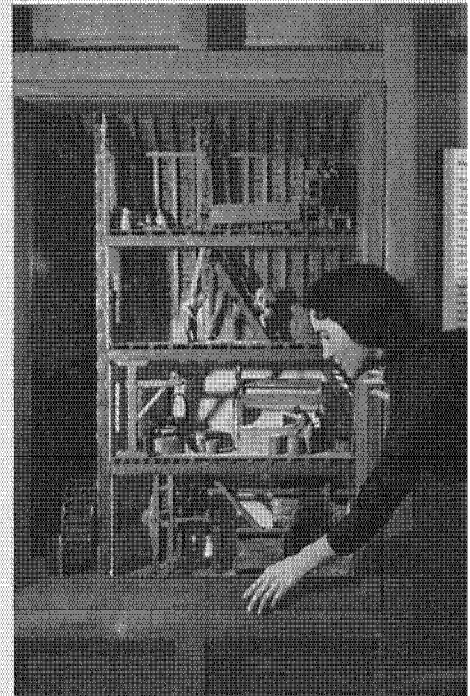
Ten-ton wheels, used to grind black powder, are still in place in mill near Brandywine.



Builder completes intricate working model of the Oliver Evans automatic flour mill.



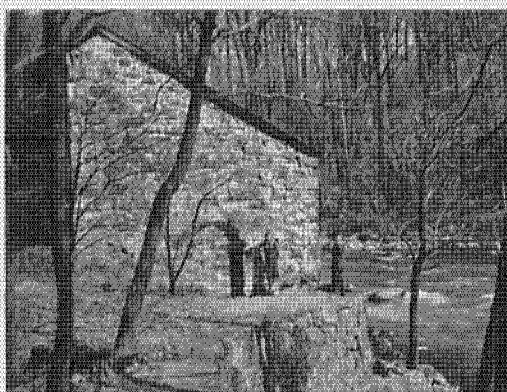
Artist recreates Du Pont Eleutherian Mills as area looked in September of 1806. By changes in lighting, diorama shows cycle of working day.



"Old process" flour milling, which Evans system modified, demanded much manual work. Scale model has many moving parts.



Various types of water wheels that turned mills were, left to right: overshot, the most efficient; breast; and undershot.



Visitors pause near Du Pont powder mill, one of 21 still standing. On occasion it ran 24 hours a day to meet the demand.

Scenes from America's industrial childhood

A new museum depicts some of the little-known beginnings of U. S. manufacturing

The story of America's industrial growth, often overshadowed in history texts by the rise and fall of political movements and personalities, is being told graphically at the new Hagley Museum near Wilmington, Del. The museum, opened formally last month, uses exhibits and working models to tell the economic history of the immediate area. In the process it gives visitors a stimulating glimpse of the inventive genius and plain hard work that created the nation's present standards of plenty.

Located on the bank of Brandywine Creek, the museum is in the heart of a scenically lovely and history-rich area. All during the late eighteenth and early nineteenth centuries when water turned the wheels of American industry, this valley was a busy manufacturing center. At the height of its greatness, the creek furnished power for more than 100 mills that turned out flour, black powder, textiles, paper, lumber and other necessities of a burgeoning nation.

Only a few miles upstream is the famous Brandywine battlefield of the Revolutionary War. This proximity makes its point: Political independence could be declared and fought for, but it took long years of patient labor along the Brandywine and in other industrial centers to loosen Europe's economic stranglehold.

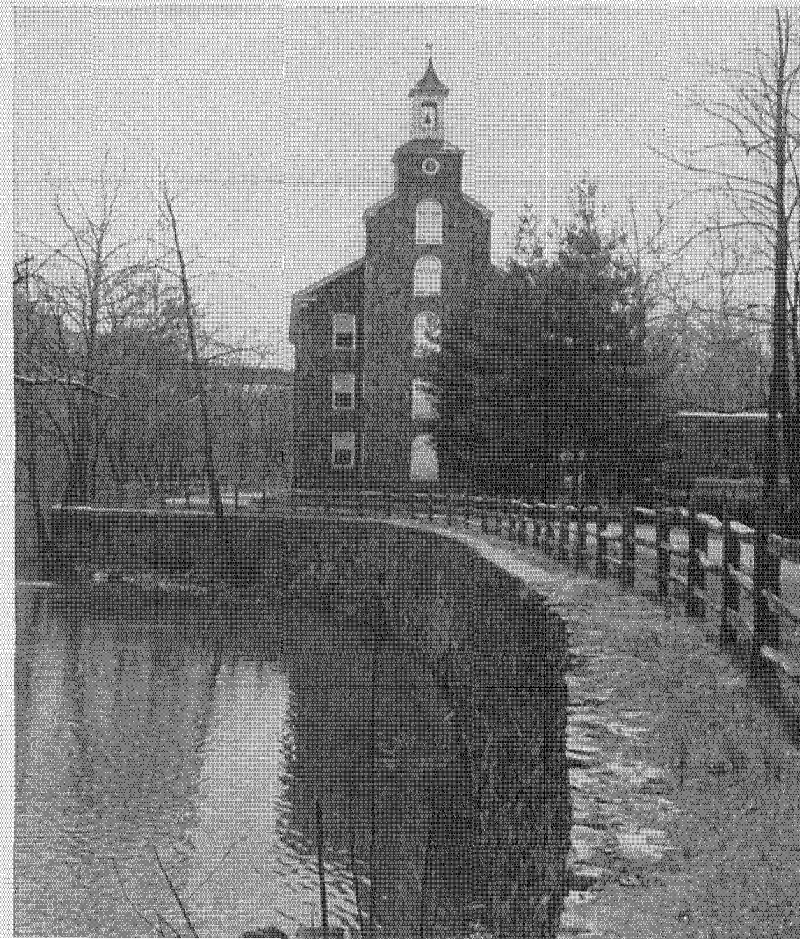
The valley already had reached its peak as a flour-milling center when Eleuthère Irénée du Pont de Nemours arrived in America from France on the first day of the nineteenth century. In 1804 the first kegs of du Pont's black powder were shipped from his Eleutherian Mills and, in time, powder making replaced flour milling as the leading industry. For 117 years the mills on the Brandywine supplied explosives for building roads, bridges, canals and railroads, for mining and quarrying and for the military.

Five years ago members of the du Pont family gave 165 acres of the old mill area to a nonprofit, educational corporation, the Eleutherian Mills-Hagley Foundation. An endowment from the Du Pont Company made possible the planning and construction of the exhibits. Designers have taken advantage of new techniques to vary their presentation and create a "guide-yourself" industrial tour. Museum visitors get a sweeping view of the Brandywine valley through a contour map, and they hear a recorded narration of its history. Drawings and three-dimensional exhibits show manufacturing processes from Indian

times through the early days of powder making. Actual gears, millstones and archeological finds also are displayed.

Especially notable are the working models, one of which depicts "old process" flour milling and another the ingenious automatic flour mill designed by Delaware inventor Oliver Evans. Largest of the dioramas shows the Eleutherian Mills area as it looked in 1806 after the black powder factory was in full operation. From the museum visitors walk the short distance to the Hagley Yard, where evidence of the early 1800s still remains in the gray ghosts of 21 old powder mills that drowse beside the Brandywine. At Eleutherian Mills, E. I. du Pont's home and his first office building are standing, and water spills through the raceway he designed.

The Hagley Museum and its historic grounds fill out the major attractions of the Brandywine valley, already a favorite of tourists thanks to the battlefield, the outstanding collection of Americana at Winterthur Museum outside Wilmington and the splendid Longwood Gardens near Kennett Square, Pa., with its fountain display.



Hagley Museum is open to the public without charge daily except Monday. Building began life as a textile mill.

Lift for a leftover

Du Pont Fuel Oil Additive No. 2 moves on from its success in light fuels to groom a petroleum workhorse, residual oil

Residual fuel, begrimed laborer of oildom, no longer need detract from the proud name of the petroleum family, thanks to new chemical grooming. The tailored touch is being applied to the heavy oil by Du Pont Fuel Oil Additive No. 2, for years an effective stabilizer of lighter home and diesel fuels.

Literally the leftover of the refining process, residual oil has one vital advantage—economy. It generally has a

price edge on other fuels; sometimes the refiner actually sells it for less than the cost of the crude oil.

That's about where advantage ends and drawback sets in. Residual oil is the thick, dark collector of impurities left behind after the removal of the lighter distillate fuels from crude, and it must be thinned by heating to be handled conveniently. The particles of residue in it tend to create sludge wherever the oil is stored or used, and

A little FOA-2 goes a long way—canful of additive stabilizes tankload of residual fuel oil, thwarts sludging.



the sludging often is accelerated when different stocks of fuel are mixed.

Other problems besides sludging are manifold, as Du Pont Petroleum Laboratory researchers learned from a survey last year. More than half of the heavy oil users canvassed reported difficulties like nozzle fouling, flame-out and loss of pump suction. The chemists found, in fact, that some of the problems existed in their own back yard—at several Du Pont manufacturing plants.

Maybe, they theorized, FOA-2 could be as beneficial to the black sheep as to the white. Perhaps its performance as a stabilizer and sludge dispersant in home and diesel fuels would carry over to residual oil. Field tests at a number of industrial installations and institutions soon bore this out. FOA-2 in small quantities—30 to 50 pounds per 1,000 barrels of fuel—caused marked changes in the behavior of residual oil.

Sludge-clogged strainers, common among residual-burning troubles, were returned to use for much longer periods without recleaning in most of the test operations. In addition, several problems peculiar to specific heavy-oil systems were solved.

At a chemical plant where the burner nozzle had fouled and misfired after routine furnace shutdowns, FOA-2 added useful life to the nozzles and to filters as well. It eliminated the flame-out problem that had been caused by water accumulation.

Thick soot inside the furnace plagued a country club because of a heavy deposit that built up repeatedly on the burner nozzle. Besides stretching the period between

strainer cleanings from two days to three weeks, FOA-2 also prevented recurrence of carbon deposits on the nozzle.

Sludge had choked a strainer which in turn strangled the pump in a heavy-oil system at an industrial plant. A heavy dose of FOA-2 cleared residue from the strainer and returned full suction to the pump in two days. From then on, small amounts of the additive kept the plant's heating system free of sludge.

FIVE GALLONS SOLVE A PROBLEM

Sludge build-up in another plant's large underground storage tank had covered the standpipe, cutting off suction to the fuel oil pump. Five gallons of FOA-2, recirculated through the system for 52 hours, suspended an estimated 1,250 gallons of the residue in the fuel so successfully that plans to pump the mixture from the tank were cancelled and the contents burned in normal operation.

A refiner customarily cleaned sludge from 50,000-barrel No. 6 oil tanks by cutting holes in the tanks' sides and removing the material with power equipment. As an alternative, a mixture of FOA-2 and a light oil was recirculated through one tank. It removed about half of the sludge in a short while.

Now, with success reports mounting, the Du Pont Petroleum Chemicals Division has decided to market FOA-2 for use in residual fuels.

So it is that residual oil, imbued by FOA-2 with some of the qualities previously limited to oildom's upper crust, is preparing to climb the social ladder after a long term as low man on the distillation column.

Remington's Humane Stunner hailed

An instrument that looks like a polo mallet or a child's space toy is proving a major landmark on the long trail toward more humane slaughter of livestock.

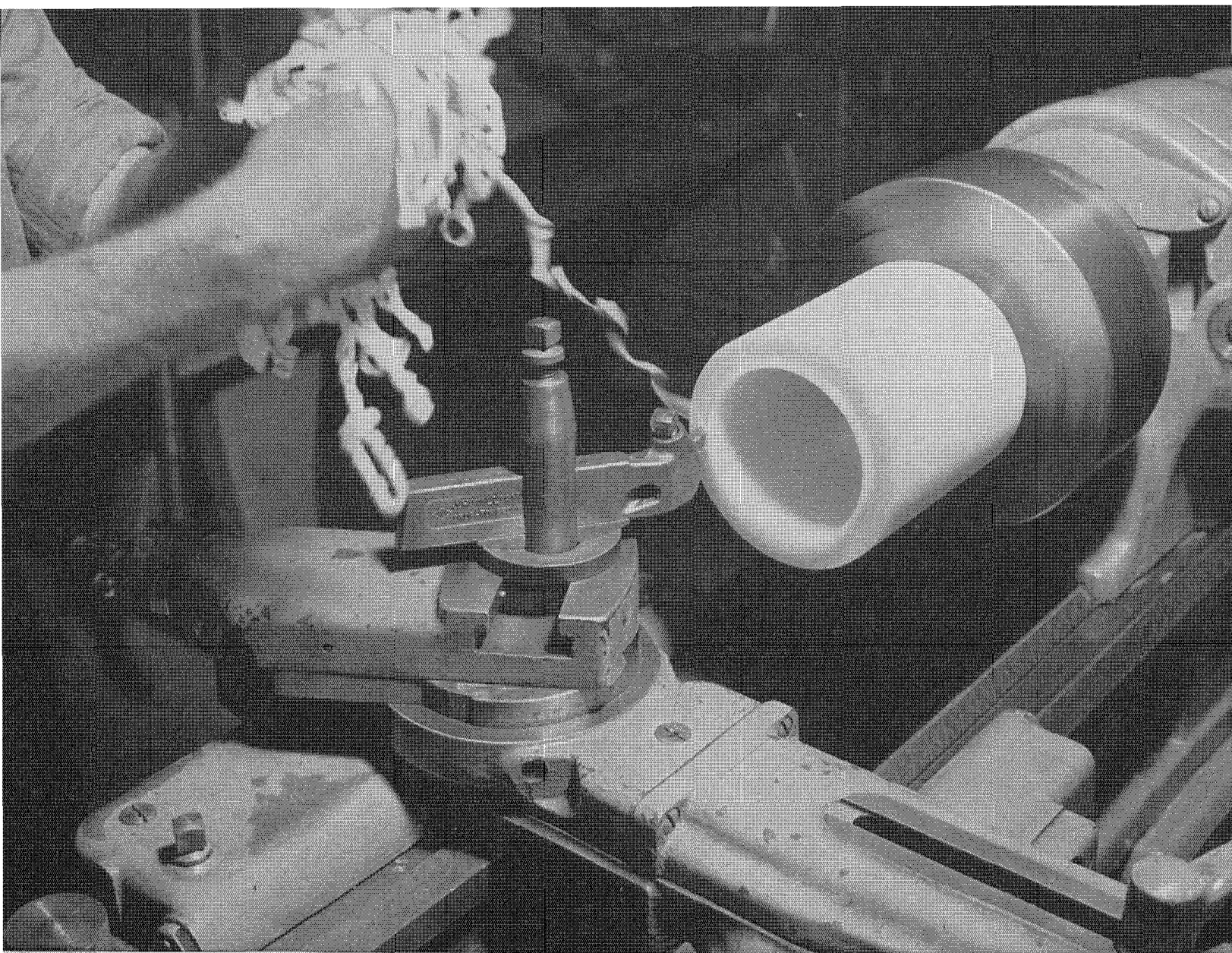
The Remington Humane Stunner, a powder-actuated tool, is now winning a place in slaughterhouses after more than a year of extensive testing. Because it quickly renders cattle insensible to pain, the meat industry reports the stunner offers significant improvements over previous slaughtering methods.

The instrument is actuated by a 22-caliber blank cartridge especially designed for the purpose. When it's tapped lightly against the animal's forehead, a protruding trigger mechanism fires the charge. A mushroom-shaped head, mounted on a captive piston, is sent forward by expanding gases to stun the animal instantly.

The instrument, developed by Remington Arms Company, Inc., has won awards from the Massachusetts Society for the Prevention of Cruelty to Animals, the American Society for the Prevention of Cruelty to Animals and the American Humane Association, which hailed it as "one of the twentieth century's most significant advancements in the humane movement."

Animal is quickly stunned with this new slaughterhouse tool.





A pressure roll for use in forming brass strip is machined easily from a nylon stock shape.

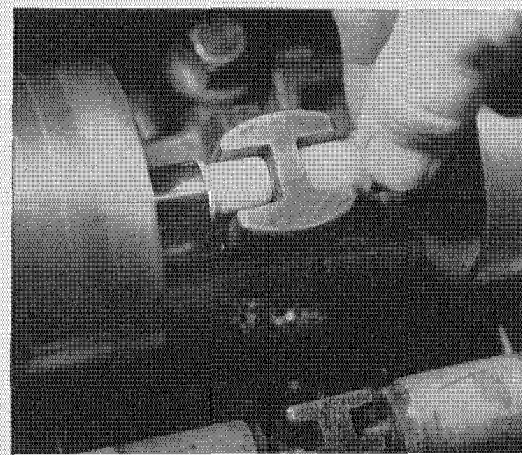
MAINTENANCE MEMO: Try nylon plastic

"Zytel" nylon resin in stock shapes can be machined economically into replacement parts for industrial equipment

One of the handiest tools in a maintenance engineer's kit these days is nylon plastic, now available to industry in a wide range of standard shapes and sizes. That's the report from men charged with the upkeep and the smooth functioning of such diverse operations as metal-plating, soft drink bottling, textile yarn spinning and welding.

They are using machined parts of Du Pont "Zytel" nylon resin as trouble-saving replacements on many types of industrial equipment. Each success story turns on the durability of the parts, but maintenance men are quick to add other reasons for favoring nylon. It's easily machined with standard metalworking tools. It's resilient, absorbing

Lubrication problems on textile yarn spinning frame ended after nylon parts replaced metal.



impact and causing little noise. Few chemicals except concentrated acids harm it. In many applications, parts made from it require little or no lubrication.

These attributes aren't news to many design engineers and equipment manufacturers, but the usefulness of "Zytel" as a maintenance tool is just catching on. Helping advance its cause is the ready availability of standard mill shapes—rod, bar, strip, slab and tubing. Maintenance men can either machine the needed parts right in their plants or order them from the companies that specialize in such assignments.

By way of encouraging the do-it-yourself approach, The Polymer Corporation of Pennsylvania in Reading distributes its standard shapes through outlets in 40 U. S. cities. But Polymer also works closely with a variety of industries to lick maintenance troubles. Placed under the chain of a bottle conveyor at the neighboring Pepsi-Cola Bottling Co. plant, Polymer's "Polypenco" nylon strip eliminated excessive metal-to-metal friction. "We've used nylon for nearly two years," reports Willard V. Noxon, president. "It cushions the operation and there doesn't seem to be any detectable wear."

USED IN FORMING BRASS STRIP

A metalworking company has turned to matched pairs of nylon and steel pressure rolls for use in forming brass strip into decorative trim for television sets. Earlier attempts to form the prefinished strip between steel rolls had severely marred the lacquer. The special rolls, which have a diameter of about four inches, are machined from thick-walled nylon tubular bar and heat-fitted over metal hubs. They cost about 40 per cent less than steel ones.

A Philadelphia textile yarn manufacturer, Nathan Schwartz & Sons, hit on a way to control irregular behavior of a spinning frame. Grease used to lubricate metal bearings became viscous and dirty, causing the pressure roll to vary in speed and pressure. Often the yarn was soiled. Thin nylon bearings that need no lubrication ended that difficulty. Schwartz further reports that nylon bushings on the back spinning roll are still in use after five years.

The National Can Co., Chicago, has ended what once was a tedious maintenance chore by switching to nylon tubing on its can bodymaker and automatic punch presses. Lengths of this special tubing carry lubricants, water, plastic spray or air with equal facility.

"We needed a material that could take concentrated flexing, since the lines on the bodymaker are flexed close to 100 million times a year," a maintenance man explains. "Although our old tubing lasted about ten days, we haven't replaced a nylon line in two years."

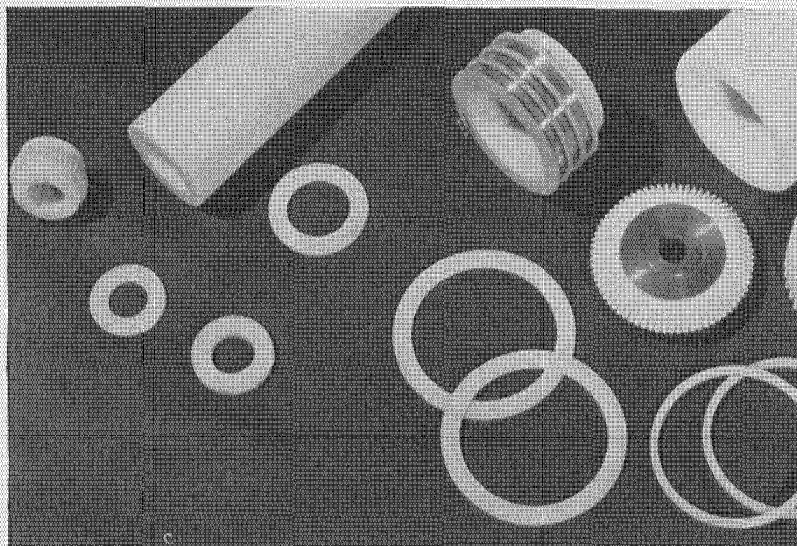
Nylon rollers on an overhead plating conveyor at Oakman Manufacturing Co., Van Dyke, Mich., have mul-

tipple responsibilities. They function as insulators on individually motored racks, as guide rollers in overhead channels and as load-bearing members that tilt 72-pound loaded racks through 15 separate cams 40 times an hour. Even so, the rollers normally are replaced only when racks are taken down for rebuilding. The rollers are made from nylon rod supplied and machined by Cadillac Plastic and Chemical Co., Detroit.

Resilience of "Zytel" is put to severe test at Congress Drives Division of Tann Corp., Detroit. Spring pads and buttons of nylon hold die-cast work in position without marring while the 10- to 35-ton presses complete their stroke. The nylon buttons show virtually no wear after two years, although those previously used either cracked after brief service or marred the work.

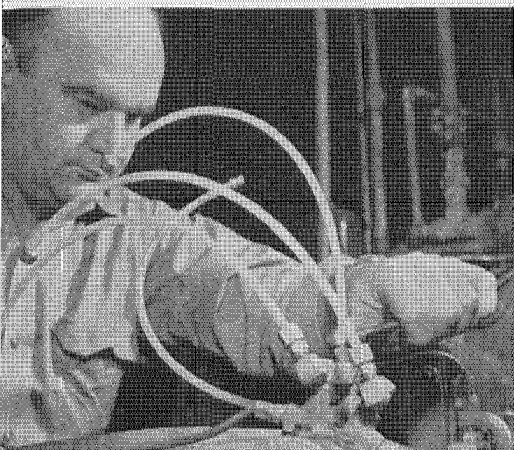
Craft Welding Equipment Co., Detroit, used $\frac{3}{8}$ -inch nylon balls in ball-bearing bails for hanging portable welding equipment. They minimize wear on the races, lessen the weight of the equipment and eliminate need for lubrication, the company reports. Also, by acting as electrical insulators, they protect the operator from high amperage current. The balls are machined by Industrial Tectonics, Inc., Ann Arbor, Mich.

This is only a starter list of odd jobs for nylon. A maintenance engineer is likely to hit on a fistful of ways to put the versatile plastic to work in his own plant. It's that kind of material. For a list of suppliers of stock shapes of "Zytel", write the Du Pont Polychemicals Dept., Room 92-67-Z, Du Pont Bldg., Wilmington 98, Del.



These parts were made from nylon tubular bar and rod. Other stock shapes of "Zytel" are strip, slab and tubing.

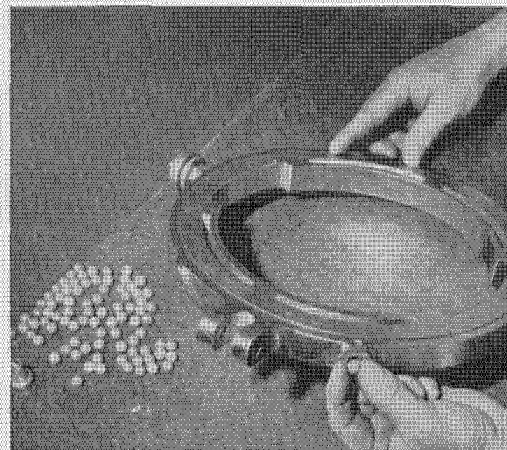
National Can Co. employee installs nylon tubing on machine that forms can bodies.



Nylon guide rollers on overhead conveyor also act as insulators and load-bearing members.



Nylon balls, used in bails for hanging welding equipment, reduce metal wear.



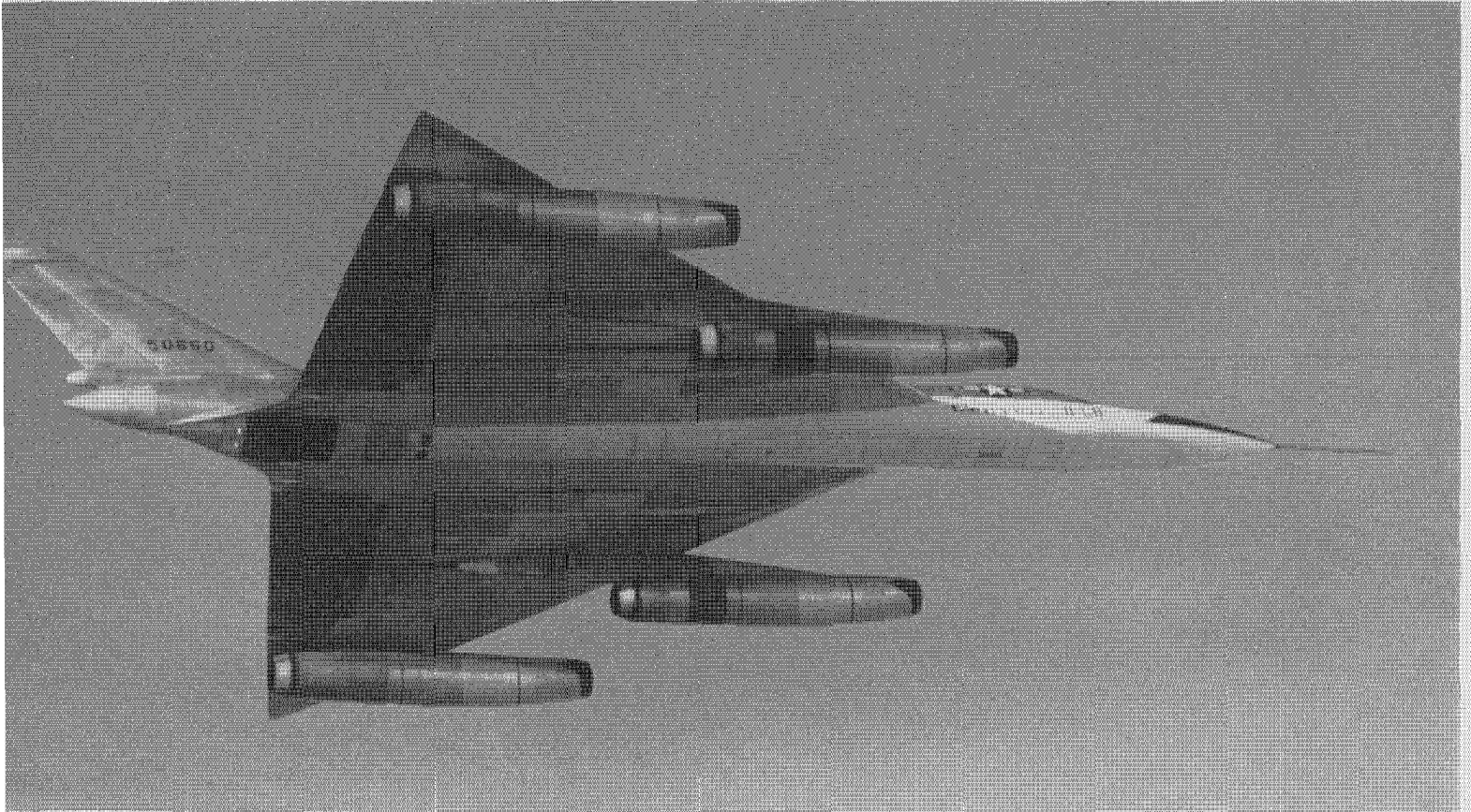
Small rivets for a big bomber

*Du Pont blind expansion rivets take on a
supersonic assignment in Convair's new B-58*

FORT WORTH, TEXAS

By STAN ENGLEBARDT

The B-58 Hustler that Convair builds here is touted as America's newest, fastest and deadliest bomber. At low altitudes it moves so swiftly it's almost impossible to follow with the eye; at peak altitudes it can't be reached by any known piloted plane. About all a ground observer sees of



Ninety-five feet long, Convair B-58 flies above 50,000 feet at supersonic speed, carries three-man crew.



KNOW HOW

... to finish furniture black

A new Du Pont finish, "Duco" semi-gloss black enamel, has helped a young couple we know bring harmony to an apartment living room furnished with odds and ends.

These people are experts at discovering secondhand furniture, but strictly amateurs when it comes to painting.

the delta-shaped, needle-nosed bomber is the thin vapor trail it paints on the blue Texas sky.

Getting the B-58 into the air meant conquering temperature and vibration problems never before encountered in an airplane. At the bomber's top speed, many of the alloys used on older planes would have lost their strength and literally let the ship fall apart in mid-air. One of the key quests of Convair engineers, therefore, was for materials that could meet the aircraft's demands.

The B-58 also required a rivet able to withstand the stresses of supersonic flight and sound vibrations from the jet engine exhaust. The flyability of the plane depended on it. The fastener was to be used on the upper surface of the elevon, a part that serves as both elevator and aileron on the bomber. Some 5,000 rivets would be needed to hold together the elevons on one airplane, and many of them would be subjected to the jet engine's exhaust blast with its extreme heat and vibration.

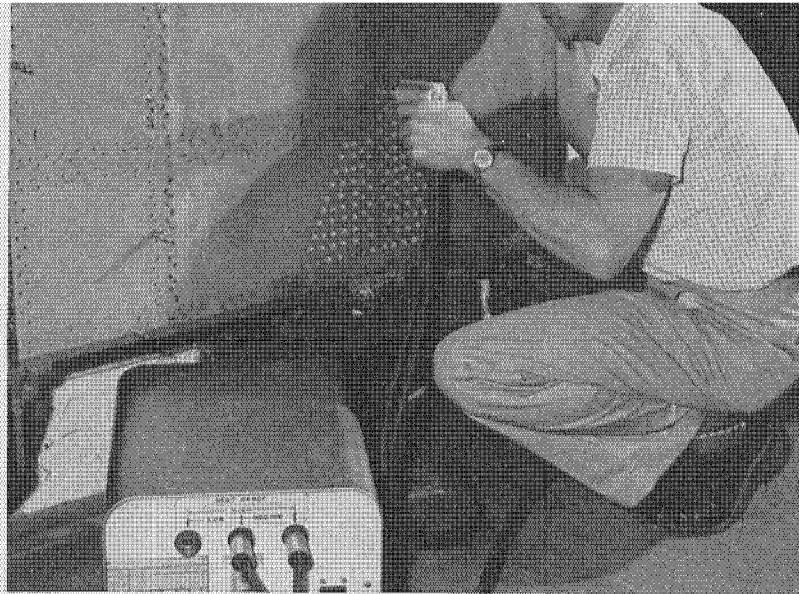
Given these facts, Convair engineers selected Du Pont A-286 super alloy blind expansion rivets, fasteners with a blend of properties that fitted them for this critical application on the new bomber.

The rivet's special stainless steel alloy enables it to maintain strength at temperatures as high as 1,400°F. This is an important requirement. Fortunately, the alloy also is compatible with the dissimilar metal of the elevon, thus minimizing electrolytic corrosion. Since the Du Pont rivet is set from the head side, no bucking bar is needed. This is important, too, because the elevon forms part of the knife-thin trailing edge of the wing and is too thin to admit a bucking bar.

RIVETS FIRED ELECTRICALLY

From a production standpoint the Du Pont rivets simplify construction of the elevons. One man sets them easily at the rate of 20 to 25 a minute, inserting them in predrilled holes and firing them with a Precision Riveter hand tool. This electrical tool activates a small, heat-sensitive chemical charge in the shank of the rivet. The shank expands, filling the hole completely, pulling together the two pieces being joined and locking the fastener securely in place. No further buffing or trimming is required.

In performance tests, other important advantages of the A-286 rivet have been its tenacity as a fastener and its



Du Pont blind fasteners used on wing control surface must withstand searing heat of the jet engine exhaust.

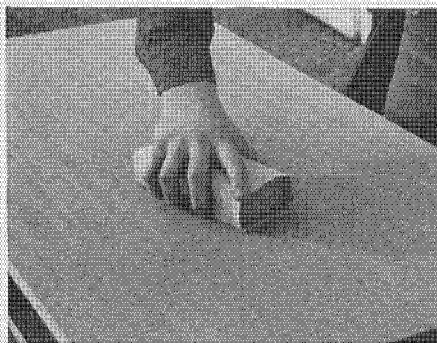
resistance to fatigue. The wing bends to some degree during flight, putting tremendous tension and shear stresses on the elevon rivets. In Convair's tests the Du Pont rivet exhibited twice the tensile and one-and-a-half times the shear strength of other fasteners tested.

While the B-58 is still too new to have been evaluated fully, flight tests so far have induced no detectable metal fatigue in the elevon rivets. Laboratory tests on the elevons—subjecting them to jet engine exhaust over a period of many hours—indicate that the Du Pont rivets stand up to conditions well beyond those actually encountered in supersonic flight.

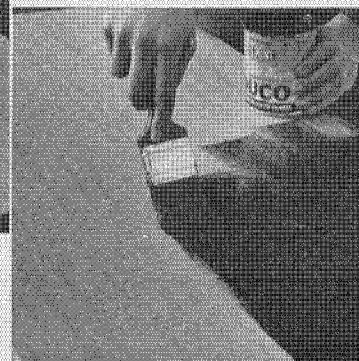
As planes fly still higher and faster, crowding the so-called heat barrier, entirely new alloys will have to be found for the ship's skin to withstand extremely high temperatures. In one respect, however, the aircraft industry is pretty well fixed. Du Pont A-286 rivets, Convair engineers say, are already capable of bearing up under flight conditions that are still many years in the future.

Thanks to the new enamel, though, they were able to turn the trick handily. They found that it went on easily and covered well in one coat. Its even gloss and color added to the unified appearance of the finished pieces.

Not only did our friends paint a bookcase, cabinet, two chairs and the table shown at the left. They also used the black enamel on the ornamental iron railing of an outside porch. Here, they report, the soft sheen is particularly attractive and shows to good advantage.



Thorough sanding readies table top for "Duco" semi-gloss black enamel, chosen for its high hiding power and "wrought-iron" effect.



WHEN DO YOU DROP A PRODUCT?

By JAMES H. McCORMICK

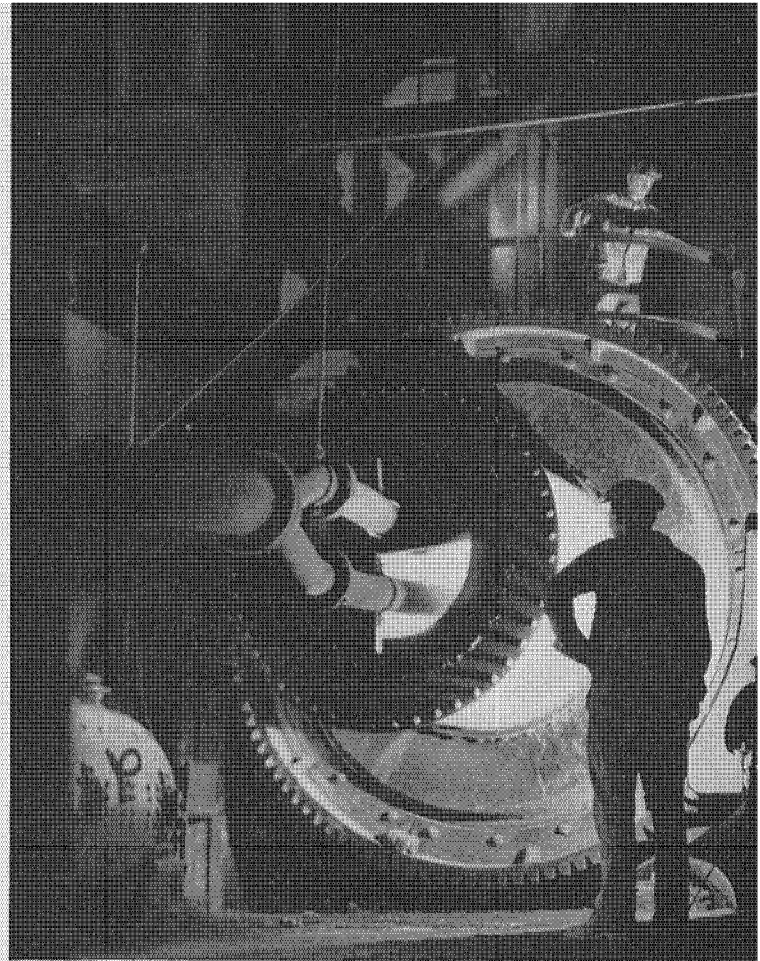
"Roughly speaking, you could compare Du Pont with a flexible barrel that has an open top and a spigot at the bottom," he said. "Research produces a flow of new materials into the top. While they are flowing in, however, products and processes that have been made obsolete by new and better ones are drained from the spigot at the bottom. A reasonable flow at both ends keeps the Company vital and healthy."

This analogy by Crawford H. Greenewalt, Du Pont president, describes a long-standing Du Pont procedure: drop products that are no longer needed or that someone else is better set up to make.

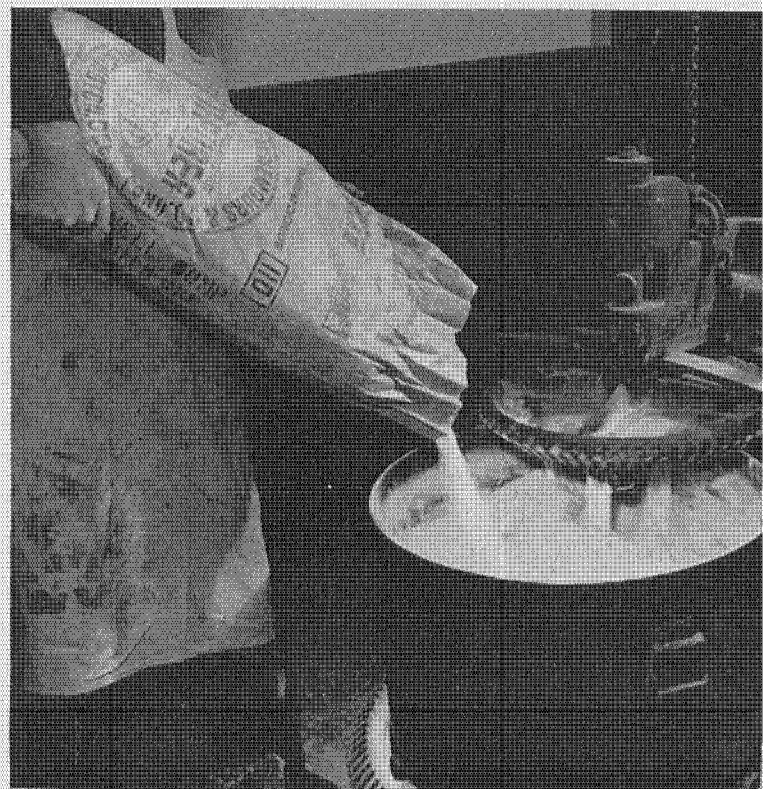
Probably the commonest reason for dropping an item is obsolescence. When Du Pont or one of its more than 10,000 competitors comes up with a new product that does a job better, more cheaply or more safely, the old product often succumbs. Du Pont quit making lithopone, for example, because titanium dioxide pigment has better covering power in paints and the like. Cellulose nitrate motion picture film was dropped when a safe, nonflammable cellulose acetate base was developed; now "Cronar" polyester photographic film base is emerging as the newest challenger.

The need to watch return on investment is also a paramount consideration. As a big company that spends large amounts on fundamental and applied research and on technical service to customers, Du Pont cannot make a reasonable return in many lines where some smaller company would find a good profit.

When do you drop a product? When you and your customer are better off with something else, or when someone else is better fitted to produce the product than you are. In the last four years Du Pont has drained off more than 120 products. Meanwhile, a comparable number of new ones have gone into the barrel and are now actively seeking a place in the market.



Roasting barytes ore, above, to make lithopone. This white pigment has been dropped by Du Pont because its usefulness was slowly waning in face of newer products. Being added to printing ink, below, is a whiter white pigment, titanium dioxide. Its superiority, especially in hiding power, made it a logical successor to lithopone.

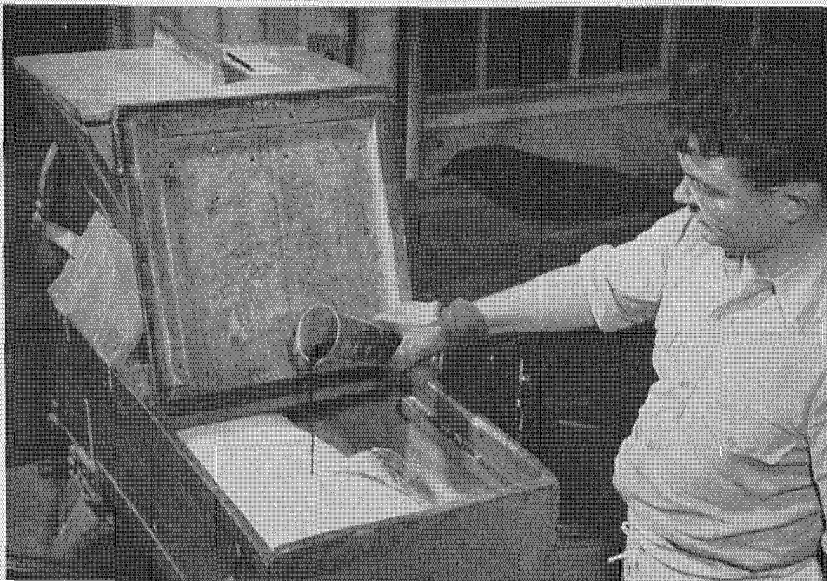




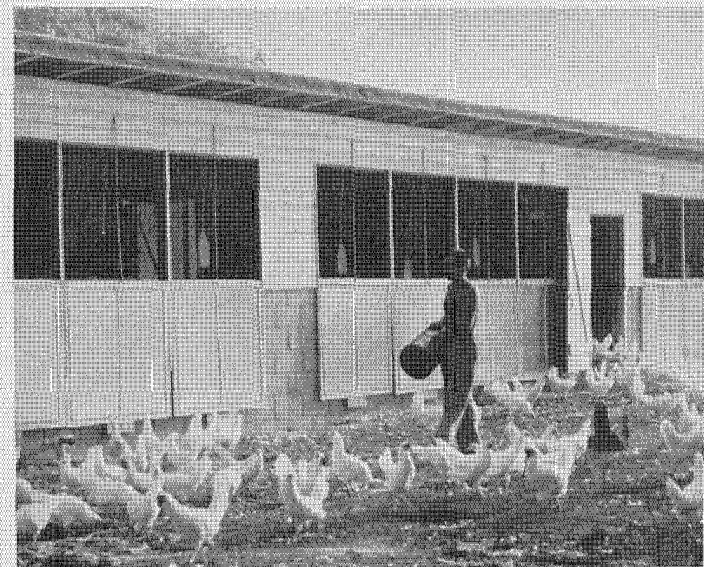
Chemical industry drops a product when a safer one comes along. Du Pont stopped making a nitrate-base motion picture film—used for this scene—when acetate safety base was developed.



Du Pont still sells DDT, but no longer makes it. Competitors' manufacturing costs were lower. The Company has developed and patented less toxic methoxychlor insecticide.

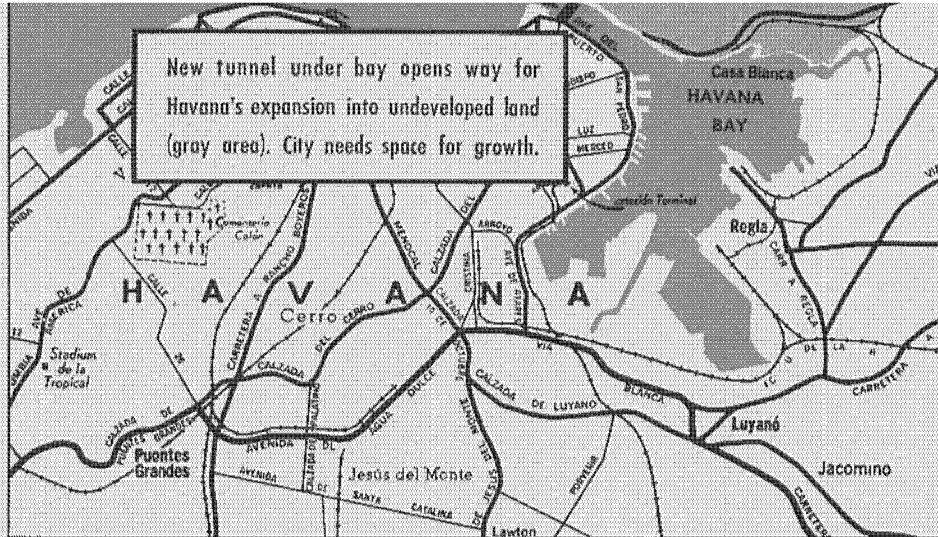


Treating cloth with durable Du Pont "Erifon" flame retardant. This excellent product was dropped because it was simply too expensive to apply to the fabric.



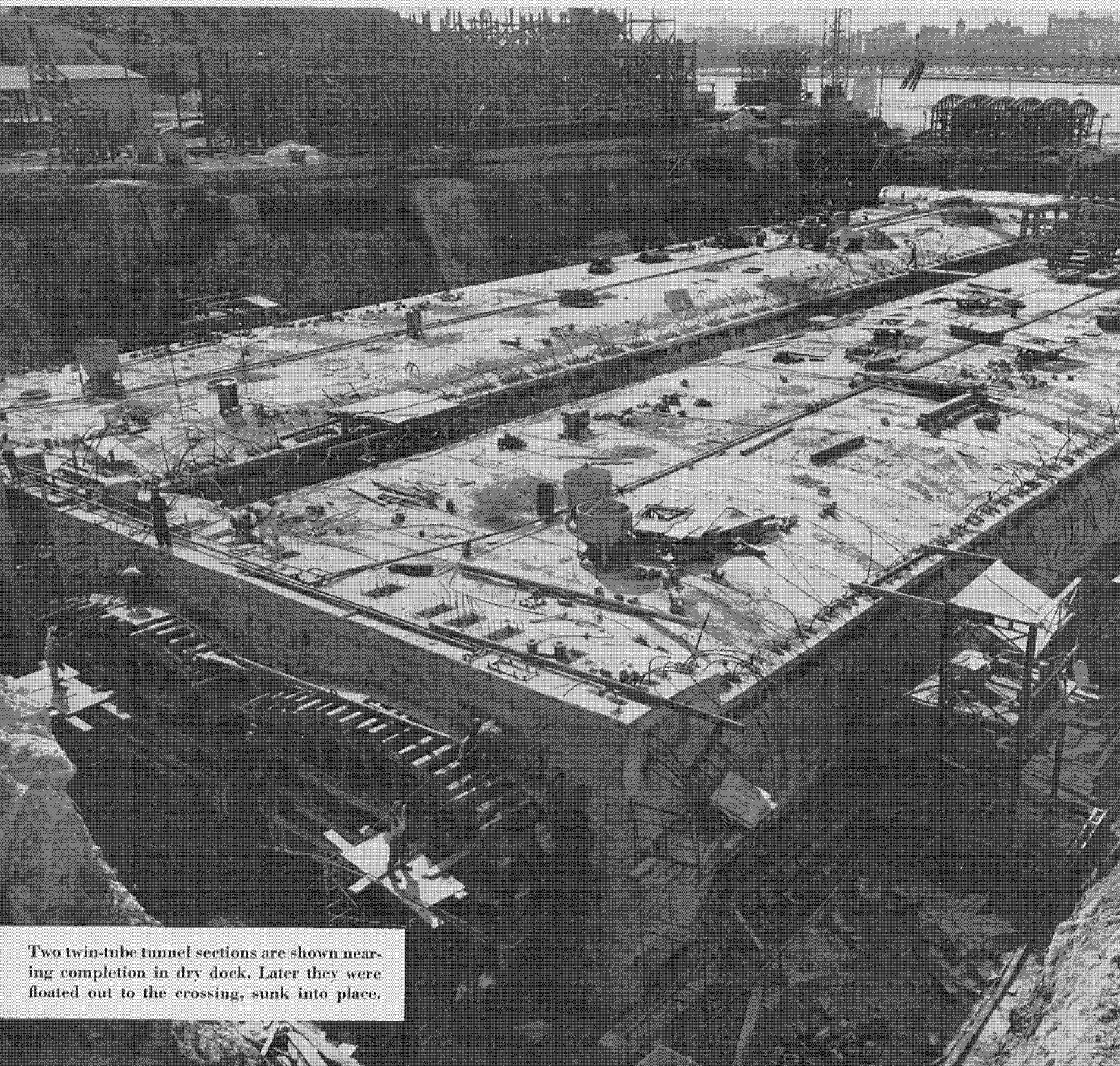
"Cel-O-Glass" plastic coated wire business was sold when Du Pont found it uneconomical to improve product. Smaller firm could sell it for less, still make better profit.

- ◀ Du Pont made aromatics—perfumes and reodorants—for years, sold out when it wasn't feasible to produce them by modern methods. Most aromatics are made in small batches, a job better suited to a small firm.



Havan

No ordinary traffic tube, this one



Two twin-tube tunnel sections are shown nearing completion in dry dock. Later they were floated out to the crossing, sunk into place.



builds a prefab tunnel

built on dry land and sunk into an undersea coral trench carved out with "Nitramon" S blasting agent



While the narrow streets of old Havana, built to help the city's defenders repel pirate attacks, are being maintained as a reminder of the past, the newer portions of Cuba's capital are feeling the impact of the city's biggest construction boom.

New office buildings, hotels, roads and bridges are making the city into a modern metropolis. Biggest project—and one that also promises to bring about the most change—is a \$28.5 million vehicular tunnel. It will connect downtown Havana with the practically undeveloped lands on the other side of Havana Bay.

Havana has expanded west and south of the bay but, with no means to cross the water except by ferry, the Morro Castle area on the eastern shore has remained virtually unsettled. Commuting by car is possible, but few will tackle the hour-plus drive each way. By cutting the time to less than 15 minutes, the new twin-tube tunnel will open up the area to hundreds of thousands of new residents. Plans also call for a business suburb to include more than a dozen 15-story buildings. All told, this amounts to construction of virtually a new city.

Low ground on the Havana side of the bay entrance and high ground on the Morro Castle side made a high-level bridge impracticable. And a regular tunnel couldn't be driven economically because the water depth would put the tunnel more than a hundred feet below sea level.

The unusual decision? Build a prefabricated "tunnel" in sections on dry land, float it piecemeal out to the crossing and sink it into a trench. That way the tunnel roadway will be at a maximum depth of 70 feet below sea level, which still will leave a channel about 45 feet deep for ships.

Casting the huge reinforced concrete sections proved to be less of a brainbuster than hewing out the trench in which they were to rest on the bay's bottom. On the Havana side, business buildings stood within a few hundred feet of the blasting site. On the other side of the bay, historic old Morro Castle was even closer to the planned approach.

The contractor, Société des Grands Travaux de Marseille, feared that submarine blasting with

dynamite couldn't be controlled, and the result would be vibration damage to the nearby buildings and equipment. Wiring the holes for delay blasting wouldn't help much in this case. The shock of the first hole detonating might be transmitted through the water, setting off the entire blast simultaneously.

Du Pont, which was awarded the explosives contract through its Cuban distributor, W. M. Anderson Trading Co., suggested a solution to the vibration problem that proved to be an innovation in harbor blasting. Try Du Pont "Nitramon" S blasting agent, which normally is used only for seismic exploration, the explosives engineers advised. It's so insensitive that one charge can be fired a few feet from another without detonating it.

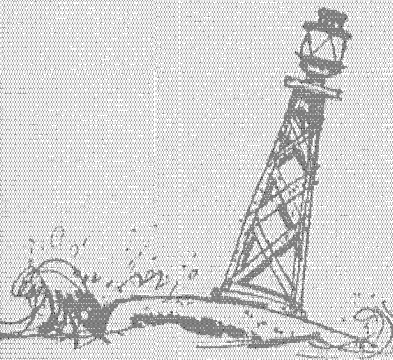
"AS GOOD OR BETTER THAN" DYNAMITE

A blast was prepared, the charge wired with Du Pont MS (millisecond) Delay electric blasting caps, and the plunger pushed. No harmful vibration. All told, more than 710,000 cubic yards of coral rock were removed without a hitch. Blasting efficiency, according to the construction company supervising the operation, proved to be as good or better than that expected with dynamite.

Meanwhile, work on two 353-foot-long tunnel sections was nearing completion in the dry dock. This dry dock had been blasted ingeniously out of rock on the Morro Castle shore so that its bottom was below sea level. When it was flooded, and the retaining wall to the sea blasted out, the sealed tunnel sections were floated easily out to the crossing and sunk into place.

Since then the last three sections have been completed, sunk in place and sealed end-to-end with waterproof joints. The result, counting the approaches, is a twin-tube tunnel 72 feet wide, 23 feet high and 2,625 feet long.

By early next year, if construction hits no snags, Havana's city fathers expect to see a double lane of traffic flowing in each direction through the new tunnel. Such projects, while they won't diminish the special flavor of old Havana, are making new Havana into a city of convenience.



LIFE AFLOAT

It's full speed ahead with America at the helm

Ahoy, mate! Climb aboard and we'll set a course for Just Anywhere, U.S.A., to take a sounding on this new rage to live—afloat. You'll find facts like these on the chart:

Last year 25 million Americans went down to sea, stream and lake in 5,550,000 pleasure craft. They spent \$151 million (nearly twice as much as in 1955) for boats, \$25 million for trailers to haul them and a lusty \$212 million for outboard motors to power them.

They had more time and money for boating than ever before, it's true, but there's more to this modern boom-ditty than that. They also got vastly better return for their sailing dollar—more utility and stamina in boats of new design and materials, strong ropes and sails that don't rot, quiet and powerful motors with many refinements.

Another key to boating's wave of popularity is the emergence of the sailorette. Nautical experts say she's attracted to the sport by the trend to more beauty of color and form afloat. The trend has its origin 30 years back, when Du Pont pioneered a durable beauty treatment for boats by introducing alkyd vehicles in its "Dulux" marine finishes. Gleaming white or attractively colored, they're still nautical favorites.

This year, for the first time, there's a wide choice of color in outboard motors to harmonize or contrast with boat hues. Among them is the 1957 line of motors offered by Scott-Atwater Mfg. Co. in five shades of "Dulux" hi-bake enamel.

Today's sailor cruises with chemistry. We won't try to spin the whole yarn, but this four-page section is devoted to a few of the chemical products that are giving boating a new look to match its new proportions.



"DACRON" SETS NAUTICAL STYLE

*Sails and running rigging of the man-made fiber now
are widely accepted by yachtsmen*

Yachtsmen are a generally conservative breed with a wholesome respect for the tradition they keep alive. Their conservatism ends, though, when it comes to new products that offer performance benefits. These they welcome aboard with real enthusiasm. Example: the growing popularity of strong nylon mooring lines on small craft.

Another case in point is that of man-made fibers for sails. First on deck was Du Pont nylon for spinners, and sailors soon found that the fiber's strength and light weight made it a desirable shipmate. When nylon was tried for jibs and mainsails in smaller craft, however, its elasticity proved difficult to control; the sails tended to "bag" in a strong breeze.

Then along came sails of "Orlon" acrylic fiber. Hardly had sunlight-resistant "Orlon" begun to kick up a bow wave, though, than "Dacron" polyester fiber came on the market. Now, six years later, "Dacron" has scored a solid hit on the basis of its strength, shape retention and resistance to rot and mildew. Eastern sailmakers this year estimate their output of jibs and mainsails of "Dacron" at from 75 to 99 per cent of total production.

"Dacron" for headsails and mainsails got its biggest boost in the sailing-conscious New York metropolitan area three seasons ago when the International One-Design Class went over to the new fiber, stem, stern and seacock. Sails for the entire fleet of 25 boats were made as identical as possible by the same sailmaker from the same shipment of cloth.

The most skillful skippers continued to win, of course, but the so-called "hackers" finished among the leaders more often than before. Sails of "Dacron", more uniform than previous ones, tended to put the boats on an even footing in this respect.

Weavers and converters of sailcloth have been major contributors to the success of "Dacron" in sails. Alexander Lamport & Brother of New York, for example, which supplies much of the sailmaking trade with its fabric, has learned how to heat-treat fabric of "Dacron" for uniform stretch and how to put on a hard, glossy finish off which the dampest of breezes slide smoothly.

Sol Lamport, an indefatigable follower of the racing circuit, keeps his ear cocked for ideas that will help his company make a better product. One of his

newest is an exceptionally glossy sailcloth of "Dacron" that should give sailmakers the slick aerodynamic surface they want for racers.

An ideal mate for a sail of "Dacron" is running rigging of the same fiber, sailors are finding. Size for size, lines of "Dacron" are almost twice as strong as manila ropes. They also resist stretching, rot and mildew, just as the sailcloth does.

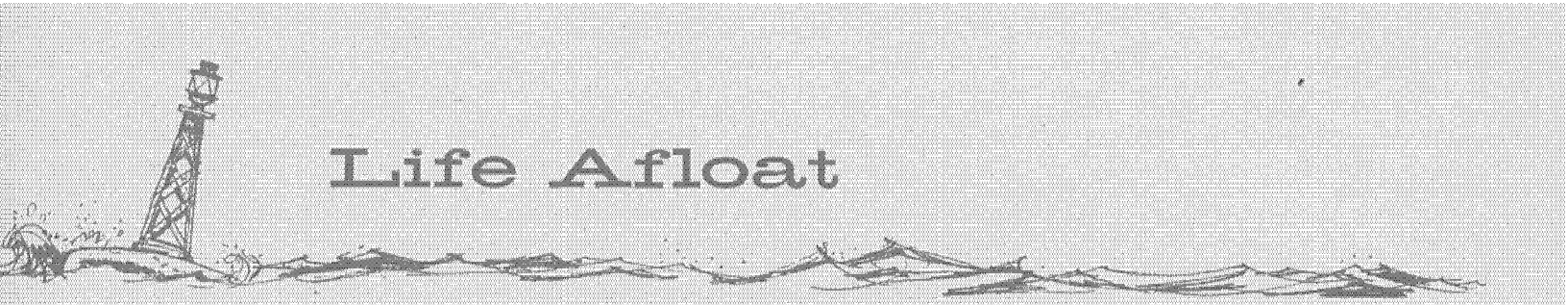
Nylon's stretch gives it the edge in mooring and anchor lines, however. This elasticity, together with a strength twice that of manila, makes nylon up to five times more shock absorbent than natural fiber, an important advantage when the wind is kicking up white water and boats surge against their cables.

Thus, while still nurturing tradition, the sailing fraternity is keeping its sport alive and growing with the help of modern fibers.

Line of "Dacron" is favored for running rigging,
more elastic nylon line for mooring and anchoring.



Eastern sailmakers say 75 per cent or more of their production is now in "Dacron". Sails are strong, hold shape, dry quickly.



Life Afloat

The elements take a licking when man-made rubber's in between

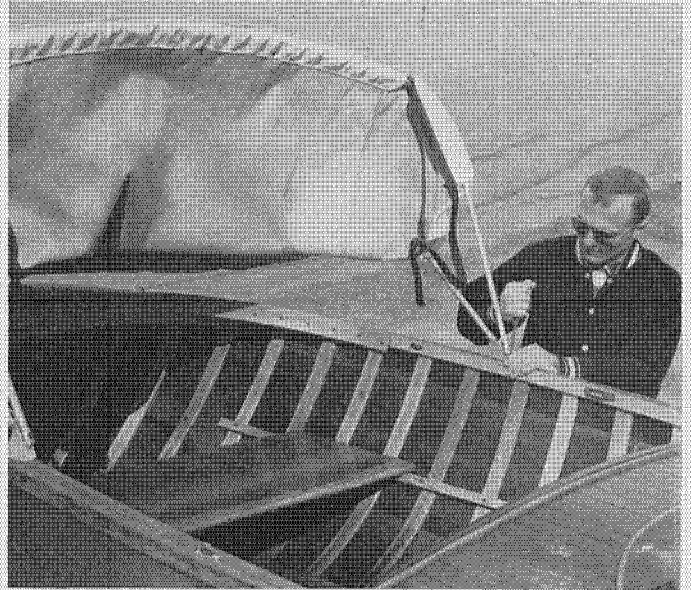
YOUR VESSEL AND THE DEEP BLUE SEA

Lots of the bounce in the current boating boom is being put there by man-made rubber. Fore and aft, materials like neoprene and "Hypalon" synthetic rubber are fending off such old foes as sea and weather.

A recent case in point is that of the converted convertible top. First made as a covering for convertible autos, fabric coated with "Hypalon" now is at sea as a sun-beating canopy for boats. Aro Top Sales Co. of West Newton, Mass., was responsible for the quick adaptation of the new material to the marine life.

"This coated fabric can be cleaned repeatedly and isn't affected by salt water," noted Aro Top sales manager George Shapiro. "Ordinary boat tops wear out fast. We've replaced several this spring with 'Hypalon'."

These custom topping jobs led to the development of a new Aro Top canopy that will fit just about any small craft. Its unusual design makes it adaptable to any windshield; a tubular aluminum frame keeps the fabric taut, and adjustable V braces on each gunwale support the whole.

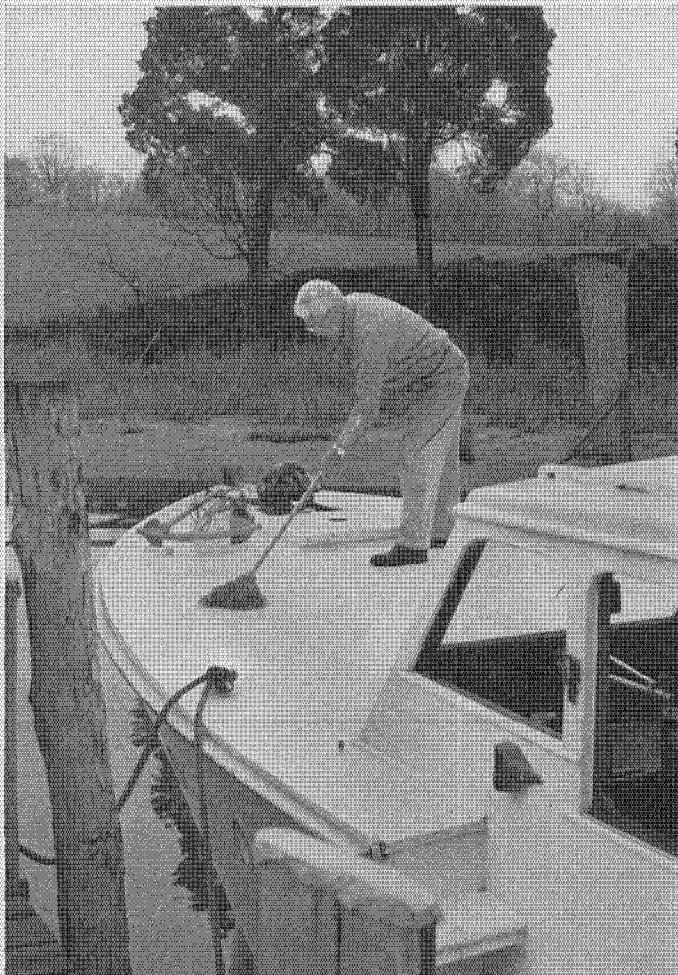


New canopy of fabric coated with weather-resistant "Hypalon" is easily installed, fits most small boats.

Straps fore and aft secure the canopy, and the forward pair can be detached to fold back the cover. The easy-to-install canopy fits beam widths of from 53 to 72 inches and comes in four colors.

Because "Hypalon" is weather resistant, washable, pliable and indifferent to most oils and chemicals found around boats, it also is being eyed as a long-wearing deck finish. Paint based on the synthetic rubber has withstood sunlight, salt water and weather extremes on the deck of one craft for more than three years without signs of deterioration, cracking or discoloration.

Versatile seafarer though "Hypalon" has proved to be, Du Pont neoprene still holds the edge in the variety of boating tasks performed. Right now it's riding the crest of the outboard motor horsepower wave. In the big kickers, neoprene is the difference between yesteryear's roar and this year's purr; most 1957 models have neoprene engine mounts that isolate vibration and so keep the boat from becoming a big sounding board. Hardly affected by gaso-



Paint with base of "Hypalon" has protected this boat's decks for three years, is expected to last for several more.

line or sun, neoprene hose is the standard fuel line for modern detached vacuum tanks, and it has replaced metal gas lines inside some motors.

Neoprene is the base for a hull coating made in several colors and brands, holding off forces that damage many finishes. Elsewhere it's an effective sealer of joints and seams as a component of a mastic adhesive-sealer and a cork-neoprene tape gasket. The gasket solved a leakage problem for one maker of aluminum boats. Rivets can be punched through it, and it resists aluminum coating oil, gasoline, lubricants and—should fortune smile on the boat's eventual occupants—fish oils.

Miscellaneous uses take neoprene to all parts of a vessel. It's being used as foam in shipboard mattresses, as a caulking paste, and for windshield and port gaskets, bilge pump parts and transom pads.

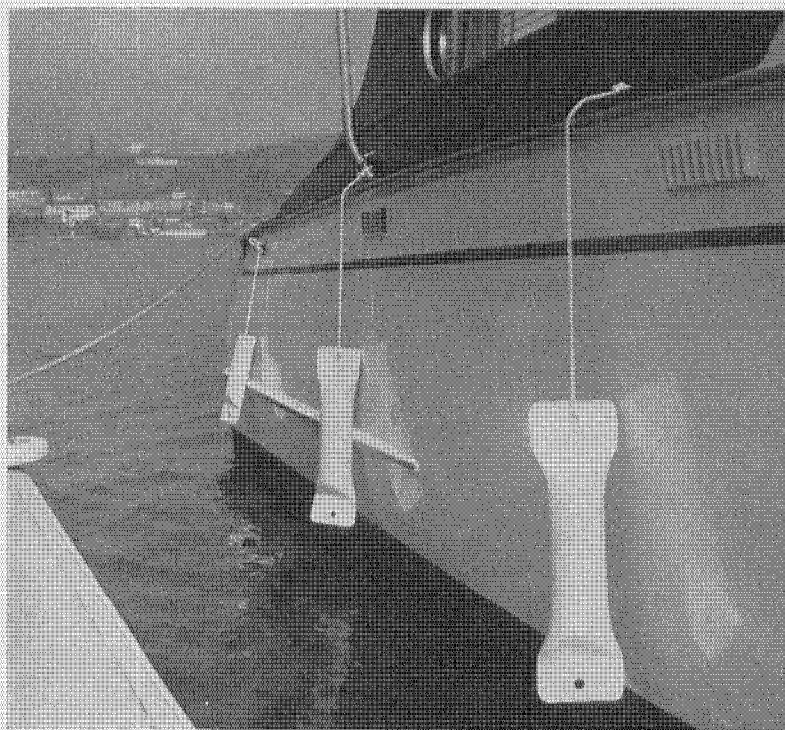
The old bump and grind of boats at dockside also has kept neoprene busy over the years. You'll find it in padded strips guarding gunwales and dock edges, in semi-pneumatic wheels that ease boats around sharp corners without scarred hulls, in foam-filled fenders dangling over the side and ready to float if dropped, and even in a stretchable snubber to absorb the shock of strained mooring lines.

Next time you step aboard, just look around. A Du Pont synthetic rubber is likely to be between you and the deck, you and the dock, you and the water.

'BYE, GUM!

Remember the days when your boat motor emerged from each long winter's nap still half asleep? How it responded with a cough and sputter when it should have bounded out to greet the bright new spring? Here's how that unhappy picture has been turned to the wall.

Between-seasons storage made inboard and outboard motors particularly susceptible to spring lethargy. Fuel consumed during the boating season and that left in the motor while it was beached for the winter often deposited clogging gum throughout the mechanism. Even though you drained the tank, some fuel remained in feeder lines, carburetors and other parts. The trouble entered the scene in the early '20s with cracked fuels that tended to deposit gum in your motor and put an end to carefree cruising.

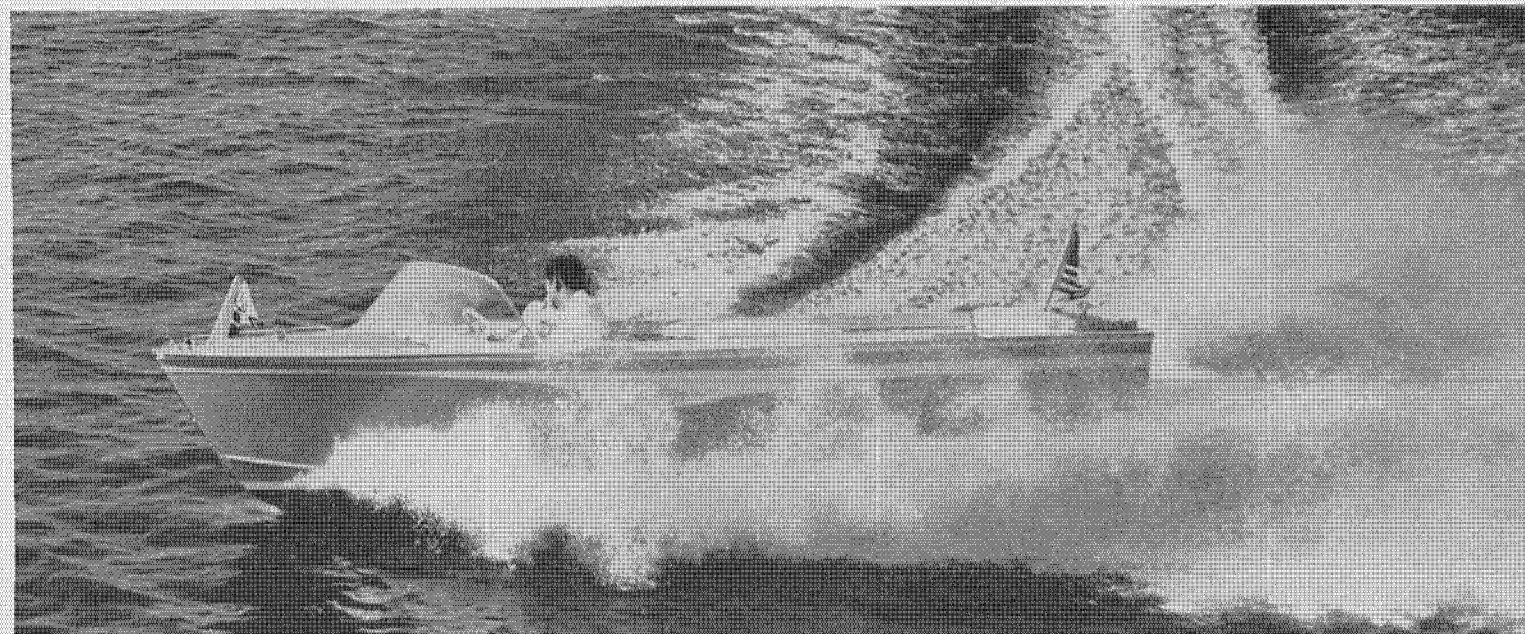


Boat fenders and dock bumpers of neoprene synthetic rubber retain resilience, guard hulls and gunwales. Fenders will float.

Antioxidant compounds were developed by Du Pont several years ago to retard this gumming, but there were baffling times when they failed to halt the process. Then chemists learned that minute quantities of copper in some fuels were acting as oxidation catalysts to undo the work of the antioxidants, permitting gum to form. The next step was to develop a compound—Du Pont Metal Deactivator—to overcome the effects of copper, which could be picked up by gasoline at various points between the refinery and the sparkplugs in your motor.

Today oil companies are adding Du Pont antioxidants and Metal Deactivator singly or in combination to their marine fuels. Using these fuels now will make it easier for your motor to rise and shine again next spring.

Formula for exhilarating cruise is good boat plus lively engine powered with modern marine fuel.



Cross country mop-up

If you have floors to swab and a cleaning force to please, you'll want to read this report from three cities



SPOKANE—Deaconess Hospital cleaning women like sponge yarn mops because they're light, easy to clean.



CHICAGO—Sponge yarn mops leave no unsightly lint or strings on floor of building, says this user.

Once people try mops made of Du Pont cellulose sponge yarn, they usually become converts, we explained to three of our writers in as many cities. Locate a user of the mops in your town—you can find one with the help of your local sanitary supply jobber—and get the reasons. We want to pass them along to our readers.

"Visited 250-bed Deaconess Hospital," came the reply from Pat McManus in Spokane, Wash. "Robert E. Baden, purchasing agent, told me sponge yarn mops used five years, said housekeeping staff was behind move.

"Found Mrs. Weeks, head housekeeper. She said sponge yarn mops used exclusively in patients' rooms. Women patients often ask where they can get mop that looks so neat.

"Hospital's cleaning women like mops because they're easy to clean, weigh little. Fact is, these ladies definitely possessive toward mops. Refuse to let nurses use them for fear they'll get them dirty."

"First Federal Building here," wrote Fanny Rinn from Chicago, "has 18 stories, 284,000 square feet of floor to be mopped. Talked to Jorgen E. Jacobsen, building superintendent, who bosses cleaning crew of 28.

"Old-fashioned mops, Jacobsen told me, shed lint, lose strings. These clog sinks and sewer line. Left on floor, strings and lint also make bad impression on public. Not so with sponge yarn mops.

"Jacobsen introduced Robert E. Bearfield, day foreman, who began conversation by saying he'd take one sponge yarn mop in preference to any ten others. They glide easily, he said, don't tangle, pick up water faster, dry faster."

"Stopped at Peter Pan Diner," reported Marian Kallfelz of Wilmington, Del. "Manager Francis Lyons said ordinary mop arrived by mistake recently, was sent right back. Only non-sponge yarn mop seen on premises since opening four years ago.

"Because diner is open 24 hours, customers see mopping in progress. Sponge yarn mops better looking, Lyons claims, more absorbent and—this is important—much more durable than common mop."

We thanked writers, told them readers would appreciate—now they've got us talking that way!



WILMINGTON—Peter Pan Diner wants mop a customer can look at without wincing. Sponge yarn in green or buff color fills the bill.

throwaway paper furnishings and clothes, from uniforms to evening dresses. But research also focuses on ways to improve papermaking processes and paper itself.

As a supplier of chemicals ranging from peroxygen bleaches for paper pulp to pigments for printing inks, Du Pont quite logically puts considerable stress on service to the industry. Paper laboratories for product development and customer service are operated by four departments—Electrochemicals, Pigments, Grasselli and the Dyes & Chemicals division of Organic Chemicals. These and other Du Pont departments are developing materials to protect paper from such adversaries as water, fire, grease and soil.

LOWLY BAG GETS CLOSE SCRUTINY

What to most of us is a modest paper bag for grocery lugging is many different things to research men. Elchem's bleaching specialists eye the bag—and even the daily newspaper—as things that would look better in a lighter shade. They have a new single-stage peroxide bleaching process for kraft, for example, that should be within the economic reach of an enterprising bag manufacturer. Dyes & Chemicals, meanwhile, has come out with a resin treatment that increases the wet strength of kraft paper.

Want a bag that's water repellent and that won't stick to refrigerated materials packaged in it? Grasselli Chemicals Dept. has a treatment to offer. If, on the other hand, you want two bags or boxes to cling together enough to keep them from skidding when they're stacked, Grasselli has that kind of treatment, too. It also makes adhesives with which the boxes are put together.

Here's more detail on these and other paper uses for Du Pont chemicals:

Wet strength improver: Kraft bags treated with "Zoron" WS wet strength resin have less tendency to disintegrate when wet; in fact, their wet strength is boosted as much as 50 per cent. While the usual wet-strength material is added at the beater, "Zoron" is designed for surface application. More uniform treatments, higher wet strengths and lower costs are the result, researchers claim.

Water repellent and release agent: "Quilon" chrome complex is familiar to *Du Pont Magazine* readers as a protectant for shoe and glove leather (see page 32) and as the chemical behind dry-cleanable suede. Its pioneer use,

however, was as a low-cost surface treatment for paper.

"The chromium head of the molecule of 'Quilon' clings tightly to a surface, leaving a stearate tail to fight off water and push other materials away," a Grasselli man explained. Among uses for paper treated with "Quilon" he listed ice delivery bags, paperboard liners for produce and frozen food boxes, paper plates and building materials.

One company markets a reinforced paper treated with "Quilon" for covering wet concrete to control evaporation. The treatment also works as a protectant for twisted paper rugs. A firm that specializes in vegetable parchments found that "Quilon" not only improved release but also markedly boosted grease resistance. The parchment is used for lard package liners and pie crust and cake mix packages. It also goes into bakery tray liners that eliminate pan greasing and scraping. Parchment separator sheets are used for uncured rubber and for adhesive-backed vinyl tile.

Water repellent and flame retardant: "You've heard of the paper casualty blankets for civilian defense," the Grasselli man said. "They shed water and resist fire because the paper is treated with 'Quilon' and ammonium sulfamate. The process involves only one step and can be handled at the size press or from a coater."

Antiskid: Just a year ago the *Magazine* reported on a cure for the slipperiness of paper bags. The treatment we suggested was a microscopically thin coating of "Ludox" colloidal silica. Now manufacturers are using the same inexpensive treatment on cardboard cartons. Although they frictionize the surface, particles of "Ludox" are so tiny that they are invisible. The coating actually improves package appearance by permitting sharper printing.

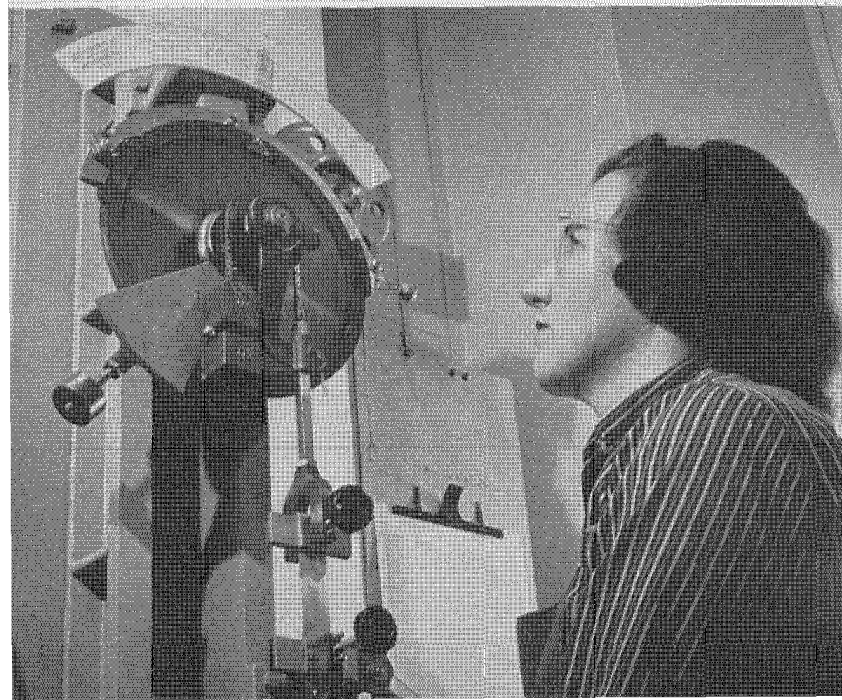
Adhesives: A new Grasselli adhesive formulation, 78X, is of interest both because it leads a double life as far as viscosity is concerned, and because it reduces carton makers' adhesive costs, in some cases by 10 to 15 per cent.

"Adhesive 78X is low in viscosity at the time it's applied," a Grasselli man explained. "Hence it goes on easily in a thin film. When roll pressure is taken off, however, the viscosity goes up, so that the adhesive doesn't soak into the paper."

Like its older brother, Adhesive 78, the new formulation is fast-setting and water-resistant. Its low cost makes

Wet kraft paper tears easily; its tensile strength is zero. This strip, treated with "Zoron" WS wet strength resin, stands 17 lbs.

Invisible coating of "Ludox" frictionizes surface of cartons. The antiskid treatment reduces breakage and safety hazards.



it attractive even in operations where water resistance isn't an absolute necessity.

Grease-resistant coating: While it is well known as an adhesive, "Elvacet" polyvinyl acetate emulsion is also notable for its grease resistance. Now grease-resistant coatings based on "Elvacet" can be applied on the machine during the regular papermaking operation. This new Elchem approach eliminates a separate off-machine coating process. Board coated with the formulation has scored a particular hit as a liner for bakery cartons.

Multipurpose coating plastic: For such thoroughly wet products as sauces, sirups, juice concentrates and brine-packaged pickles, olives and fish, there's another packaging possibility: paper coated with thin films of "Alathon" polyethylene resin. The paper can be extrusion-coated by a Du Pont-developed process that makes it possible to coat "Alathon" on unbleached kraft for heavy, multiwall bags or carton liners; on bleached kraft for packaging frozen food, or on glassine, foil or films for pouch packages.

Smoother skin: Conventional paper coatings that call for titanium dioxide can be improved by using a rutile form of this white pigment. With "Ti-Pure" titanium dioxide R-510-P, developed by Du Pont's Pigments Dept., excellent coating fineness is achieved with minimum dispersion. The rutile pigment is particularly suited for paper or board that's to be waxed, oiled or varnished.

IN THE BEGINNING: A BLEACH

Long before any of these specialized coatings have set to work, much of the pulp from which paper is made will have undergone intensive chemical beauty treatments. Bleaching—by processes that may involve from one to more than five stages—brightens the pulp to make possible paper that is whiter.

Planned for peroxide: Elchem technical men are watching with great interest the building of a new mill in the South. It's the first designed especially to use a new five-stage peroxide bleaching system for kraft pulp.

"Every mill setup is different," an Elchem representative pointed out. "That's why we say there are few trade secrets but a lot of know-how needed in this business. Previously we've adapted our processes for 'Albone' hydrogen peroxide and 'Solozone' sodium peroxide to existing

equipment. Now, with a setup especially built for it, peroxide bleaching will really be able to show its stuff."

Two-stage bleaching: Frequently, bleaching allows the mechanically made groundwood pulp to be substituted for chemical pulps, more costly because they require chemical digesting. Elchem and Orchem technical men are working jointly on a two-stage peroxide and sodium hydrosulfite bleaching project that promises unusually bright groundwood for such things as throwaway paper products.

"Groundwood" from chips: Thanks to a new process for making a groundwood-type pulp from hardwood chips, papermakers are eyeing the hardwoods that are particularly abundant in eastern forests. The economics of the new method make it a good bet for mills requiring as little as 40 tons of pulp a day.

Heart of the process: Hardwood chips, produced mechanically by chipping peeled logs, are impregnated with either cold caustic soda or sodium bisulfite solution.

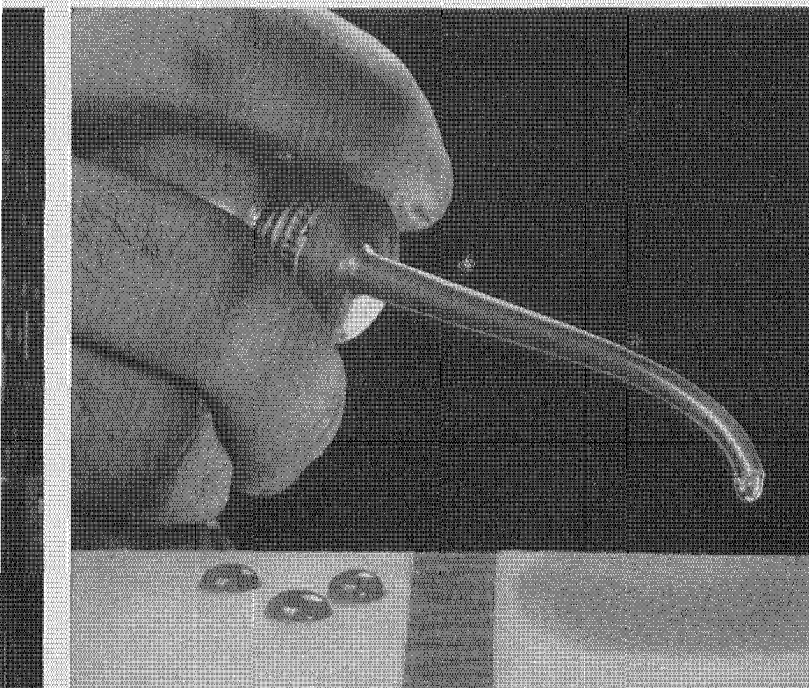
"Any of 12 hardwoods—including white oak and hickory—that we have investigated can be converted to a usable semichemical pulp," the developing company reports. The new method also can be used to make pulp from softwood chips or from sawmill wastes.

Du Pont has carried out extensive laboratory and field tests to determine the bleachability of these new pulps. Most hardwood species can be bleached to a brightness range of 70-75 G.E. with the use of peroxide alone or a hypochlorite treatment followed by peroxide.

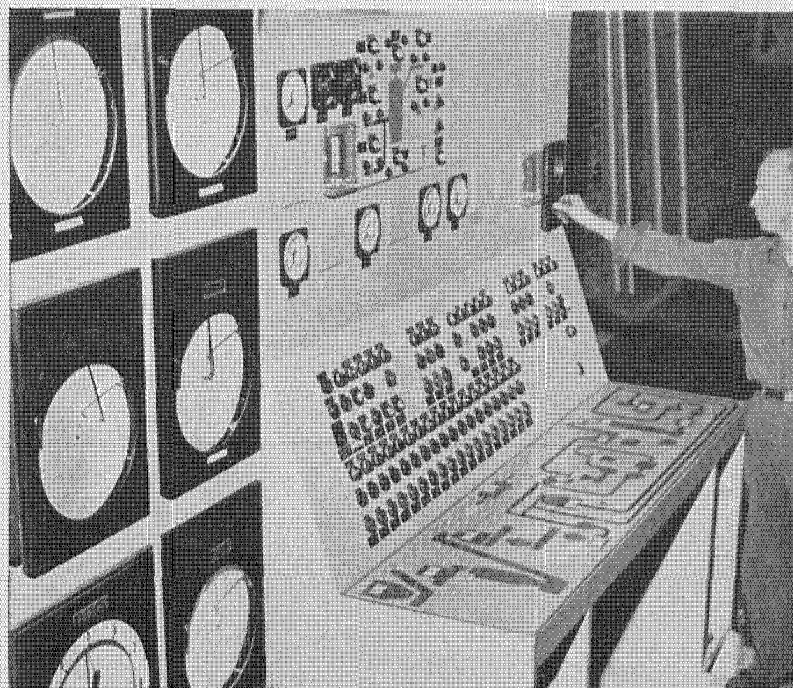
An attractive feature of this groundwood pulp is that it can replace sizable amounts of more expensive kinds for a variety of papers, especially calendered grades of magazine stock. Moreover, it offers existing newsprint mills an additional raw material supply and makes possible newsprint manufacture in areas where the available wood wasn't thought to be suitable.

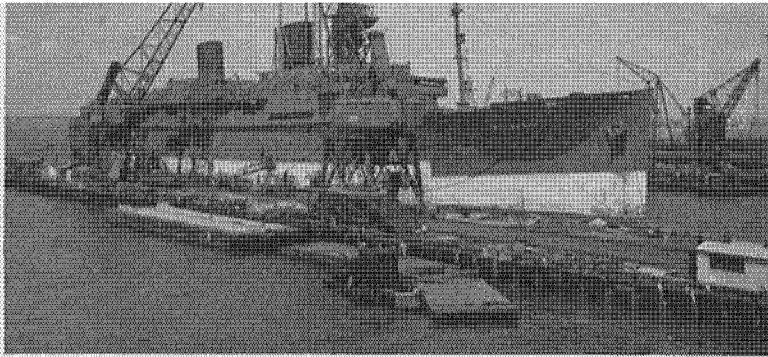
Back to the Bag: Finally, as we mentioned earlier, there's that single-stage bleaching method that could lighten the tan of kraft grocery bags. So far, no bag manufacturer has thought it worth the added cost, but in this day of emphasis on attractive packages you can't tell. After all, shopping bags and department store sacks are blossoming in distinctive colors. But that's part of the dyes-for-paper story we plan to bring you in our next issue.

Vegetable parchment, left, is treated with "Quilon" to stop oil crawl. Note spread of oil on untreated parchment, right.



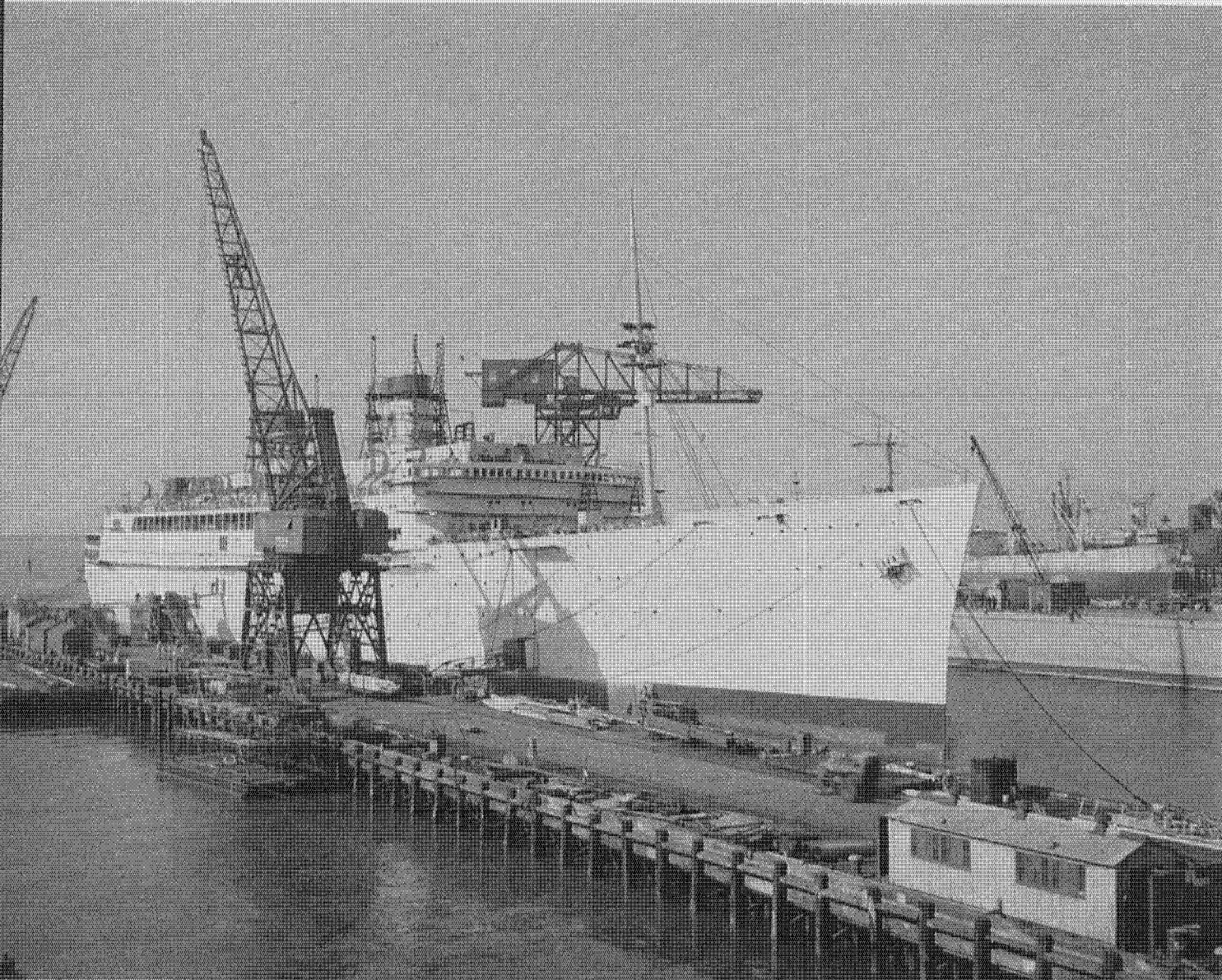
Modern mill producing groundwood-type pulp from hardwood chips is highly automated. This control panel is heart of whole process.





MATSON LINE

Out of action since



The Matson liner before, top, and after her facelifting. New, more rakish bow has been added, and topside has been brightened with "Dulux" marine enamel.

Capt. H. O. Matthiesen, ship's 53-year-old skipper, sailed as an able seaman 35 years ago on the original *Matsonia*. This is third ship to bear the name.



Back in mufti

After troopship duty in World War II, the refurbished liner enters passenger service to Hawaii

Back into Pacific passenger service this month goes the gleaming white *S. S. Matsonia*, fresh from a \$20 million beauty treatment that has erased the gray memory of her five years as a U. S. troop carrier in World War II.

With both the *Matsonia* and the *Lurline* now in service, Matson Navigation Co. can offer again, for the first time since war swept the Pacific in '41, a schedule of weekly sailings from Los Angeles or San Francisco to Honolulu. Tourists thus will be able to make the round-trip voyage on a two-week vacation, with five or six days ashore in the Islands.

What the Newport News Shipbuilding and Dry Dock Co. calls "an unusually complete renovation" readied the *Matsonia* for her return to civilian life. Towed from California to Virginia via Panama more than a year ago, the ship resounded for the next 12 months to the clatter of air hammers and the hiss of welding torches. Plans for the conversion were drawn up by Gibbs & Cox, naval architects. Off came the ship's bow, to be replaced with a longer and more rakish one. Interior bulkheads were relocated almost completely; where 4,300 troops had been quartered, 760 passengers would now be served in luxury. In went a swimming pool, a children's playroom complete with Hawaiian little grass shack, a ballroom with 50 artificial butterflies suspended from the blue overhead, and state-rooms with individual temperature control.

Industrial designer Harry Neafie of New York commissioned 18 artists to decorate the ship in an appropriate mood. Eight-foot carved tikis, the Polynesian version of totem poles, stand guard at the entrance to the main lounge; other public spaces are lush with Hawaiian flora, and legends of the Islands are depicted in wood inlay and gold and silver leaf designs on native wood panels. For the ship's interior color scheme, Neafie dipped into a Pacific

rainbow. He chose 29 colors from Du Pont's Custom Color series, and had three special shades mixed to order at the Du Pont finishes plant in Philadelphia. Below and top-side, thousands of gallons of Du Pont paint put the finishing touches to the *Matsonia's* facelifting.

"We had to be ingenious in our use of color so that one space wouldn't look like the last one," says Neafie. "I used the same colors on the *Matsonia*, incidentally, that I picked last year for the *Mariposa* and *Monterey*, two Matson ships on the California-Australia run, and for the redecoration of the *Lurline* last December. This will simplify the stocking of maintenance paint.

"Matson specified Du Pont finishes. It was one of the few ironclad specifications they gave me. They've been pleased with it, and I can tell you one reason why. When the *Lurline* came in last December for her first complete redecoration in ten years, she had the original 'Dulux' enamel on a good many of her bulkheads, and it was still in fine condition."

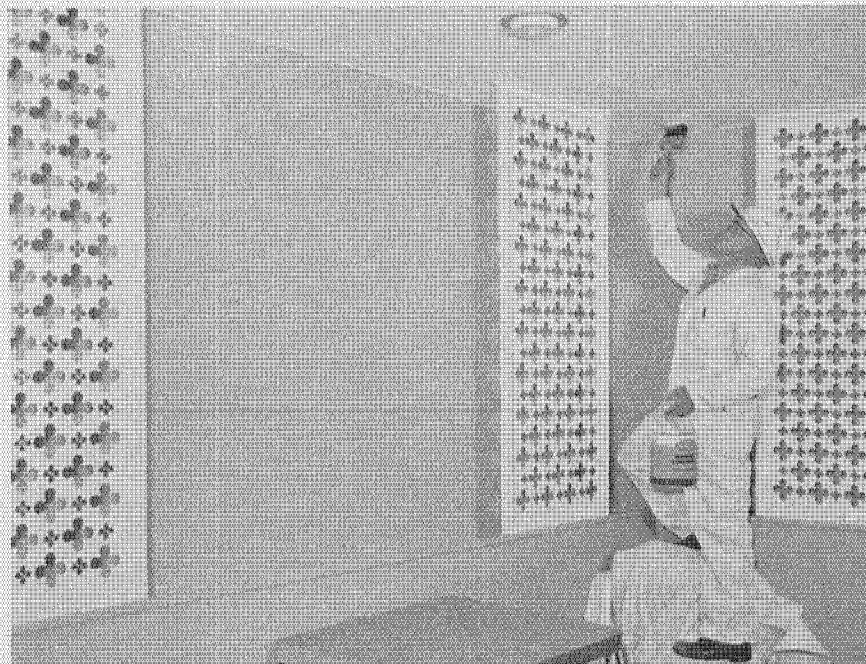
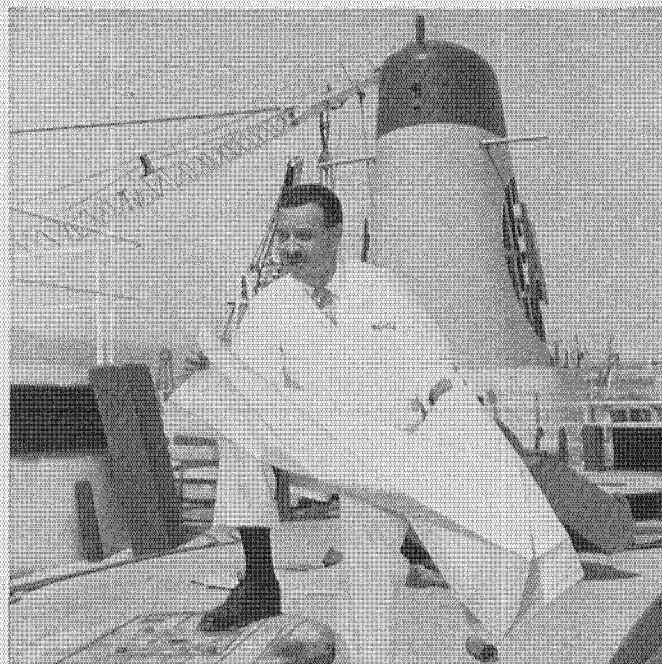
As you might expect, the prosaic numbers Du Pont attaches to its Custom Colors were transformed aboard the *Matsonia* into names like Samoan Pink, Sun King Gold and Hilo Blue. It's believed that tourists might be disappointed if this weren't done.

Commanding Matson's latest "white ship" is 53-year-old Capt. Hans O. Matthiesen, who sailed on the first *S. S. Matsonia*—this one is the third—as an able seaman 35 years ago.

He was on the bridge when the vessel left Newport News last month for New York, where she was greeted with a 50-foot floral lei. After a leisurely voyage with passengers to Los Angeles by way of Caribbean ports, Panama and Acapulco, she was scheduled to make her maiden trip to Honolulu June 11.

Harry Neafie, New York industrial designer, was responsible for ship's interior, chose 32 colors of paint.

Du Pont Custom Colors were given such names as Lanai Yellow and Maui Mauve to match vessel's Hawaiian décor.





Used 2½ years, milk tank brush bristled with "Tynex" is still in good condition. Former brushes lasted a month.



Pipe elbow brush cleans tubes at Wisconsin's Hiawatha Valley Dairies Co-op. Nylon-bristled brushes absorb almost no water, stay sanitary.

Dairyland bristles with "Tynex"

Nylon-bristled brushes outwear others

*and are easier to keep clean,
say milk producers and processors*

By EDGAR M. HOOPER

Until a few months ago, the Hiawatha Valley Dairies Co-op had a brush manufacturer as a next-door neighbor in the heart of Wisconsin's dairy country. Largely as a result of this unusual juxtaposition, Hiawatha has brushed off many persistent cleaning problems.

The plant produces dried milk powder on a round-the-clock schedule for national distribution. Nine man-hours out of every 24 are devoted to cleanups, necessary if Hiawatha is to meet the dairy industry's strict sanitation requirements.

For the latest in cleaning methods, Hiawatha soon learned that it was good business to ask the advice of its brushmaking neighbor. It was about five years ago, for instance, that the milk co-op tried out some new brushes made with Du Pont "Tynex" nylon bristles. Dairy foreman Casper Schober quickly discovered advantages: Unlike other brushes, these absorbed almost no water, hence stayed fresh and sanitary.

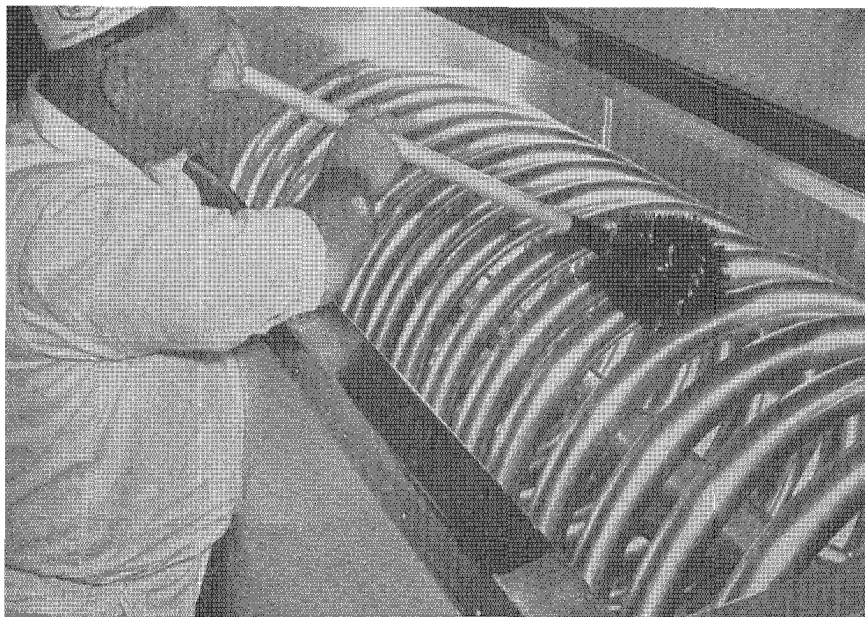
"Our other brushes used to go limp in a couple of weeks, but these were still lively after a year," Schober recalls. "We soon found we'd cut our brush cost in half because the nylon bristles wore so much longer." The dairy now lists on its cleaning roster 18 different kinds of brushes bristled with "Tynex".

DOWN ON THE FARM, TOO

Nearby dairy farms, among the world's finest, dramatize the change that has taken place since the days when most families kept their own cow.

Today, aided by modern equipment and methods, many dairy farmers in Wisconsin and elsewhere take justifiable pride in milking their cows in spick-and-span milking "parlors." Frequent and increasingly strict inspections must be passed if the farms are to sell quality milk. Here again, brushmakers have been called on to design a variety of specialty brushes that keep equipment gleaming and remove milk residues from the intricate milking machines.

Recently many farmers have begun putting milk in bulk tanks rather than cans to await shipment. Tank manufacturers asked for, and got, a special brush for



Hiawatha foreman Casper Schober goes into action with coil pasteurizer brush bristled with "Tynex", one of 13 different brushes.

"Tynex" bristles withstand 190°F. temperature of a dryer box, where brush sweeps milk powder from walls and floor.

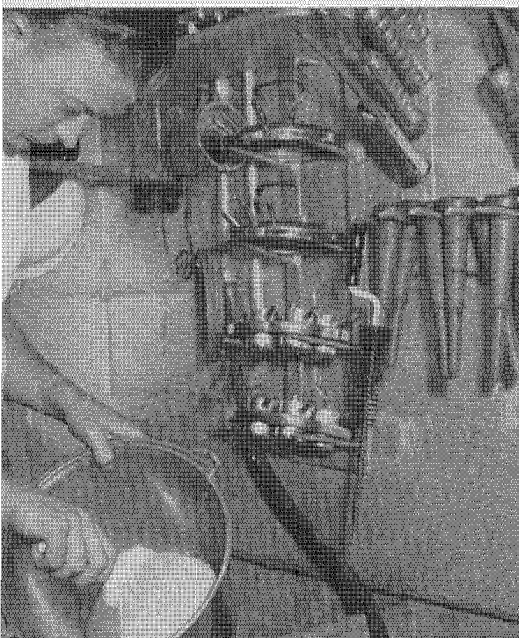
cleaning these tanks. The brush's "Tynex" bristles are proving themselves handsomely in partnership with chemical cleaners to take the rub out of this extra scrubbing.

The dairy industry is by no means the only one that's gone over to "Tynex". A Du Pont man who's been brushing up on the subject lately describes his findings enthusiastically after a series of field trips.

"Brushes are old, old tools, but they're still discovering new uses for them," he says. "We've talked a lot about how man-made bristles can be tailored for tough jobs or delicate ones, but you have to see these brushes in action to appreciate them. I've been watching them clean con-

veyor belts, where they remove sharp particles of coal or sticky, sugary things. Then I've gone to a food processing plant and watched machines scrubbing tomatoes. These brushes, also bristled with 'Tynex', didn't even break the thin skins of the fruit. In other plants maintenance men use a round brush, forced through pipes by liquid pressure, to clean pipelines."

What he's saying, we think, is clear: If your production or maintenance schedule calls for cleaning, it's likely to pay you to review your present materials and methods. Nylon-bristled brushes to suit your needs can be obtained from a long list of manufacturers.



Handy cleaning tool at dairy farm is this utility brush. Nylon bristles have been crimped to improve water pickup, retention.



Bristle lengths vary on brush designed for cleaning irregular surfaces of milking machine cups. Stiffness can be varied, too.

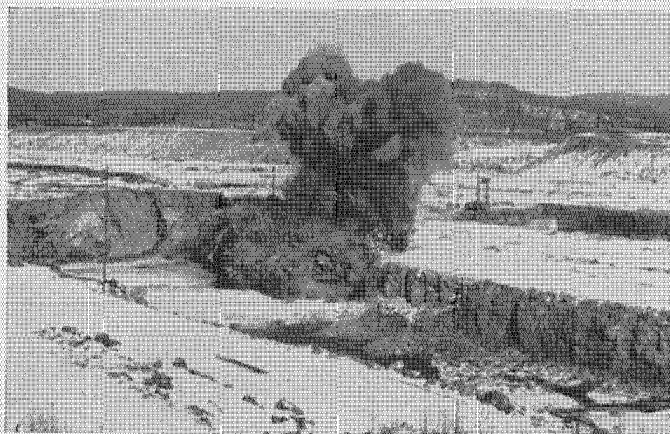


Unless surfaces of holding tanks are thoroughly cleaned, milkstone forms. This stiff, nylon-bristled brush removes such residues.

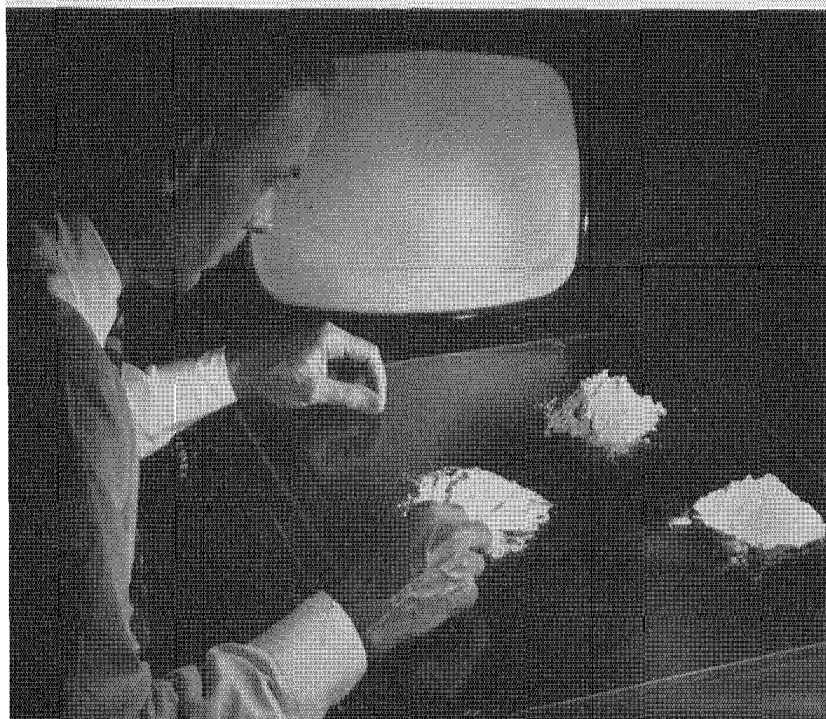
What's New

- **NEW LETTERPRESS PRINTING** plate made of a lightweight, flexible plastic instead of conventional metal is being readied for field testing this year, the Du Pont Photo Products Dept. reports. Process involves exposure of the photosensitive plate to light through a negative containing both type and illustrations. A bath in a simple water solution then "washes out" areas not exposed. Image, formed by a chemical change in the plastic during exposure, is left in relief. The plate is then ready for the press. Last month's brief announcement of the development came after eight years of Du Pont research on the product. We'll have more details in a later issue.

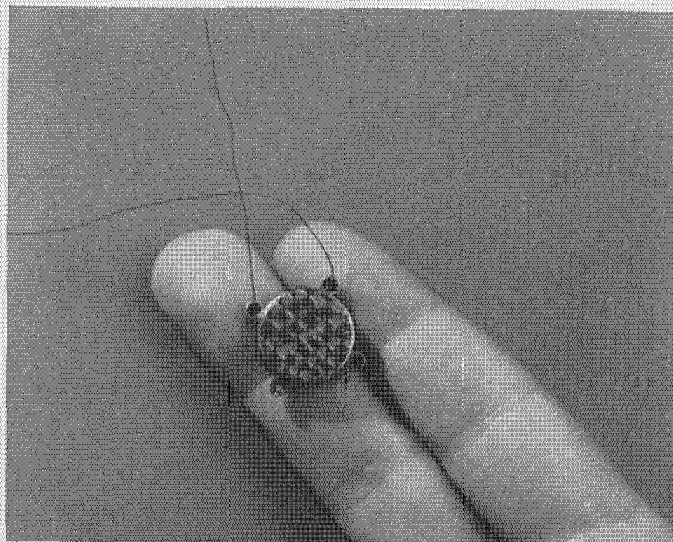
- **MOTION PICTURE SCREENS** made of new Du Pont "Cavaltex" vinyl coated fabric are for colored slide or movie projection. Silvery surface of fabric, which requires no further processing by screen manufacturers, gives exceptionally clear image on screen.



- **NEW HARD-HITTING** Du Pont "Nitramex" 2H blasting agent gives better breakage in such hard-to-shatter materials as taconite, magnetite and massive sandstone. It has the highest density of any blasting agent yet developed by Du Pont.



- **BRIGHTER TELEVIEWING** is in prospect on picture tubes screened with new Du Pont P-4 phosphor blends, tubemakers report. The new blends adhere well to tube faces throughout the tube manufacturing process.



- **EXPERIMENTAL ATOMIC BATTERIES** developed jointly by Elgin Watch Co. and Kidde Nuclear Laboratories are expected to give continuous power to wrist watches and hearing aids for more than two years. To generate electricity, a layer of radioactive material and phosphor activates photocells made of Du Pont hyper-pure silicon by Hoffman Electronics Corp.

• **HOW OLD IS OLD ENOUGH** for a youngster to begin shooting? This and similar parental questions are answered in the revised Sporting Arms and Ammunition Manufacturers' Institute booklet, *What Every Parent Should Know When a Boy or Girl Wants a Gun*. You can get it by writing to Sportsmen's Service Bureau, Dept. D3, 250 E. 43rd St., New York City.

• **POLYETHYLENE GARMENT BAGS** are preferred by dry-cleaning customers, an Alfred Politz survey shows. Public appreciates toughness and transparency of film made from such materials as "Alathon" polyethylene resin. Report on survey is available from Polychemicals Dept., Room 92-67, Du Pont Bldg., Wilmington 98, Del.

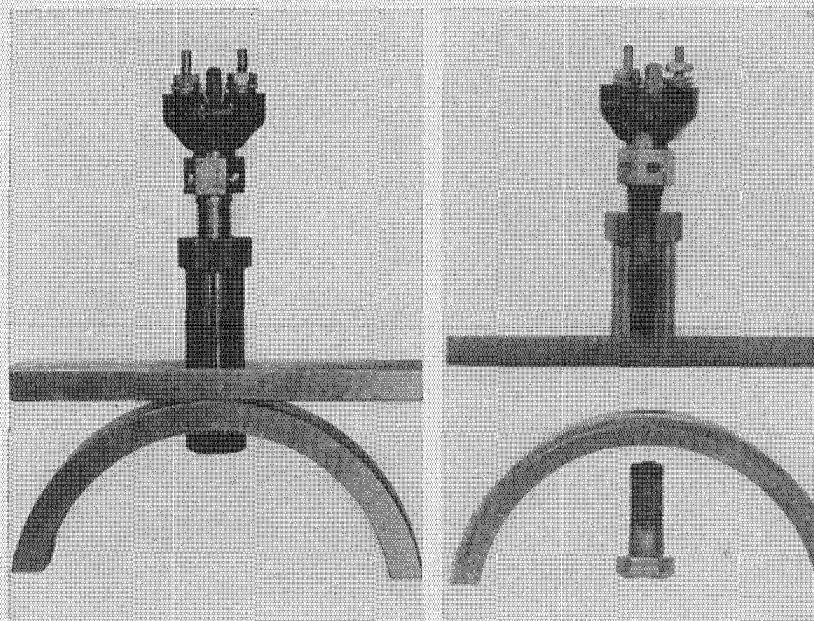


• **YACHT BLANKET** of "Orlon" acrylic fiber is lightweight, washable, absorbs little or no moisture and resists mildew damage. It's made by Lebanon of Tennessee, 93 Worth St., New York City.

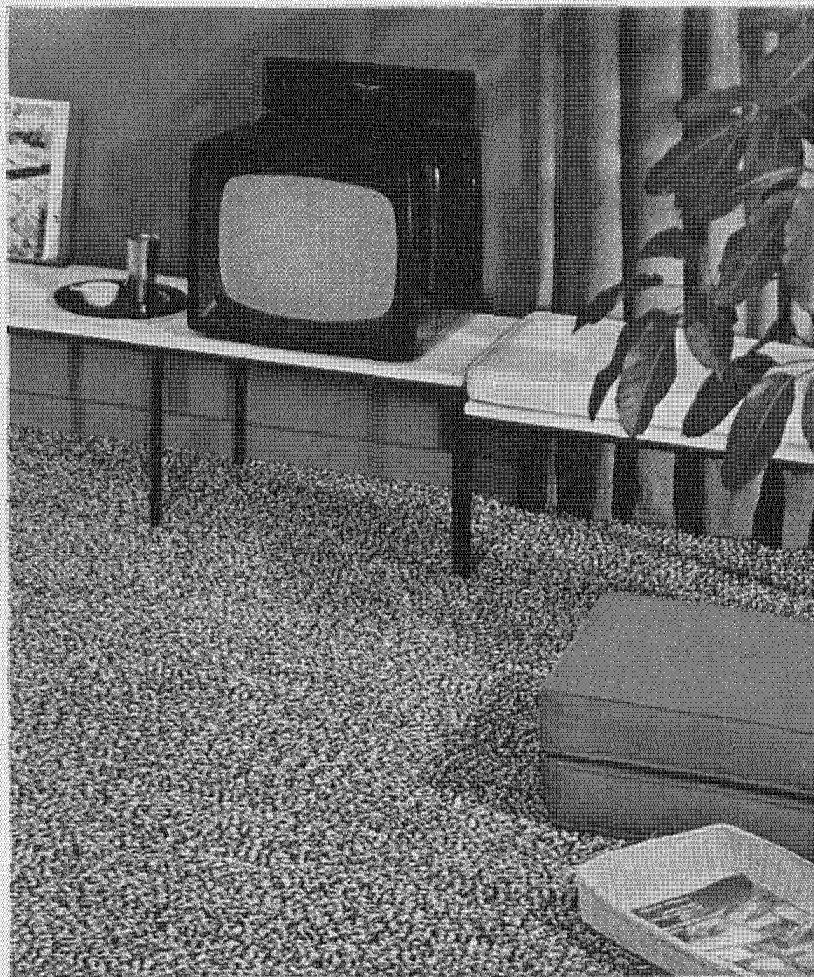
• **ROLLED WASHERS** of "Zytel" nylon resin, slipped over bolts, screws and rivets, flow into the space between the fastener and the hole when the fastener is tightened, thus making a leakproof seal. Made by Nyltite Corp. of America, Union, N. J.

• **STEPPED-UP RESISTANCE** to heat and sunlight characterizes new Type 330 high tenacity nylon yarn. Available from Du Pont in 210 denier, the yarn is expected to be useful in such products as tarpaulins and outdoor furniture. It's the latest of many yarn and fiber types Du Pont has developed for specific end-use areas.

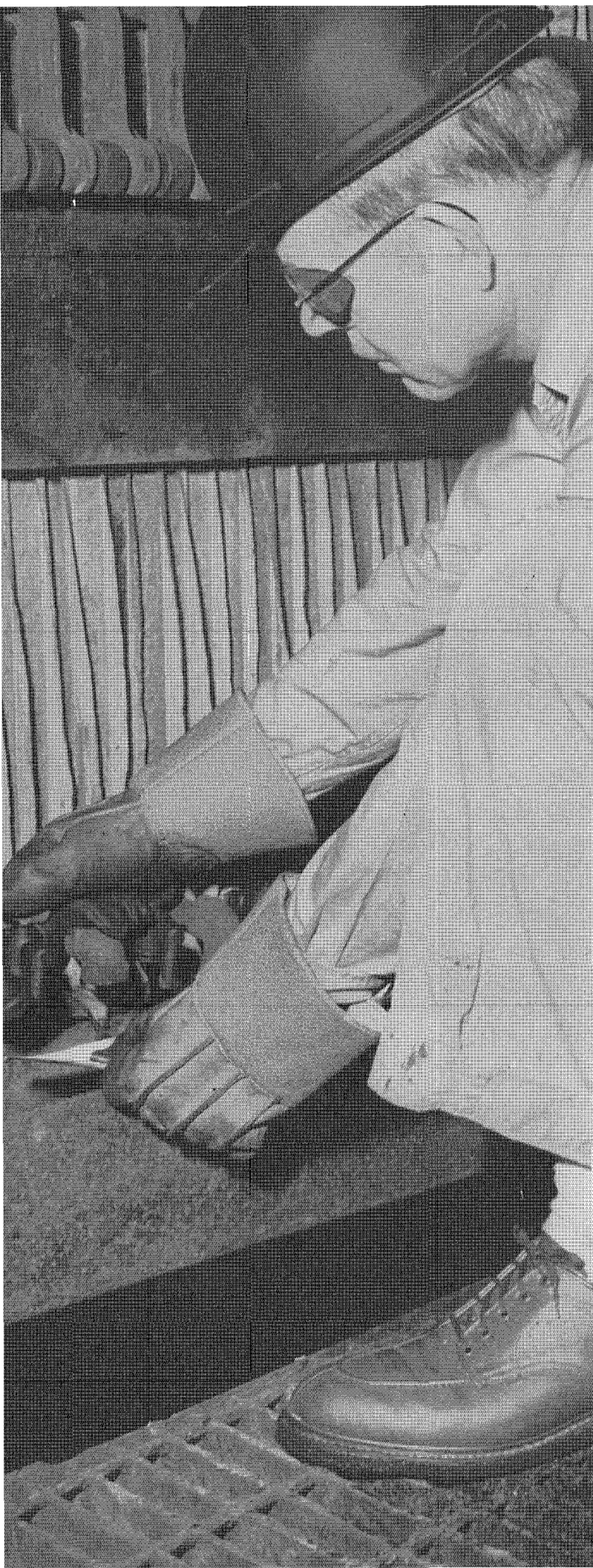
• **FOR THE WEIGHT CONSCIOUS**, non-caloric sweeteners made with Du Pont "Cylan" calcium cyclamate are now available in drug and grocery stores. Two brands are "Table Sweet" by Rexall Drug Co. and "Sweet 10" by Tidy House Products Co.



• **AIRCRAFT FUEL TANKS** or other external gear are jettisoned quickly and positively by this new Du Pont explosive release. It's fired electrically to split a special nut away from the bolt holding the part to the plane.



• **SPARKLE AND LUSTER** are added to new fiber rugs with quarter-inch-wide strands of transparent "Mylar" polyester film, woven into the fabriclike yarn. This reversible Gold Seal LoomWeave rug, made by Congoleum-Nairn Inc., begins at about \$2.25 a square yard.



Longer life for work shoes and gloves

... and a more comfortable one for their wearers is in prospect when the leather is processed with "Quilon"

The purchasing agent had a gleam in his eye. "Any time someone can show me a way to make our people happier—and actually save me money to boot—I'm interested," he said, smiling.

His enthusiasm increased as he dug deeper into the reports from industrial workers who had been wearing safety shoes and gloves made from leather processed with Du Pont "Quilon" chrome complex.

The test area for gloves was one where many different chemicals are handled and where glove life had been conspicuously short. By lasting longer, the treated gloves whittled costs 15 per cent in the three-month test period. On a plant-wide basis, the saving would be 25 to 35 per cent, the purchasing agent calculated.

He read aloud the men's succinct comments: "These gloves stay soft. My old ones didn't." "They don't wet through as fast." "Better acid resistance."

Even more forceful praise was showered on the shoes, where presumably the pinch of discomfort is more acute. "Test shoes didn't shrink overnight or weekends," one man noted. "Shoes dry out soft after being wet," another wearer reported.

On the basis of these reports, the purchasing agent revised his standards for gloves and safety shoes to specify that they be made from leather processed with "Quilon". Similar switch-overs are taking place at other industrial plants as the word spreads.

"Quilon", applied in the leather tanning process, is a permanent treatment that lasts for the life of the leather. We first reported on the improved performance of such leather 18 months ago in an article called "Shoe Leather Steps Ahead." Now most manufacturers of safety shoes and several who make work shoes, hunting, hiking and sports shoes have added styles with "Quilon" to their lines. Leather work gloves processed with "Quilon" are also available from some manufacturers.

WHAT ARE BOYS' CLOTHES MADE OF?

"Don't play in the water with your good clothes on," Mother has warned Mike, Chip and Robbie 100 times. She might as well save her breath. Boys haven't changed, but fortunately their clothes have.

Thanks to man-made fibers—"Dacron"* and "Orlon"***—the outfits these youngsters are wearing can be washed easily, drip-dried and put on again with little or no ironing.

Something altogether new in boys' clothes, they are styled like the popular wash-and-wear suits for men and sized to fit boys from 7 to 17.

Choose from a wide variety of fabrics, but be sure they contain sufficient "Dacron" or "Orlon" to insure *built-in* neatness retention and wash-and-wear convenience. That way the clothes come through even a boy's energetic day in fine shape . . . wearing after wearing. Typical good performers are fabrics woven from these fiber blends: 65 per cent or more "Dacron" with cotton; 55 per cent or more "Dacron" with rayon; 50 per cent or more "Dacron" with "Orlon".

*"Dacron" is Du Pont's registered trademark for its polyester fiber.

***"Orlon" is Du Pont's registered trademark for its acrylic fiber.

Du Pont makes fibers, does not make the fabrics or garments shown.



WASH AND WEAR BOYS' CLOTHES:

Just wash  . . . drip-dry  . . . and wear



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



WASH 'N' WEAR...NEW CONVENIENCE BUILT IN WITH
DACRON · ORLON · NYLON

REG. U.S. PAT. OFF.

REG. U.S. PAT. OFF.

The right paint for your home

*Du Pont chemists offer you paints that last for years —
for every kind of exterior*

White houses remain dazzling year after year when they're painted with Du Pont white house paints. These paints are rich in titanium dioxide, the *whitest* paint pigment. That's why you not only get an easy-to-apply, high-hiding finish, but one that stays white longer than you ever thought possible.

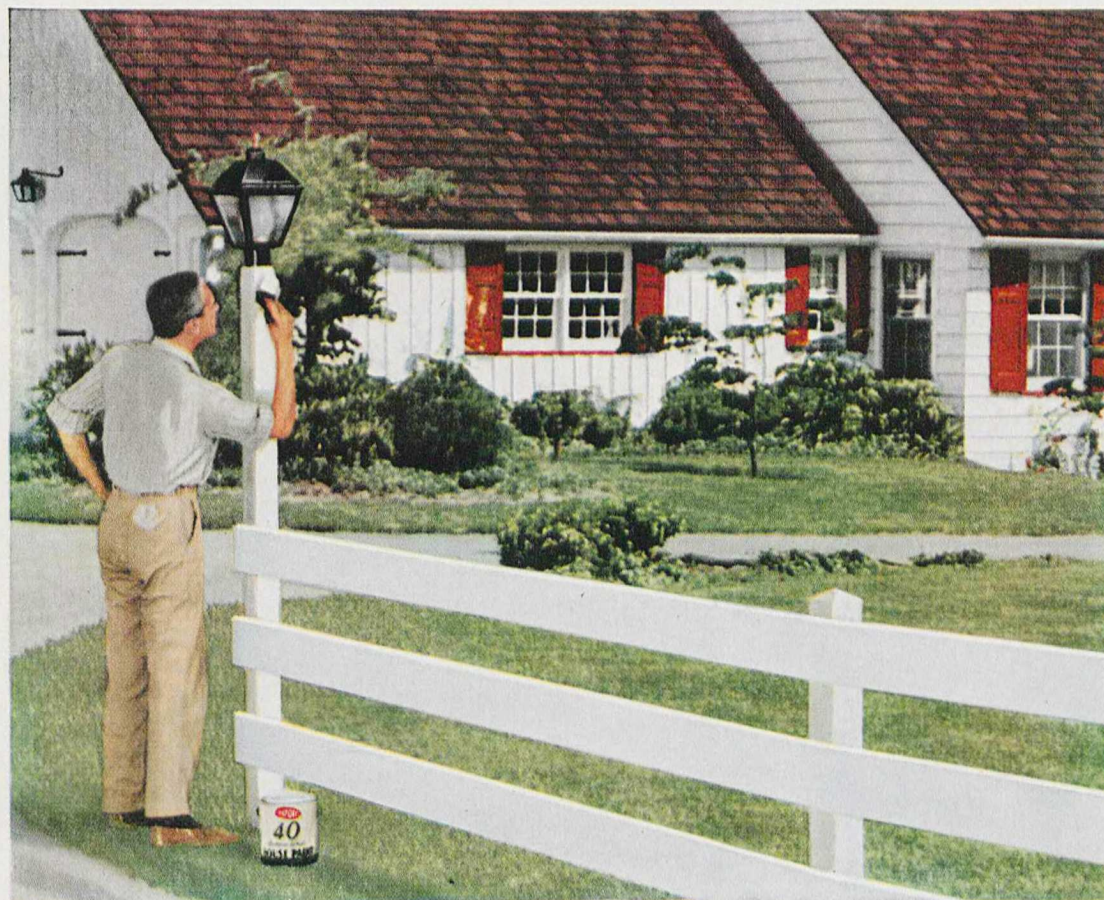
For all-wood homes, there's Du Pont "40" Outside White House Paint. This paint actually cleans itself, and keeps your home fresh

looking season after season. It sheds dust and grime with every heavy rain, unless dense shade or excessive stains slow this unique process.

For wood-masonry houses, Du Pont chemists provide "42" Chalk-Resistant White House Paint. It's chemically formulated to end staining problems on brick or stone located below wood or clapboard surfaces. Like all Du Pont house paints, it's extra tough, has high-hiding power and is easy to apply.



174 CUSTOM COLORS mixed to your order, plus a wide range of popular, ready-mixed tints! You'll find the color you've been looking for—from deep modern tones to soft pastels. They're easy to apply, and extra-durable, too!



"DULUX" STUCCO, SHAKE AND SHINGLE PAINT—also ideal for asbestos shingles, cement, brick. Goes on smoothly . . . dries to low-luster finish. Alkyd-fortified with "Dulux" reinforcing oils for extra durability. White and many colors.



"DULUX" TRIM AND SHUTTER PAINT keeps trim new looking for years. Dries fast to a hard surface that resists fading and dirt accumulation. Alkyd-based, it lasts and lasts. Eight gleaming colors and new brilliant white. Try it



PAINTS

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