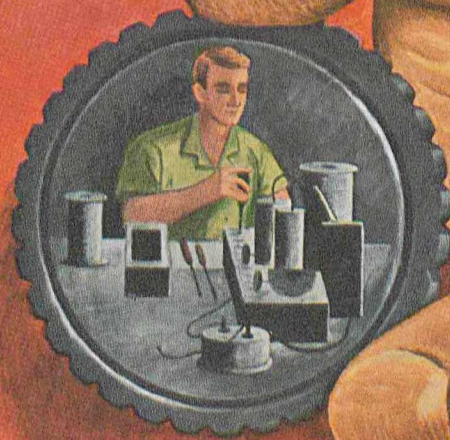


Dupont

m a g a z i n e



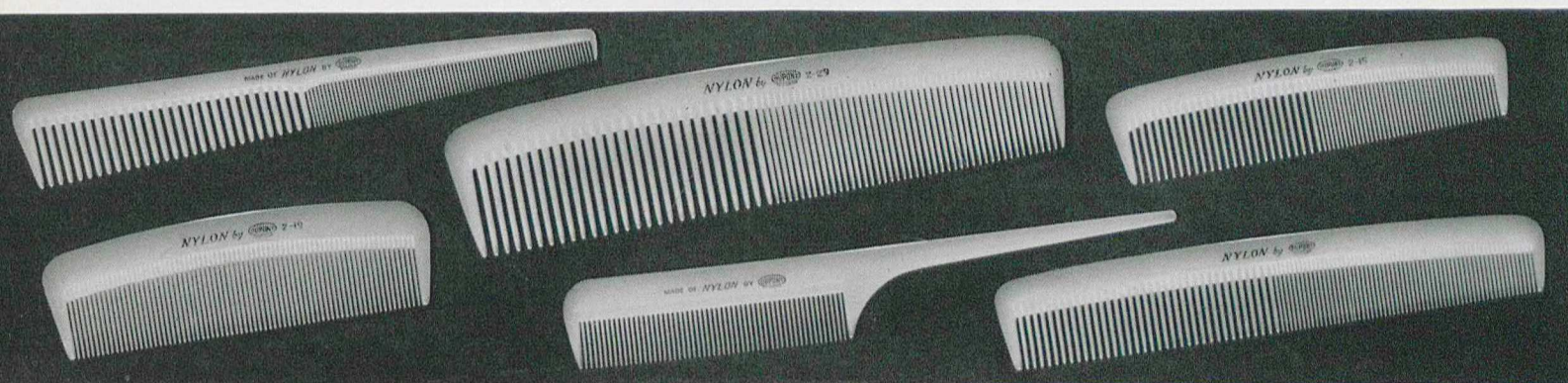
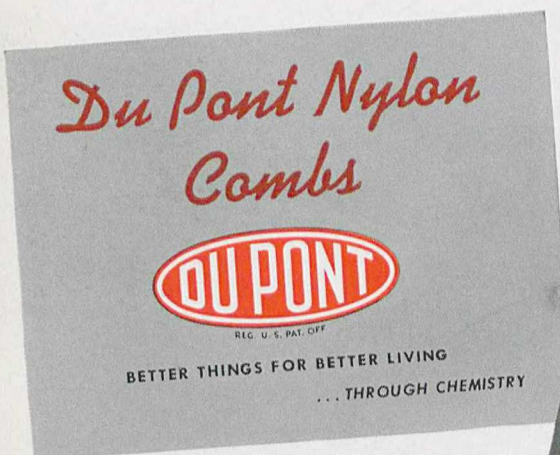
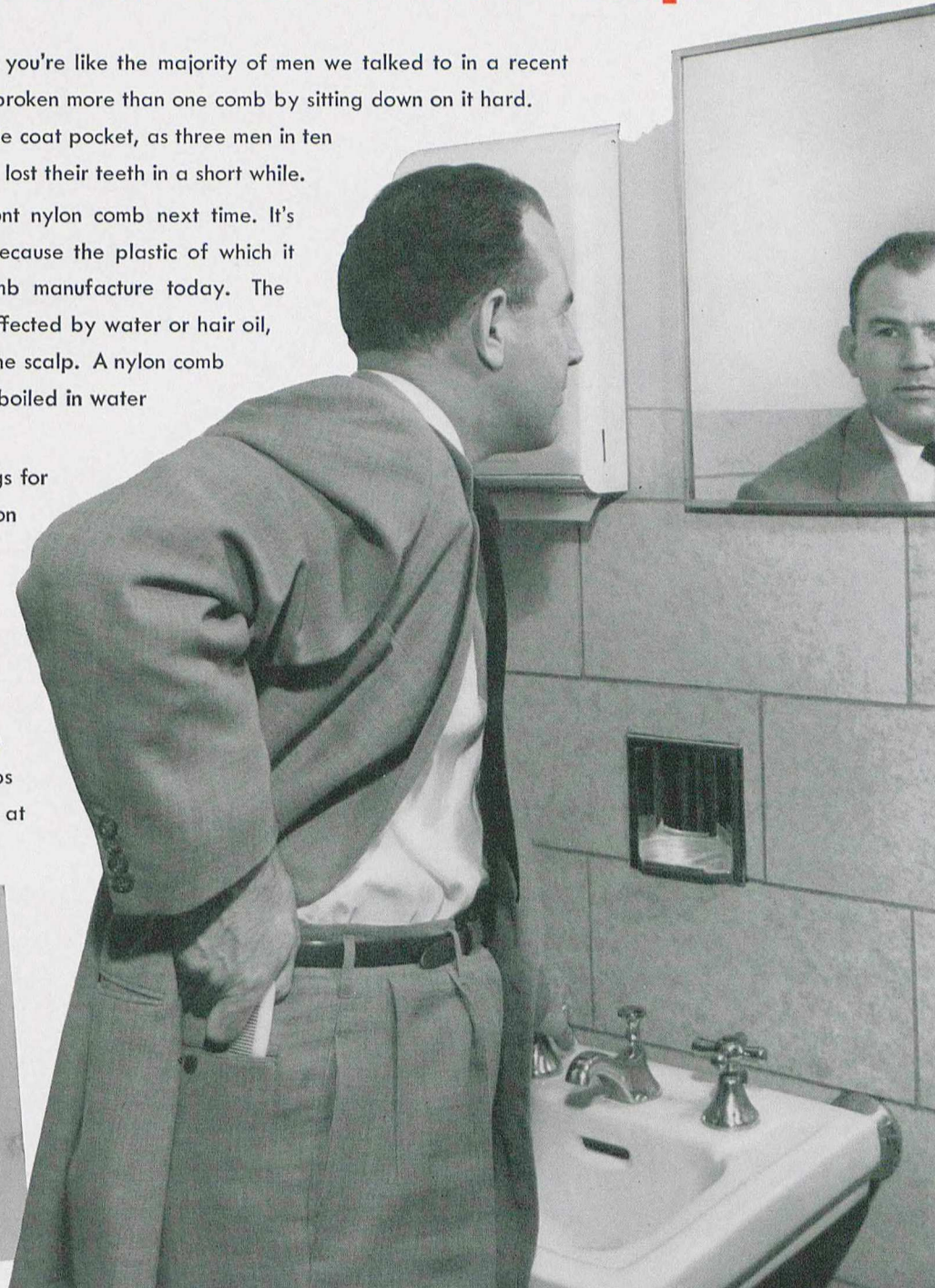
Do you draw from the hip?

If you carry your comb in a hip pocket, you're like the majority of men we talked to in a recent informal survey. Also, you've probably broken more than one comb by sitting down on it hard. Even if you carry your comb in an inside coat pocket, as three men in ten did, you've probably bought some that lost their teeth in a short while.

The point is, why not try a Du Pont nylon comb next time. It's exceptionally tough and long lasting, because the plastic of which it is molded is the strongest used in comb manufacture today. The teeth of a Du Pont nylon comb are unaffected by water or hair oil, and have no sharp edges to scratch the scalp. A nylon comb is easily cleaned, too—it can even be boiled in water without damage.

If you'd like to establish these things for yourself, buy an inexpensive Du Pont nylon comb today in a drug, department or chain variety store.

Du Pont manufactures nylon combs in a variety of styles to serve the needs of every member of the family, and in natural (cream color) or pastel colors to suit everyone's fancy. Nylon combs are made by Du Pont in its plant at Leominster, Mass.



DU PONT MAGAZINE

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DU PONT

M A G A Z I N E

JUNE • JULY 1954

This 8th in a series of articles and cover illustrations highlights Company research on production instruments, its . . .

Chemical watchdogs

By JAMES H. McCORMICK

Remember seeing pictures—like the one below of Du Pont's Sabine, Tex. methanol plant—that show operators facing rows of instruments recording the status of chemical reactions in remote operating areas?

Back of them lies one of industry's most far-reaching success stories. Only two or three decades ago thermometers, pressure gauges, hydrometers and the like were all the instruments chemical industry operators had to help them turn out more and better products. As you'd expect, things have changed. Du Pont and its competitors, working with instrument makers, have moved one chemical process after another from the area of art and rule-of-thumb to scientific control, ruled by man but without the variations inherent in human judgment. Where there's enough demand for a chemical, they are switching manufacture from 19th century batch methods to the more efficient and cost-cutting continuous processes.

This is a condensed and highlighted report of how production instrumentation research is improving quality, efficiency and working conditions at Du Pont.

You can't put your finger on an exact date Du Pont began looking beyond thermometers and their ilk for instruments to aid



in production. It happened piecemeal; an idea here, an application there. The first goal, actually, was greater safety rather than higher quality. The process for making acetate yarn calls for the recovery of dilute acetic acid by extraction with ethyl ether, as combustible a solvent as you'd ever want to keep in the next county. In time accidents happened, and top management issued a mandate. It was rough. "Recover acid safely or close up," it said in effect.

This was in the early '40s, mind you, when the expression "production instrumentation" was almost exclusively for the experts. But an order was just that, and engineers decided they must put the acetic acid recovery equipment outdoors and put the operators in a control house not even directly connected with the equipment they were to operate. The specification left no leeway: there could be no direct line from the recovery system to the control room.

Available equipment wasn't enough. It was revised, or even scrapped and rebuilt from scratch with new components. The pressures, temperatures, liquid flows and other critical information from the recovery unit the operator needed at his fingertips were carried to transmitters. These were located near the operating equipment and looked and worked much like the radiator thermostat on your car. The transmitters in turn activated calibrated recording devices which gave a picture of what was happening in the recovery unit. Then operators, without leaving the safety of their control room, were quickly and easily able to make remote-control adjustments on their new \$3,000,000 recovery system.

World War II gave instrumentation at Du Pont, as in industry generally, a tremendous jolt. Du Pont's need for a central research group was realized acutely during the days of the Hanford atomic energy project when men faced control and measuring problems never dreamed of. Company men returning to Du Pont plants brought back a deep-seated respect—even a reverence—for what instru-



This colorimeter has helped reduce by half the shadings required to put a batch of finish within color specifications.

ments could do. The early birth of an instrumentation research program was a natural outgrowth.

For close to ten years now, the Du Pont Engineering Dept. has had a research group charged with applying physical techniques to plant processes. Today the group spends 60,000 man-hours yearly on instrumentation research. Research activities very conveniently have fallen into three basic categories: continuous inspection of products, automatic control of processes, and continuous chemical analysis. Manufacturing departments with special process or control problems usually call on the Engineering Dept. group to get their experts to chew on them. When the researchers come up with a new tool, they go out to the plants to see where they can apply it.

These engineers strive to make their instruments work automatically, continuously and instantaneously. These are the usual earmarks of successful production instrumentation—and they're near enough to reality to cause one Du Pont plant manager to tell us he'll be happy when he can look at a couple of dials in his office and tell how each of his units and operations is doing.

Let's look at some of the specific tools and devices developed by this group and see how Du Pont has capitalized on them.

Du Pont physicists are broadening the use of ultraviolet gas analyzers, or detectors, for both safety and production control. In the Company's manufacture of sulfuric acid by the chamber process, for example, a Du Pont-adapted ultraviolet analyzer measures the mixed nitrous and sulfur dioxide gases in the exit gas. The device works automatically, continuously and almost instantaneously, giving operators the feel and pulse of the operation they need for best results.

... "Infrared even more important"

Applying the principles of infrared absorption is even more important in Du Pont's instrumentation research scheme. Infrared absorption bands, unlike those in the ultraviolet, are quite narrow and selective. They can pick out and measure one individual chemical or compound in a complex mixture—like the gases being synthesized into methanol or polymerized into polyethylene, for instance. "Such automatic chemical analysis methods," an expert summed up for us, "are paying off in an impressive amount of dollars and cents."

In making moistureproof cellophane, infrared devices are credited both with improving safety and saving considerable cash. When cellophane is given its moisture-proofing bath of organic solvents, vapors are drawn off to recovery units. It's possible, unfortunately, for the vapor to mix with air in proportions that can let go with a deadly bang. To play safe, a great excess of air was used—cheap enough in itself but costly when you figure that the air had to be heated and the vapors had to be salvaged from all that air by the recovery system. At one time, cellophane production was actually limited by the capacity of the recovery system to handle the necessary flow of air. The engineers, we were told, could buy more recovery equipment, or increase the efficiency of the recovery operation, bearing in mind the need for safety.

Film and Engineering Dept. engineers put their heads together and developed an infrared-absorption control system that accurately controls the vapor-air mixture. It safely cut back on the air needed and removed a bottleneck at very nominal cost.

To fit their needs, Du Pont scientists have increased the sensitivity of infrared devices by a hundred to a thousandfold over early commercial models, and some 50 or 60 are in use at Company plants around the country. One such improved model records as few as three parts of water to a million of "Freon" fluorinated hydrocarbon refrigerant.

"With the equipment available in 1946 we could handle maybe 15 per cent of Du Pont's continuous gas analysis problems. Now, 90 per cent can be handled with today's equipment and techniques," the leader of the instrumentation research group explained.

Liquids brew their own peculiar type of hell for instrumentation specialists. They resist the continuous, simultaneous and automatic soul-searching that production superintendents want. Refractometers, x-ray absorption

instruments, complicated pH meters, electro-magnetic flowmeters and differential colorimeters are all weapons in the attack.

At one plant, a refractometer continuously and automatically compares a sample piped from the production stream against a known standard. The liquid being checked is as complex as a doctor's prescription, but sensitive changes in the refractive index reflect even minute variations in the mixture.

Instrumentation research is saving time, money and nerves in the realm of color. On one hand, Du Pont-devised colorimeters cast their critical eye over products such as polyethylene plastic to make sure they're not off-color. On the other hand, they tell whether or not a dye, pigment, paint or colored fiber meets color specifications. Visible-light photoelectric analyzers, for example, check the color of pigmented cellulose acetate solution to make sure both the hue and intensity are correct before it is spun into yarn.

The making of finishes is a good illustration of how Du Pont-devised differential colorimeters have replaced art with science. Historically, a highly trained operator called a shader added varying amounts of pigment and vehicle to get paint the color he wanted. He sometimes needed to make literally dozens of shadings to get just the desired hue, adding first a bit of this pigment, followed by some of another. Then the batch of paint might pass his inspection but not sit right with another shader.

This Company, in gradually moving from the shadowy realm of art to the solid ground of science, first learned to judge color by instrument—to measure a color exactly and to reproduce it exactly time after time at one and all Du Pont finishes plants. Soon they were able to reduce the number of shadings needed to get the desired

hue. The record today shows that the colorimeter plus scientific calculation have reduced by half the shadings required to put a batch of finish within color specifications.

A new type of liquid measurement saves headaches where corrosive mixtures chewed up one measuring instrument after another. Yet for proper operation you needed to know how much chemical was in the tank. A radioactive liquid level indicator took care of this one, doing all its work without exposing any part of the measuring device to the corrosive chemicals. Rays from radium are continuously beamed through the tank and its contents to an ion chamber on the other side. As the level of the liquid rises, fewer of the rays reach the measuring chamber. The minute change in the electrical output of the ion chamber activated by the radiation is measured electronically and translated into data for the operator.

The Company has a variety of such devices that measure the configuration or dimension of its products. One is a dielectric capacitance gauge for measuring denier variations in yarn, used by Du Pont textile fibers plants, that works on a tuned radio circuit principle. The instrument is tuned for the proper size yarn. Any off-standard product instantly puts the circuit out of tune, and the fiber is rejected, marked or recorded in some other way. "Once we are able to measure any quantity or material," we are told, "it's duck soup to do the necessary controlling."

So far, this picture of instrumentation research has been painted in terms of devices and applications. For better focus let's see how one typical Du Pont department benefits from this in addition to providing safer working conditions. The Electrochemicals Dept. puts instruments to work on the process line in five ways.

First, they detect impurities in raw materials. Second, they automatically regulate flow of such material into process, such as the flow of molten sodium metal into equipment for making the powerful bleach, sodium peroxide. Third, instruments regulate the conditions of reaction—temperature, pressure, pH, flow and the like. Fourth, instruments analogous to those on the dash of your car give a complete and to-the-second picture of the progress of the operation. Fifth, devices determine the purity of the end product.

Elchem's instrumentation specialists also work closely with scientists developing new processes and products. They want to make those processes as automatic and self-controlling as possible through the best use of instruments. Then when a full-scale plant is built, there'll be no guesswork about what instruments can work where.

What of Du Pont's broad aims in the next decade? They are many. Simplification. Standardization. Improvement of existing tools. A search for other techniques and devices leading to more automatic, uniform operation.

"Within ten years, we even expect to measure molecular weights of chemicals in process streams," an authority said. "Ten years ago that wasn't even at the dream stage. This shows you how fast instrumentation is moving."

Checking radium source of liquid level measuring device, recent development of research to aid chemical production.

Rebuilding recorder for plant use. In 2 minutes, it records 120 separate items.

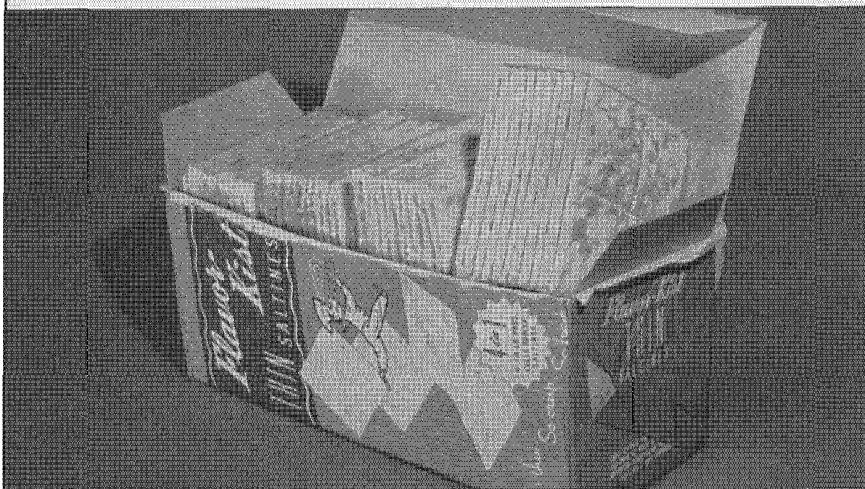


Little packages— Little waste

Many food packagers are helping the homemaker erase the wasteful practices shown to the left. No efficient homemaker likes to throw out leftovers and food that has lost its freshness. It's too hard on the pocketbook these days.

Food processors are meeting this problem for the small household—there are 26 million in the U.S. made up of three or fewer persons—by offering small packages, fractional packages, and variety packages. Some examples, utilizing the protective value of Du Pont cellophane, are shown below. For the small family, these packages mean greater variety and convenience with less waste.

Saltines were among the first foods to be inner-wrapped in Du Pont cellophane to keep product crisp to the last bite.



Pretzels, as well as cookies, cakes, cereals, potato chips, and the like stay fresh longer in convenient fractional packages.



Quick-frozen TV dinner, ready to heat and serve in an aluminum tray, is protected by cellophane.



For the small household, the half loaf of bread or the small half cake assures freshness without waste.





Foam rubber latex is quick-frozen before being heated in this mold. Result is more uniform cell structure.

Air conditioning, refrigeration and "Freon". They add up to . . .

Cold comfort for industry

By JAMES LINCOLN

There's nothing like a good chill to give production a boost in many a factory these days. Turning the thermostat down is paying off in increased production and reduced costs, as well as in processes actually made possible by lower temperatures.

Consider the case of the Birds Eye Veneer Co. of Escanaba, Mich. In hot weather Birds Eye had trouble cutting smooth, thin veneers from basswood logs. Now a large cooler not unlike those used in butcher

shops chills the basswood logs a carload at a time, and the weather no longer matters.

In another field, refrigeration has improved the quality of synthetic rubber. It cools the reactor chambers, reducing the polymerization temperature of the rubber from 122°F. to 41°F. so that the finished product will have more strength and resiliency.

In the manufacture of shoe polish and paste wax a simple but important step is the chilling of the hot

liquid material after it is poured into cans. A belt carries the cans through a refrigerated tunnel to solidify the material.

Temperature control is important in metalworking, too. When metals are being honed or drilled, for instance, the heat of friction often is very high. A stream of oil normally runs across the hot spot to reduce friction and carry heat away, but the oil may heat up to 60° above room temperature. Now refrigeration units designed to cool cutting oil to the desired temperature may be seen standing beside machine tools in hundreds of factories.

NEAT TRICK: FROZEN MERCURY PATTERNS

One of the more ingenious industrial uses of refrigeration is in freezing mercury to make forms for casting intricate metal parts. Liquid mercury is poured into a metal die at room temperature, then chilled to -100°F. Next, the mercury form is removed from the die and repeatedly dipped in a ceramic slurry which gradually builds up on the frozen mercury. When the ceramic shell is of sufficient thickness and has hardened, the mercury is melted out for re-use and the shell is fired. Molten metal is then poured into the ceramic shell to make the finished part.

Still another use of refrigeration is in shrink-fitting metal parts. Metals contract when temperatures are lowered, and this property is used to obtain a tight fit by chilling parts before joining them. When they warm up to room temperature, they expand and fit tightly in place.

AIR CONDITIONING BEATS STICKY PROBLEM

A sticky problem for Godchaux Sugars, Inc., was solved by air conditioning at a refinery near New

Cooled oil from refrigerating unit (left) flows through boring machine, controls heat expansion in metal being worked. In this case it's a hydraulic pump housing for Bucyrus-Erie bulldozer.

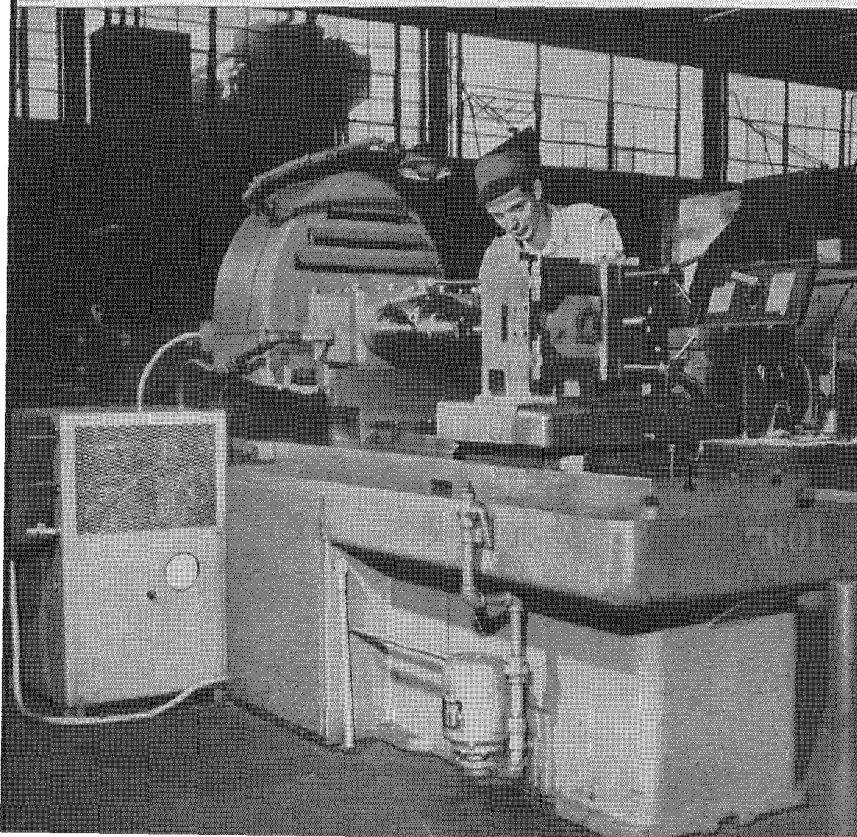


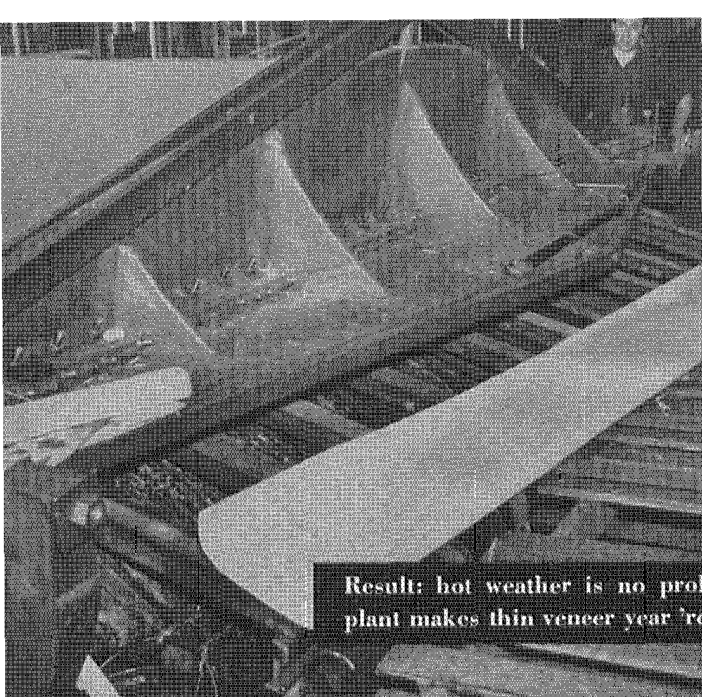
Basswood cuts poorly when warm, so this veneer plant refrigerates it.

Orleans. Formerly, during the three fall and winter months when the cane crop was being harvested, this company had to package its refined sugar as it was produced. Unfortunately it's then a slack season for sugar sales, so most of the packages had to be stored. Frequently the sizes packaged did not fit later customer demand.

Now Godchaux has a better way of doing it. Large storage silos hold bulk sugar indefinitely and the packaging room can run at an even pace all year. Why doesn't the sugar solidify in the silos? They're air-conditioned—and so is the packaging room. The

Another job for refrigeration: To make intricate metal parts, mercury is frozen in shape desired, dipped in ceramic slurry. Between dips, it is held in a cooled box to keep it frozen.



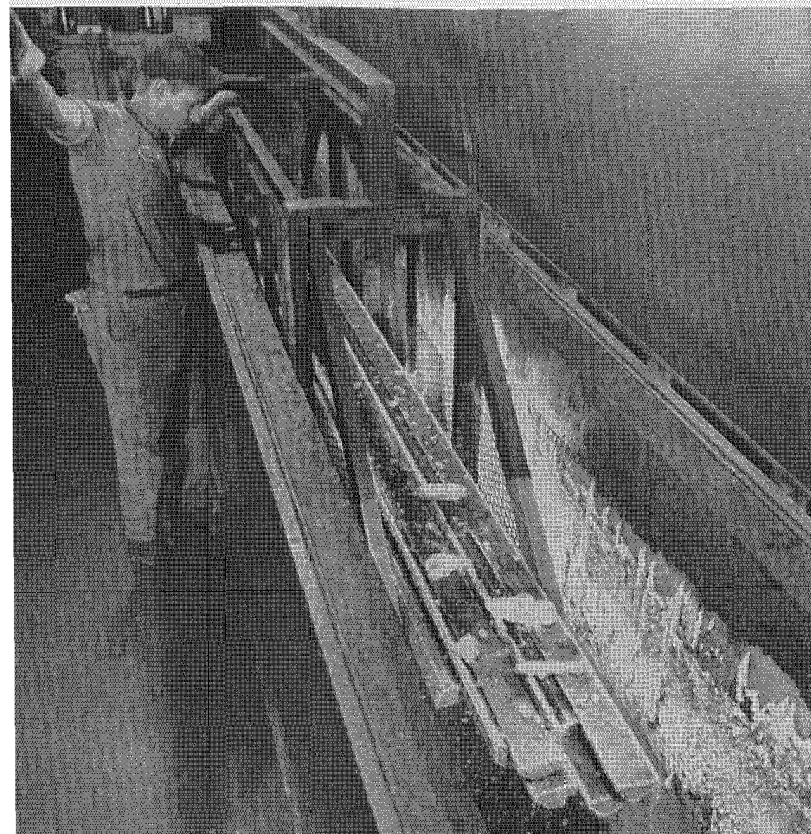


Result: hot weather is no problem, plant makes thin veneer year 'round.

packaging room was an unpleasant place to work before it was air-conditioned—sugar dust settled on the floor, walls, machinery, and employees, and the Louisiana climate turned it into syrup in short order.

Air conditioning has proved to be a good investment in the portable tool manufacturing business, too. The Rotor Tool Co. has an attractive, modern plant in Cleveland with complete air conditioning. Rotor finds it necessary to hold tolerances up to 3/10,000 of an inch in tool parts, and uses air conditioning to hold the temperature at a constant 75°F. This eliminates expansion and contraction of the metals used in

Hardening and tempering of machine tool steel once required years of seasoning. Now it's done in a matter of hours by a low-temperature treatment. Temperature in cabinet is -120°F.



portable tools, and has increased efficiency throughout the plant. Rotor is well pleased with its air-conditioning system, and particularly with the cost—less than one per cent of labor and overhead combined.

Printers find that air conditioning saves them a lot of inconvenience and lost time. Printing paper absorbs moisture readily, and stretches as it does. Then, when humidity drops, the paper shrinks. A little of this is enough to make paper so wavy it won't feed through presses properly. Air-conditioned paper storage rooms put an end to that, and many printing plants are completely air-conditioned.

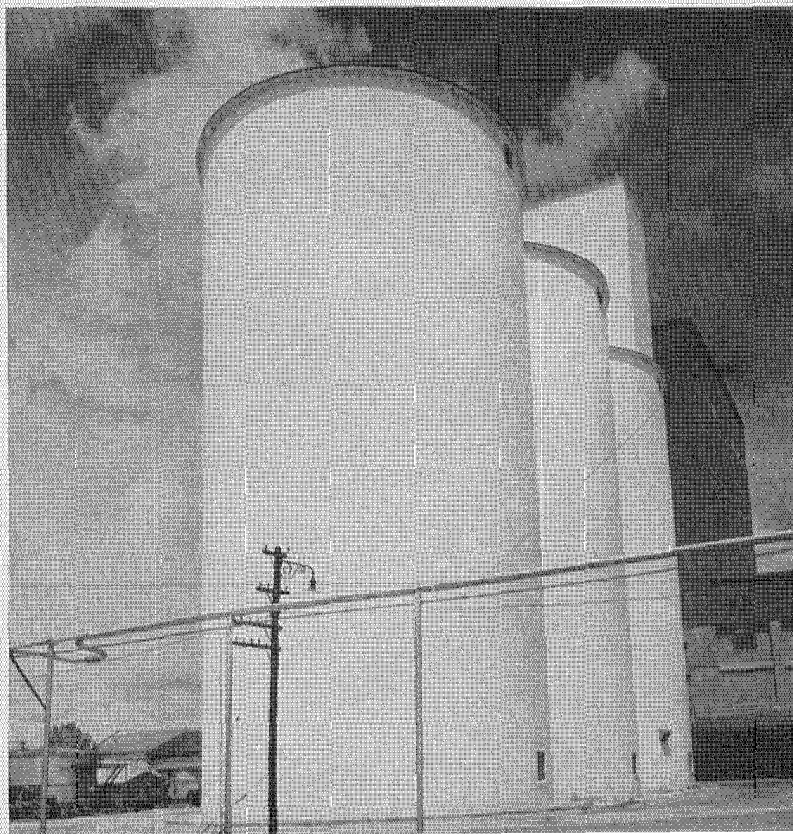
"FREON" REFRIGERANTS THE KEY

There are few industries in which refrigeration and air conditioning are not worth the investment. In part, this is because dependable equipment using safe "Freon" refrigerants is available for virtually any type of installation.

"Freon" refrigerants have been produced for 23 years and have become almost universally accepted. Du Pont now makes a family of five "Freon" fluorinated hydrocarbon refrigerants to meet varying air-conditioning and refrigeration needs. While these five are designed for use in different types and sizes of systems, they are alike in the characteristic for which "Freon" refrigerants are noted: safety. They are nonflammable, nonexplosive, virtually nontoxic, and noncorrosive.

The latest development in this field is "Freon-13" monochlorotrifluoromethane, intended for ultra-low temperature refrigeration. This refrigerant is welcomed as a member of the "Freon" family while Du Pont continues to work with the refrigeration and air-conditioning industries on still better refrigerants.

Air-conditioning equipment using "Freon" refrigerant also plays an industrial role. These air-conditioned silos are used for storing sugar. Controlled humidity prevents lumping and caking.





My husband gets plenty of help from the small Olson spongers.

We're first-class spongers

By PHYLLIS R. OLSON

Our first baby's spilled milk prompted me to try a cellulose sponge to mop up. Now, three babies and hundreds of sponges later we have become first-class spongers, using these handy helpers for some 30 jobs around the house.

I found sponges were a versatile aid to busy mothers. But as one after another vanished to the basement or garage, I concluded that busy fathers find them just as useful. One day I looked out the window and saw my husband, Neal, passing them out to all four children. They went to work washing the car, including a "dry-suds" job on the upholstery. When next I looked, they were busy on the storm windows. Neal later borrowed my sponge mop to wash down the paint on the outside of the house.

That was the beginning of a long list of time and laborsaving uses for sponges at our house. We tried our own paper hanging, and found a sponge just the thing for removing excess paste as each strip of paper was hung. Neal uses a special fine-pore sponge in photography for drying newly developed film and for wiping prints as he puts them on drying sheets. He discovered that a small sponge, squeezed nearly dry, is just right for removing lint and fingerprints from sensitive micro-groove records. Carl, our stamp collector, likes a sponge to moisten hinges to affix his stamps. Our children, who enjoy painting with water colors, find the sponge helpful in lightening wet colors.

If your absorbing interest is fishing, you'll find a large sponge a fine bailer, whether you've had good luck with a damp catch or bad luck with a leaky boat. Carl, who is 11,

is a true fisherman, even to stories about the one that got away. I go along, but take a sponge to remove the gummy feeling on my hands after baiting up for bullheads. When the fishing trip is over, the sponge does a clean-up job on the boat itself. When my son and I fish, we fish all over.

One man we know used a sponge to shampoo his dog after a set-to with a skunk. I didn't hear what happened to that particular sponge, but the user became a sponge enthusiast in more pleasant fields.

READY FOR THE UNPREDICTABLE

Looking for simplified ways to take care of household tasks, especially those unpredictable ones that come along with a growing family, I like the versatility of the cellulose sponge. They are gentle for bathing baby, yet excellent for scrubbing the floor or a grimy knee. A cellulose sponge is easy to handle, wash out and store, and sterilize by boiling.

In our family, colors distinguish whose sponge is whose. For example, I keep the yellow sponges for washing floors, walls, woodwork and utilities, shampooing rugs and upholstery, wiping off books, lamp shades and window shades, cleaning dirt from corners and wiping out bureau drawers. I find that a slightly damp sponge is especially good for dusting furniture which is carved or covered with "gingerbread," whether old-fashioned wooden trim or that which comes from the oven. It will clean lint from velvet in the silver chest or from clothing such as dark corduroys. Sponges are also useful to apply silver polish or wax. I

keep one on hand to dampen dry spots when I am ironing our clothes.

Recently I discovered a package of assorted Du Pont cellulose sponges on the market. In it were two sponges just the right size for our soap dishes. I was delighted, for the sponge keeps the soap dish clean and lets the soap dry out after being replaced by four pairs of no longer grubby, but still drippy hands.

NEW LABEL LISTS SPONGE USE

Since the homemaker has found specific uses for the various sizes and textures of sponges, the Du Pont Company now is packaging individual sponges with a new printed cellophane wrapper showing major uses of the sponge, such as bathing, cleaning or dishwashing. When shopping, I check the labels on the shelf, and select the sponge size and color I want for a particular purpose.

Our children heartily approve the sponge's place in our home, too. The kids clean muddy boots, shine shoes, erase the blackboard, cut out animals as gifts, keep scrapbooks free of paste, and produce delightful effects with finger paint and a bit of sponge. When Lynn, our nine-year-old daughter,



makes designs with the paper punch, resulting in thousands of little circles on the floor, she sweeps them up with a damp sponge. We have all kinds of puddles, ranging from four-year-old Ken's bubble blowing in the bathroom to the mess that only a child cook can produce in the kitchen. With a sponge handy in every cupboard, the children have become efficient spongers and a big help to their parents.

For baths, each youngster has a sponge of the color he most admires. It gets wonderfully squishy when lathered with soap and the child emerges with even his neck clean. We use a sponge for shampoos, both for the hair and to cover the eyes to keep out soapsuds. As part of our traveling equipment, a damp sponge, carried in a polyethylene bag, is indispensable for sticky hands and faces or unexpected spills in the car.

Once you become a sponger, there is almost no limit to the uses you will find for those little helpers, whether they are small or large, pink or blue. But I can't help thinking how marvelous it would be if they were made in the shape of a diaper.

At my grocery, I choose sponges by size and color, an easy job because the new labels picture various uses.



FOOTPRINTS

By WILLIAM S. DUTTON

Some few men of every generation leave footprints that time does not erase. John D. Rockefeller and Henry Ford were among those giants in the onward march of America's industry. So was Pierre Samuel du Pont.

The genius of Rockefeller organized the men and marketing facilities of our petroleum industry. Ford blazed a like trail in manufacturing by organizing men and machines in the phenomenon of mass production. Pierre du Pont organized men and chemistry.

He went beyond the factory to the basic source of waste, the failings inherent in age-old raw materials. On a wider front than any other, he dared to devise new raw materials and improve old ones as a routine function of our chemical industry.

Ford and Rockefeller dealt with oil and motors, but du Pont, the chemist-trained industrialist, planned in terms of scores and then hundreds of products, many as yet undeveloped or unborn. When singleness of purpose was emphasized as the ideal of production, he led his Company and much of industry into a maze of diversification.

When he died this April, the Du Pont Company, once solely a manufacturer of explosives, was producing 1,200 products and product lines. They included materials as old as sulfuric acid and as new as titanium metal.

However, diversification was not Pierre du Pont's chief contribution to free enterprise in America. The way to diversification had to come first in the form of a new kind of Company management, one that could inject order into what otherwise would have meant confusion, and also disprove the adage that the Jack-of-all-trades rarely is successful in any.

Du Pont was one of the architects of that new management plan, the pattern of which has been adopted by many large businesses. By virtue of it, the opportunities open to able men and women to share in the direction and rewards of business have been multiplied.

"One of the architects" is the way he would have expressed it. His cardinal creed was cooperative effort, and its roots went deep. As a young man, fresh from college, Pierre went to work for the old family-owned firm on the banks of the Brandywine, near Wilmington. It was a day of rugged individualism in management, of one-man rule when a subordinate's first qualification for his job was an instinctive "Yes, Sir!"

By instinct and training alike, the young chemist rebelled at the arbitrary control that was typical of most businesses around the century's end. In the Du Pont firm, he saw the senior partner overburdened by a load that had outgrown any one man's capacity. He listened to men fret at being seen but never heard, he watched potential leaders—younger du Ponts among them—strike off for other fields and brighter prospects.

At the end of nine years, nearing 30 years old, Pierre

also struck off, with the resolve that if he ever returned and had the power, one-man rule would be banished forever from the Du Pont business.

He did return, and with Alfred and Coleman du Pont, took over the old company in 1902. The three cousins' first major move was to open the ownership to the public. Their second was to invite men other than du Ponts to sit in the front row of management. Governed by majority decisions, that front line *became* the management. It combined many talents.

A bonus plan based on earnings was made a permanent feature of the new structure, to the end that able men, working together, might be rewarded for achievement as well as they would be if engaged independently in their own businesses. One clause of the plan merits special note. It stipulates that carrying a project to success despite opposition is to be considered a special category of achievement.

Step by step, guided by the counsels of many viewpoints, the plan of diversified production under a single management took form. Men acting jointly and with a common interest coordinated the complexity that soon grew like the branches of a tree from the bole of chemistry.

The point is that *men came first!* That was the unique conception, the idea that men are the primary asset of any company, that money and plants and products and sales facilities are secondary assets, which become valueless if the right men are lacking. Possibly others preceded Pierre du Pont to this discovery, but nobody exceeded him and his associates in giving it wholesale recognition and demonstration.

The vision reached down the line to the humblest janitor. Plans for pensions and kindred aids to employees who had earned them by long service were also formalized. Du Pont plants became among the safest in which to work, both as a matter of good business and as a responsibility to those who manned them. Medical services were inaugurated, and later fellowships for promising students. The aim was to make a job with Du Pont a career.

Pierre never had cause to regret or to revise his faith in the dominance of human values. In World War I, the organization that he headed was credited with a major share in saving the Allies. It furnished 40 per cent of the propellant powders fired by our own and Allied guns. At the same time, the foundation of today's Company was laid.

Later, during a financial crisis at General Motors, du Pont reorganized that corporation after the pattern of his faith. Then he stepped aside. The *men* of General Motors went on to build the world's largest manufacturing enterprise.

Outsiders who study the Du Pont Company invariably comment on what they call its remarkable faculty to get and hold able men. The genesis of that great asset was the resolve of a discouraged young chemist seeking elsewhere the opportunity that he believed should begin at

home. He returned to Wilmington to establish it for future generations.

Delaware was Pierre du Pont's base. In his home state he was the father of its modern school system. Asked by a farmer, fearful of change, why farm boys should be taught music and art, his answer bespoke the man.

"I believe that farm boys are entitled to enjoy as many of the fine things of life as I am," he said.

He gave money and time to the building of scores of public schools for white and colored alike, but the only school that bears his name is a high school in Wilmington—Delaware's finest—which was built from public funds.

Cooperative effort, he felt, is one of the inherent duties of American citizenship—that the right of the free citizen to decry what is wrong also entails the responsibility to try to correct. A foe of Prohibition as a greater evil than the one it sought to banish, he was, after the law's repeal, neither too big nor too busy to become liquor commissioner for his state. When taxes needed by Delaware's schools went unpaid, he became the state's tax collector, and to that thankless task gave years of work without salary, paying the expenses of his own office.

VISITORS WELCOMED

He valued privacy, yet his expansive Longwood Gardens were open to any wayfarer. More than 250,000 visit here each year, and the foundation he created assures their continuance for public enjoyment.

Not far from Longwood is a modern hospital, built in memory of a chauffeur he loved as a son.

Pierre du Pont did not pretend to greatness. The footprints that he left are those of one who walked humbly, even in his own garden.

One summer day an old lady came to Longwood. She asked the elderly man, whom she took to be a gardener, if she might be shown about in one of the wheelchairs reserved for invalids. Her feet hurt so badly, she said, that she couldn't do much walking, and on getting home it would be a walk of several blocks from the bus stop.

The man helped her into a chair, and for the next two hours wheeled the visitor along the winding paths among rare flowers, shrubs, trees, and fountains. With intimate knowledge and Old World courtesy he described each bit of beauty, each lovely vista.

The old lady never knew it, but the gardener was Pierre du Pont.



Resistoflex machine extrudes new tubing for hose, hose assemblies.



Keeping its title as tough guy among
engineering resins means

New jobs for "Teflon"

By MARY ELLEN EVANS

Du Pont's "Teflon" tetrafluoroethylene resin, unlike most products of research, was discovered accidentally. During research on fluorinated hydrocarbons, tetrafluoroethylene gas, stored in a cylinder, changed into a gray-white, waxy solid. It had polymerized, and the result was the most inert organic resin scientists had ever run up against. But what is happening to "Teflon" today is far from accidental.

Its outstanding properties give "Teflon" more roles than Sid Caesar. In the chemical industry, where acids and alkalis have the annoying habit of eating up the working parts of machinery and equipment, its applications range from valve parts to pump packing and pipe dope. Chemists and engineers have tried without success to destroy "Teflon" with the most violent of corrosive chemicals. It keeps its good properties even at temperatures up to 500°F. or as low as -450°F. Bars of "Teflon" kept at 480° for a month showed negligible loss in tensile strength. Over a period of many years, weathering has no effect on it. Its water absorption rates zero and it is one of the best electrical insulators in the world.

In food machinery and equipment, "Teflon" is rolling out bread dough or moving candy on conveyor belts because almost nothing will stick to the material. The same property makes it ideal for heat sealer plates on packaging machinery. "Teflon" is in coated glass fabrics, in paintlike finishes, film, tape and wire, and motor insulation. Its electrical and electronic applications are so numerous, a special report on this subject will appear in an early issue of this *Magazine*.

Aviation fuels and increasing temperatures in aircraft

and guided missiles have created a need for a hose that is flexible yet hard, strong yet lightweight and impermeable to all fuels, lubricants and other highly reactive fluids.

Resistoflex Corp. of Belleville, N. J., with wide experience in manufacturing aircraft hose assemblies, looked at "Teflon" with one eye and visualized the answer to the difficult fluid conveying problem with the other. In about three years, their chemists and engineers developed the right composition, effective design and foolproof processing techniques. Result: this spring Resistoflex introduced a high-temperature hose made up of a seamless extruded tube of "Fluoroflex"-T, trade name for their compound containing Du Pont "Teflon", reinforced with a braided jacket of stainless steel wire.

TORTURE TESTS TRIED

Pressure, vibration, fluid immersion and circulation tests at 450°F. were carried out for more than a year. Torture tests included thermal shock in which the hose was soaked at -110°F. and, while at this temperature, synthetic oil at 450° was suddenly introduced into the lines. Unlike previous materials used, its life span seems practically unlimited.

"An astounding result and something that had never occurred before in a hose or assembly development program," says Irving D. Press, chief engineer at Resistoflex, "was the fact that not a single hose assembly failed in any of the severe tests." Although designed for aircraft usage, the hose can be used equally well for heavy duty service in industry, Press points out.

A companion product made by Resistoflex is a laminated pipe which has an internal layer of "Fluoroflex"-T combined with a high strength reinforcement of glass fabric impregnated with "Teflon". This pipe has all the properties of the high-temperature hose, and in addition, it can be readily cut and fitted on the job. It has successfully endured operating temperatures of 500°F. and wide, sudden temperature changes. Developed specifically for the chemical processing industries, this laminated pipe looks likely as a prospect for foods, beverages and other industries.

Adding ease of assembly and maintenance to installations of threaded, rigid polyvinyl chloride pipe and fittings is a new pipe dope based on "Teflon". Pipe dope on pipe threads makes a leakproof seal at the joints. Test installations were set up in chemical, electroplating, pulp and paper, photograph, pickling and similar fields. Strap wrenches were used to make all joints very tight before pressure tests were run. The fittings were then backed off one and one-half turns and pressure applied. Even then the seal was so effective no leakage occurred. The pipes and fittings can be assembled and disassembled easily because of the extremely low coefficient of friction of "Teflon". Reports indicate that the pipe dope works equally well with special formula steels and other metals used for chemical pipe systems.

The use of "Teflon" in chemical process equipment, for gaskets, pump packing, valves, pistons and agitators, mechanical seals and plug valve liners, means less maintenance and less replacement costs. It also means stepped-up production through less down time, reduced wear on pistons and shafts, and simplified design. Quality of the products is improved because contamination is eliminated.

These advantages add up to substantial savings. For example, one manufacturer using chlorinated benzol was replacing centrifugal pump packing every three days. In 30 months he had spent \$1,488 for replacements and labor. He installed packing of "Teflon" which lasted 30 months and cost \$34.20.

A considerable number of fabricators are custom-making products of "Teflon" to specifications of manufacturers. For example, Dixon Corp. of Bristol, R. I. makes a diaphragm of "Teflon" for use in valves. This diaphragm

presented special fabricating problems since a stud must be molded in the center. Dixon licked the problems, set up flex and porosity tests, and the valve maker likes the product because it withstands acids and solvents which attacked previous diaphragm materials.

Dixon has developed a bearing material of filled "Teflon", trade-marked "Rulon", which is being used by Anco, Inc. of Providence, R. I. as a self-lubricating seal in their line of rotary pressure joints. "Rulon" is used because of its low coefficient of friction and its resistance to abrasion and chemicals.

For its future in the chemical industry, researchers at Du Pont foresee a complete chemical system of "Teflon"—pipes, tubing, valves, pumps, lined tanks, heat interchangers and distillation equipment.

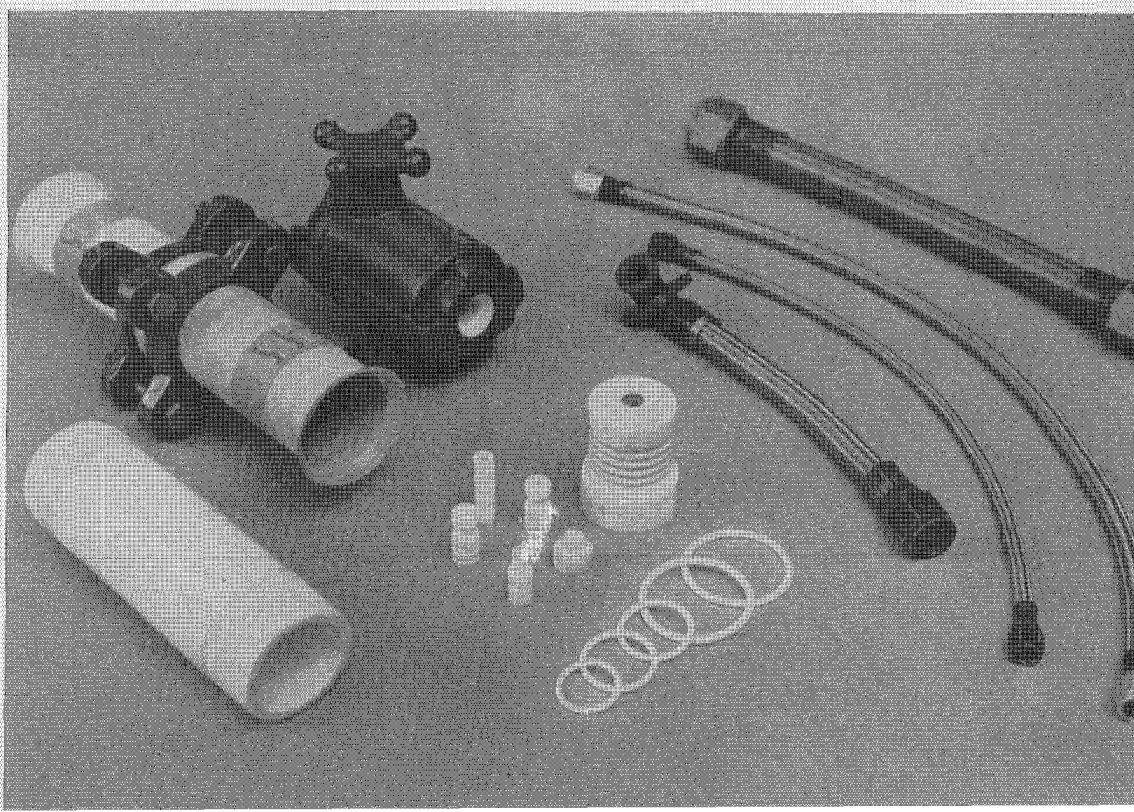
MECHANICAL JOBS, TOO

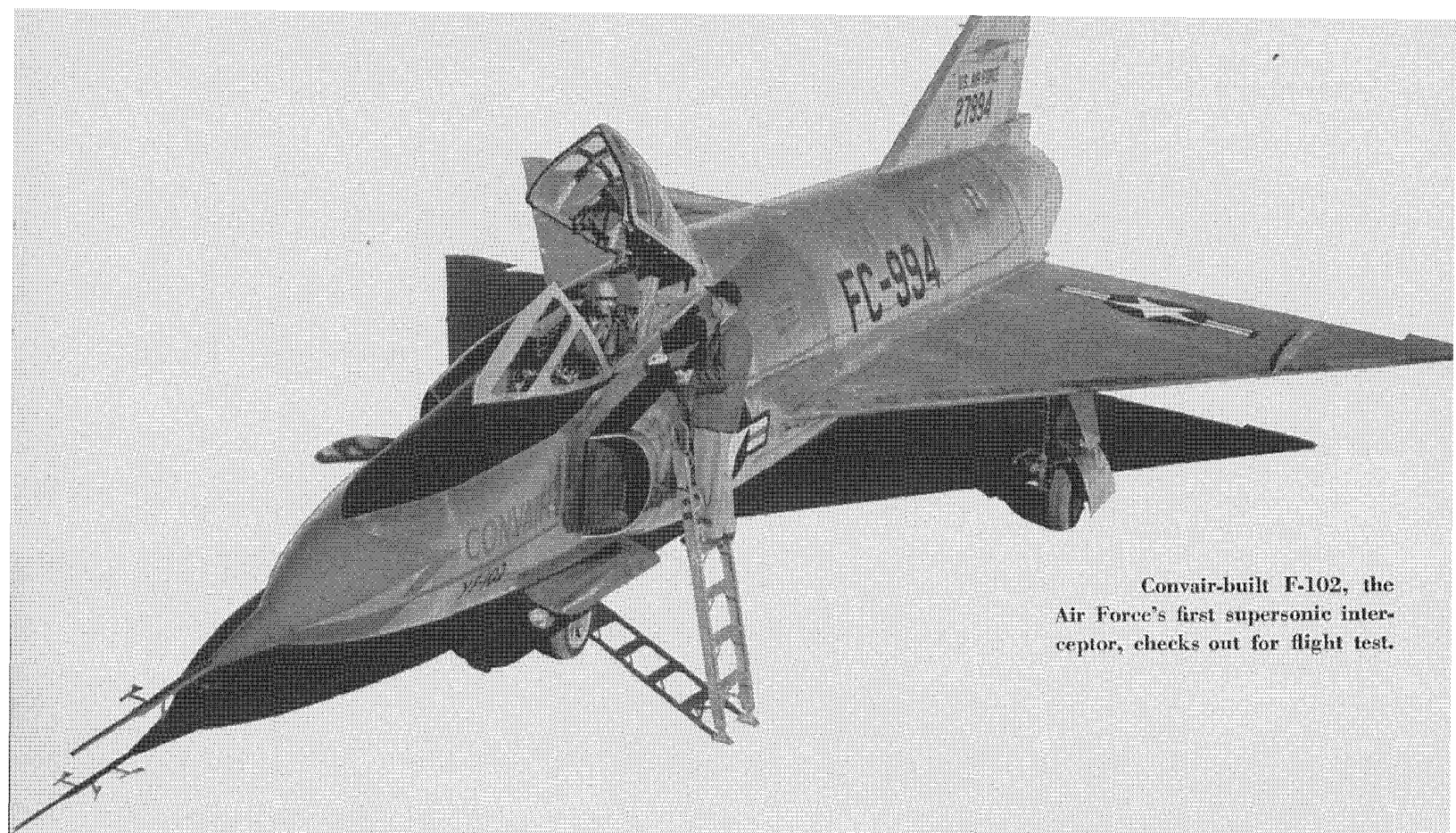
For centuries bakers have been plagued with sticky raw dough. Even in modern bakeries, knives peel dough from steel rollers which must be dusted continually with flour. Now rollers may be made of "Teflon" or covered with "Teflon" coated glass fabric made by the Du Pont Fabrics Division. The dough drops off cleanly without a dust of flour. Savings on flour alone may mean the difference in profit and loss in a year, if the bakery has dozens of machines.

In packaging products in film, a big problem has been covering the heat-sealing units so the film will not stick to the machine itself. Now the plates may be covered with "Teflon" coated glass fabric for continuous operation of the sealing unit. Similarly, in the production of decorative laminates on tables and equipment, the coated glass fabric prevents sticking of laminates to plates. For printing and bookbinding, it has a future in covering ink, glue pots, and glue rollers to prevent absorption by the roller. In the food processing industry, another sticky problem is conquered by using conveyor belts covered with "Teflon" coated glass fabric so that candies or syrups leave the belt without a nudge from a knife.

The tough jobs of industry seem to suit the tough guy of plastics. "Teflon" looks forward to full employment.

Resistoflex's "Fluoroflex"-T line includes pipe, tubing, machined parts, valves and flexible hose made from Du Pont "Teflon", all resistant to chemicals and oils.





Convair-built F-102, the Air Force's first supersonic interceptor, checks out for flight test.

Du Pont starts a new venture—a search for

The fuels of tomorrow

By R. J. WOODRUFF, JR.

Some months ago one of the major suppliers of fighter planes for the Air Force and Navy gave a farewell party for a very special plane. There were speeches—some sentimental nonsense and some legitimate regrets. Then everybody gathered around, gave the plane a fond slap and sent it off to pasture.

There was more of a milestone here than met the eye; this was the *last* of thousands of piston-engined fighters that had come off the line since the frantic days of 1942. Henceforth the company was in the jet business for keeps.

By coincidence the Du Pont Company, with a push of a button, kicked off a jet burner in a laboratory in its Deepwater, N. J. plant at about the same time. There was more of a milestone here than met the eye, too. For Du Pont, on the basis of a sober policy decision and months of groundwork and expensive instrumentation, was off on a new tack—investigating the overall performance of jet fuels.

Du Pont's decision to get into this field isn't so strange when you consider the experience of three decades ago. At that time the



Close-up of jet burner that aids researchers in testing jet fuel additives in Du Pont laboratory.

automotive industry was grinding along in second gear. Engines were turning up 25 horsepower or maybe a little better. Efforts to increase compression, and, therefore, engine efficiency, were tied to the capacity of available fuels to provide knock-free combustion. Auto makers concluded that tetraethyl lead was the answer, and turned to Du Pont to produce it. The introduction of tetraethyl lead as a fuel additive was one of the historic moments of the motorcar age. Automotive engineers were at once able to bring out the higher compression engines they were capable of making.

The parallel between 1923 and 1953—when the jet fuel research project was launched by Du Pont—was just as clear cut and just as challenging. For better jet fuel means better, more efficient jet power plants. Better planes are the end product.

The problems are in some ways as confined, and in others as limitless, as those of sound, speed, metallurgy, and weight, which engineers, designers, and meteorologists are currently probing in their efforts to fling planes through the air at supersonic speeds.

The ideal jet fuel exists somewhere, possibly only in minute quantities. It burns clean and hot in the presence of the gales of air fed to it. It doesn't leave carbon deposits on the shining steel burners, or clog the pinpoint holes of the fuel nozzles, or corrode the blades of the whirling turbines, or leave black smoke streaming astern.

Kerosene is a good jet fuel, but it's foreseeable that there won't be enough of it around once military and civilian "potential demand" becomes "actual need." It is necessary to adopt fuels which can be supplied in greater volumes.

Today's standard jet fuel—the military calls it JP-4—combines a small amount of kerosene with gasoline fractions and cracked stocks. As such it is relatively cheap and plentiful, but it puts a limitation on the efficiency of jets. To this extent, jet progress is dependent on progress in making better fuels.

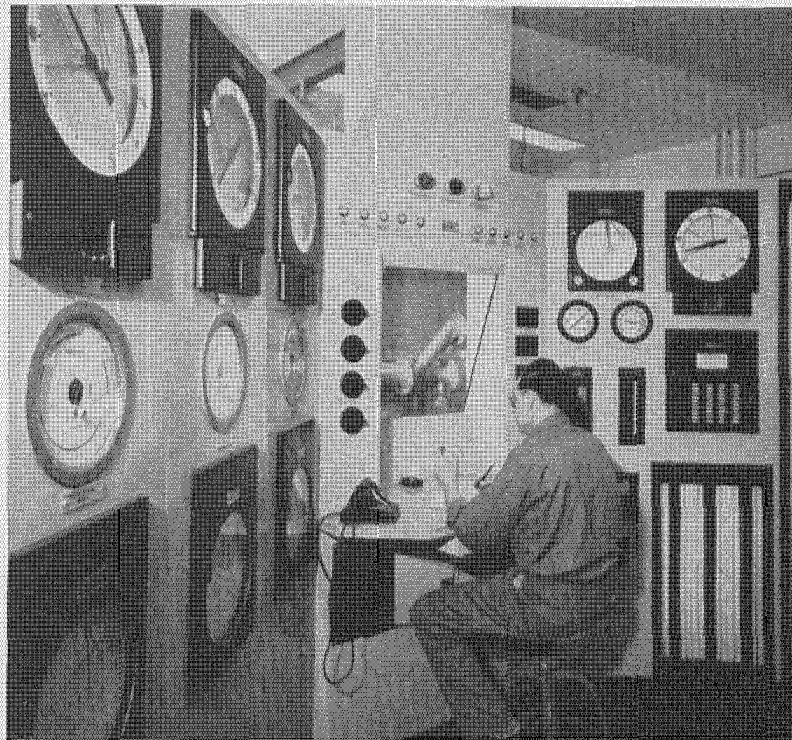
At the Petroleum Laboratory at Deepwater, Du Pont maintains a jet burner which is purposely inefficient. In a 15-minute operating period, for example, more carbon will collect on the dome and in the burner than perhaps during dozens of hours of actual operation aloft. An array of instruments constantly samples the way the fuel burns. One even takes running samples of the smoke.

CHEMICALS AFFECT FUEL

This is not a full-scale test of a jet engine in operation by any means, but the single burner is sufficient to perform the necessary job: to test changes in the performance of the fuel brought about by various chemical additives. Months of testing are required to investigate the effects of fuels on such bugbears as carbon, nozzle clogging, and the like. How chemicals

affect these is also being carefully investigated. Again the objective is to increase the over-all efficiency of fuel use and to reduce critical flight problems. Who knows, maybe the day of the flameout—the pilot's nightmare—may soon be behind us.

There is much at stake in this improved-fuels search. Just last March Congressional hearings on the defense budget brought to light the fact that the petroleum industry would be required to furnish 77 per cent *more* jet fuel during the fiscal year starting in July than in the previous 12 months. Industry spokesmen, without blinking an eyelash, said, sure they'd have it handy, whenever the Air Force and Navy called for it.



In jet room at Petroleum Laboratory, operator checks effect of fuel additives on carbon deposition, nozzle clogging and smoke in jet burner.

That's all well and good, but where there are some 11,000 thirsty jets to be fueled in the next year, there will be 20,000 or more by 1957. And it is certain that the aircraft industry and our military planners won't be content with jet power plants of the same power and efficiency as today's.

What it means is that the "dream" fuels in research status today will have to be furnished in quantity tomorrow, with the same process repeating itself over and over again into the future.

Du Pont hopes that its addition of jet fuel research equipment to its already extensive facilities for studying combustion will help solve this problem which, directly or indirectly, affects us all.

It's playing such a big role in clothing progress that you can honestly say . . .

Chemistry helps make the man

By LOUISE J. GRUBER

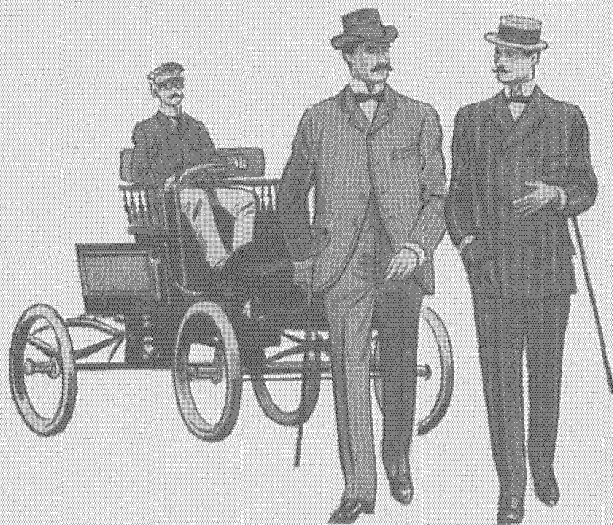
Chemical Progress Week in May was a gentle reminder of the many ways chemistry contributes to better living. Chemistry is even at work on men's fashions.

In appearance, man's outer garb hasn't changed much in the last 50-odd years—it's still trousers, coat, sometimes vest. But the silhouette of men's apparel has undergone a subtle, gradual transition toward greater comfort and casualness. Fabrics have become more porous; they are no longer stiff and tightly woven. They look, feel and wear better, thanks in

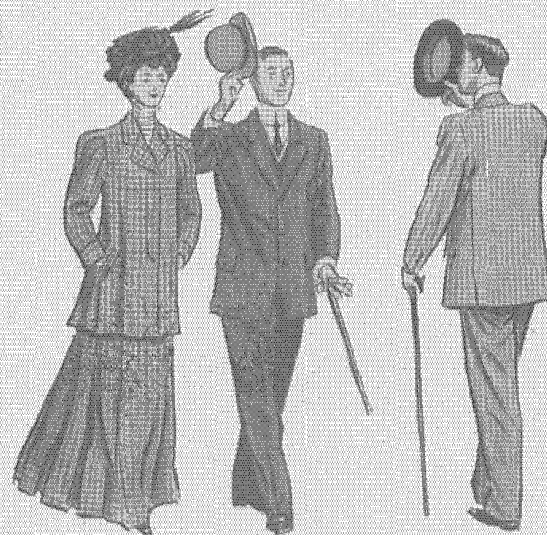
many cases to the properties of chemical fibers.

The latest and most sweeping change sparked by chemistry is the concept of "wash 'n wear," which has made men's clothes easy to take care of as well as easy to wear.

The first wash 'n wear suits, available in 1952, featured both Du Pont's "Dacron" polyester fiber and "Orlon" acrylic fiber. Since then, increasing numbers of owners of wash 'n wear suits and slacks have been praising their light weight and wrinkle resistance, and



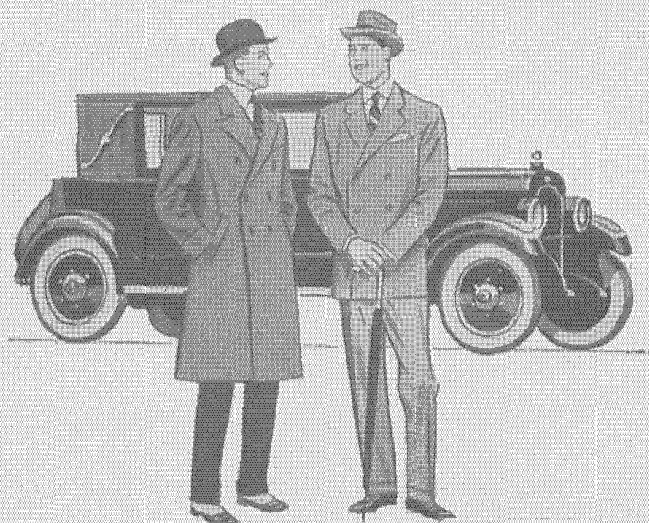
1900 New Century Begins—Men had that "chairman of the board" look, no comfort in high-waisted, high-buttoned coats; trousers so narrow a man had to remove his shoes to take off his trousers.



1908 Taft Elected President—Coats longer, trousers roomier; deep cuffs caught anything—dust or loose change. "Dull, drab, conservative" describes the color range of these heavyweight fabrics.



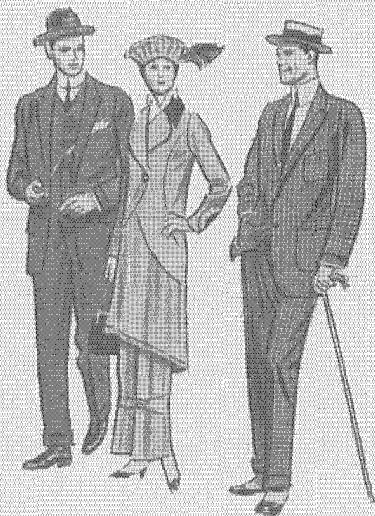
1917 U.S. Enters War—Wartime restrictions fostered the "just enough" look. Ease of motion, comfort missing in suits with narrow shoulders, coats buttoned high and short matchstick trousers.



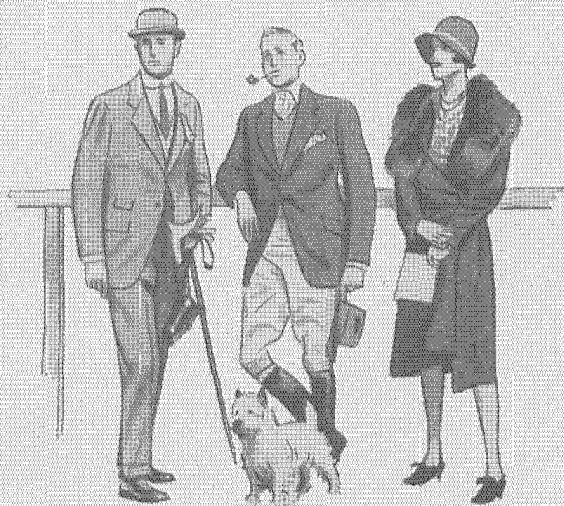
1923 Dempsey Kayoes Firpo—The "easy-going" years saw accent shift to comfort, looser fitting garments. Double-breasted suit came into its own. Lighter weight tropicals introduced for summer.

New 1954 summer suits contain "Orlon", "Dacron" or nylon—man-made fibers that add easy care, comfort and neat appearance to apparel for the man of today. ▶

the fact that a neat appearance is possible with little or no pressing. Crease and shape retention are other qualities having hot weather appeal. Pockets and linings of man-made fibers insure complete washability. Washing suits at home saves money and time, especially in summer. Fifty years ago the suggestion might have met a cool reception, but, in 1954, "wash 'n wear" for year-round wear for the whole family is not only a hot idea, it's on the way to reality.



1913 Wilson Inaugurated—Men still wearing heavy worsteds, cheviots. Coats had slight flair. Ready-made garments were gaining acceptance, but the summer suit, as we know it, was not being made.



1930 Amos 'n Andy on the Air—Coats again fitted and trousers skimpy, this time reflecting Crash of '29. End of this decade saw beginnings of style change to comfort and ease known today.



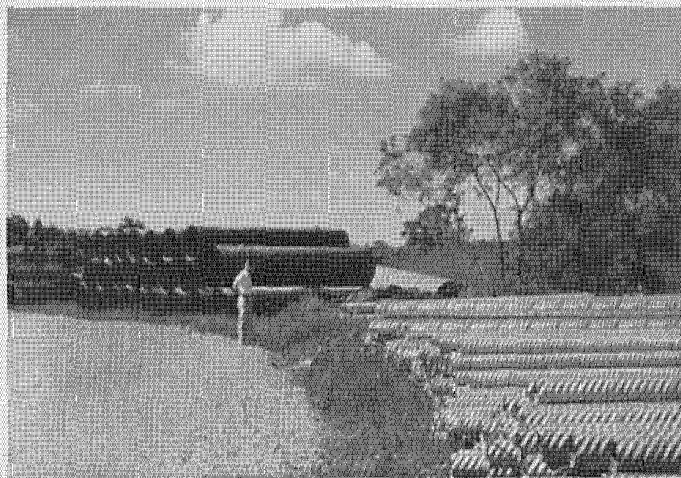


No regrowth seven months after drainage area at Hamilton Air Force Base, Calif. was treated with "Telvar" W.

Industry's war on weeds

If you are trying to make grass grow on a bare spot in your lawn, you have a problem and the sympathy of your neighbors. But if you want a bare spot where grass and weeds insist on staking out a claim, your problem, until recently, was strictly your worry and it was a big one.

Both weeds and grass were a nuisance to workers at this outdoor storage area for Florida steel plant.



Who wants bare spots? Many people. Oil men who must work around wells, pipe lines and storage tanks. Railroad officials who want clean tracks and yards the year round. Manufacturers who must provide neat outdoor storage space, parking areas and driveways. Ordnance men who don't dare tolerate a

After treatment with "Telvar" W, the storage area was clear of vegetation, a neat spot for products.



Grass between tracks in railroad yard was treated with "Telvar" W.

fire hazard. Lumbermen for whom vegetation is a nuisance and a hazard in lumberyards.

The need for a weed killer that would not only kill all growth but would prevent early regrowth led Du Pont to develop a new organic substituted urea herbicide, first called CMU and now known as "Telvar" W weed killer. Photographs on these pages show its effectiveness on unwanted vegetation.

"Telvar" W not only kills growth, but has the unusual ability to keep areas free of regrowth for a long time—an entire season or longer. This herbicide works mainly through the roots of plants. Rain carries the chemical down into the root zones where it remains effective for months. In some cases, control of growth has been so satisfactory no respraying has been necessary the second year.

It doesn't take much "Telvar" W to accomplish these results. As little as 40 pounds an acre has done the job. This is one reason industrialists have been quick to try the herbicide. "Telvar" W is not only

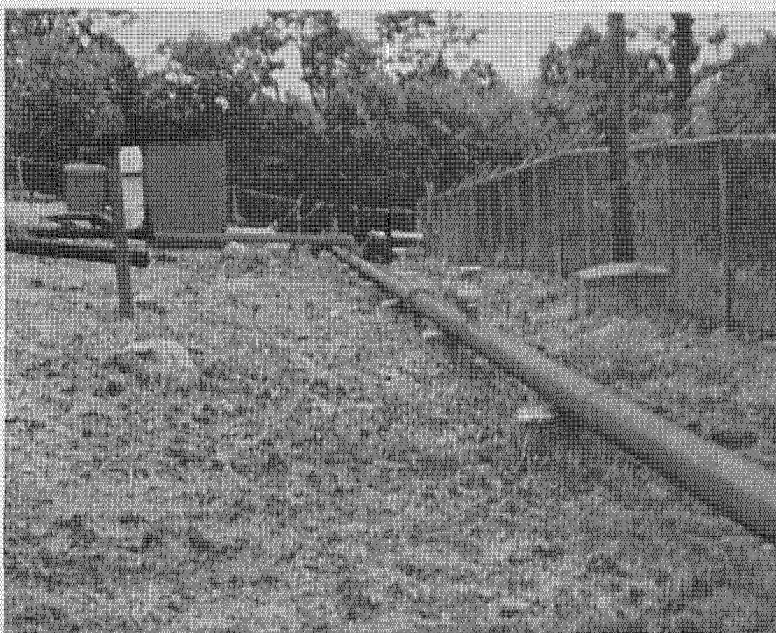
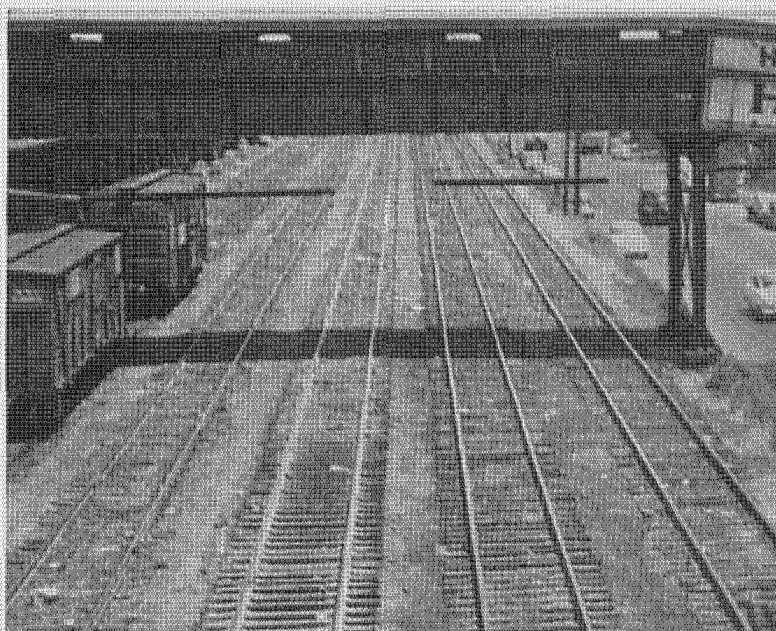
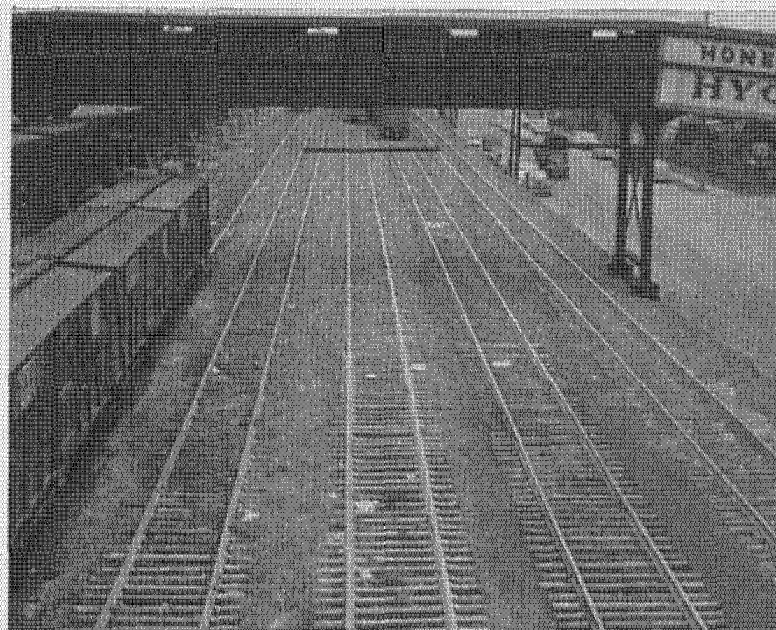
After more than six months, treated area still remained free from weeds, grasses.

nonflammable, but its toxicity is exceedingly low to warm-blooded animals. It won't corrode metal spray equipment, posts, guard rails or warehouses. As an added plus, it is nonvolatile so there are no fumes to drift over to nearby crops or grass.

This herbicide can be applied by maintenance crews or by custom applicators. For example, one specialist in Oklahoma is servicing 145 oil wells. In Minneapolis, another firm concentrates on weed control for the city's milling industry. Companies generally find it more economical to call on a custom applicator than to invest in equipment and acquire the know-how for a few days' weed control work a year.

While "Telvar" W keeps industrial areas free of vegetation, Du Pont continues its research with related urea compounds that promise even more effective weed control for the future. Already two members of the growing family have found a valued place in agriculture, and we hope to report on this next year. The way things are shaping up, town or country weeds are going to have a harder time eking out a living.

Eighteen months after treatment pipeline area shows no regrowth.



Paper's latest look

Neoprene is making good on its earlier promise in the paper field. One of its newest contributions is an improved fiber seat cover

By GERALD KING

One characteristic of a dynamic economy is that no single product has the world by the tail for very long. Competition may come from a new product or a revitalized older one, but come it does.

A case in point is the fiber seat cover for automobiles, now showing new vitality after losing ground in recent years to plastic seat covers. Fiber covers always have offered seating comfort, little or no static build-up, and resistance to cigarette burns. But complaints like these were heard, too: The seams tear, they split in the seat, and the corners wear too fast. These customer beefs could be traced to the poor water resistance of the fibers, which lost strength rapidly under the assaults of perspiration, wet bathing suits, or rain from an open window.

Now a new type of fiber yarn reinforced with neoprene, Du Pont's chemical rubber, is putting fiber seat covers back in the thick of things. Neoprene increases the wet strength of the material dramatically, resulting in a fiber seat cover that can be sponged clean and that has improved resistance to fraying and pulling apart when wet.

Fiber seat covers are woven from a yarn made of twisted paper strips. Neoprene is added to the pulp from which the paper is made, and becomes an integral part of the yarn itself.

Laboratory tests on two yarns, treated and untreated, show the value of adding neoprene. When dry, the two yarns have substantially the same tensile strength, but after being soaked in

water for 24 hours the untreated yarn retains only 15 per cent of its dry strength, while the neoprene-treated yarn retains 44 per cent. When wet, the treated yarn is three times as strong as the untreated.

A washing machine test shows the contrast even more spectacularly. Two fiber swatches, one woven of treated and the other of untreated yarn, are washed together in a tumble-type washing machine at 130°F. using a soluble cleaning compound. After 30 minutes, the untreated fabric has disintegrated completely and is reduced almost to pulp. The treated fabric is still good, and has no broken yarns or surface fuzzing.

Of course, no one recommends tossing auto seat covers into a washer, but the test is significant. It shows what moisture can do, slowly and unobserved, to a conventional fiber cover in service. It also shows that anything as mild, comparatively, as a wet bathing suit or a damp sponge could hardly threaten neoprene-treated seat cover fabric.

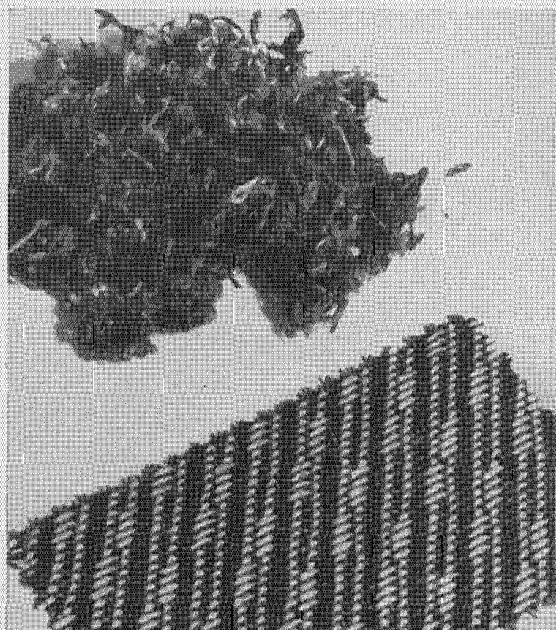
The seat cover fabrics are being woven by Swift Manufacturing Co. of Columbus, Ga. Swift calls its new line "Colorprene", and is introducing the fabrics to seat cover producers in many colorful patterns. In addition, one automaker is considering Swift's new neoprene-treated fiber fabric for use as interior trim in station wagons.

FILTER PAPER, TOO

This chapter on neoprene in fiber seat covers is the latest in a story that began two years ago, when we first reported in the *Magazine* that neoprene and paper had been united successfully. We told then of one of the first results of this partnership, neoprene-treated filter paper. Today we can report that the added wet strength and chemical resistance of neoprene-treated paper is still winning converts in this field.

Clinton Scoble of the National Filter Media Corp., New Haven, told us recently that petroleum re-refiners are among the newest customers for "Netone", National's neoprene-treated filter paper. Re-refiners filter used lubricating oil at temperatures up to 275°F. Scoble said that

Half hour in washer ruins ordinary seat cover fabric; neoprene-treated is intact.





An example of the new water-resistant fiber seat covers made of neoprene-treated paper.

"Netone" is the most effective paper filter re-refiners have found to date.

An acid manufacturer also is using "Netone" in a filter press handling a ten per cent mineral acid solution, Scoble reported. The user is getting eight to ten cycles with the neoprene-treated paper instead of the one he got with untreated paper.

"'Netone' is growing in a way we like," Scoble said. "It's building a solid base in a variety of fields."

BOOSTS INTERNAL STRENGTH

The H. P. Smith Paper Co. of Chicago manufactures backing paper for pressure-sensitive stickers. Storekeepers put the stickers up on their windows to advertise bargains and service station attendants stick one on your car door post after changing the crankcase oil.

The backing paper protects the adhesive. It is coated with polyethylene plastic, and is peeled off the pressure-sensitive sticker immediately prior to use. In theory, this was fine, but in practice the peeling process often split the paper internally, bringing off sticker, polyethylene coating and half the paper backing in the frustrated user's hand.

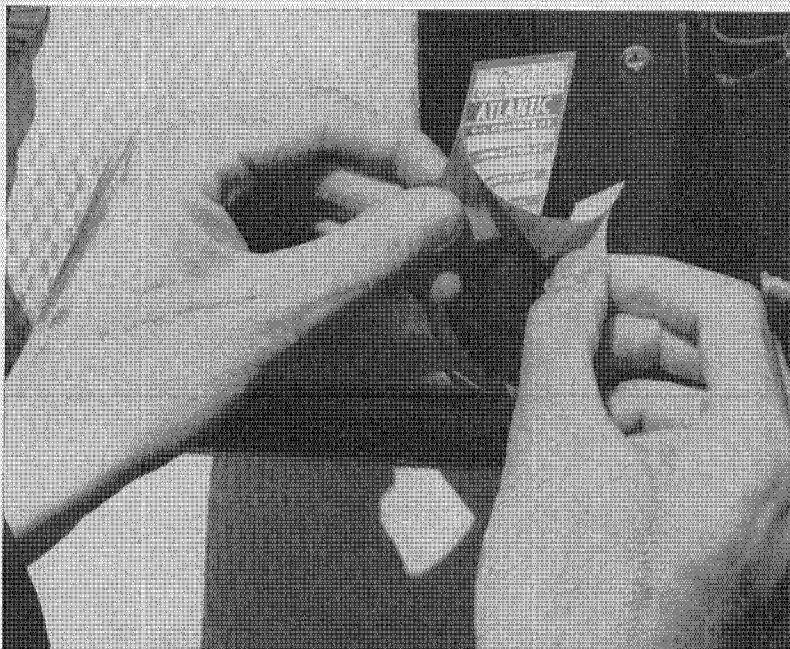
Smith has solved the problem with neoprene-treated paper. The neoprene more than doubles the internal bond strength of the backing paper, and has definitely licked the splitting problem. Now Smith's improved paper backing is challenging the traditional cloth backing for pressure-sensitive tape, and the same paper is being used as an interleaving for rubber sheet stock.

Another result of the neoprene-paper union:

A neoprene-treated paper work cap developed by Du Pont safety engineers and now being sold by the Record Industrial Co. of Philadelphia. Its useful life compares favorably with that of cloth caps, and it sells for about one-third less.

We mentioned earlier the role of revitalized products in a competitive economy. Paper, its many fine qualities bolstered by such allies as neoprene, is certainly an outstanding example.

Backing paper for pressure-sensitive sticker is reinforced with neoprene to strengthen internal bond.



Report from Paris

*The man-made fibers drape many a
shapely model in the 1954 collections*

By JANE STEWART DENTON



▲
*De Givenchy used wash-
able surah of "Orlon"
and silk for three pas-
tel dresses shown here.*



*All three were widely
acclaimed at the Paris
openings. Yellow dress
has pleated back panels. ▼*



*De Givenchy's softened shirtwaist dress. Fab-
rics of man-made fibers are numerous this year.*

The growing impact of man-made fibers on the fashion world was proved again at the recent Paris openings. There beautifully styled fabrics of the newer synthetics were shown in some of the most outstanding designs by members of the Parisian haute couture. Because Paris remains the style capital of the world, the increasing use of these fabrics by some of the biggest names in fashion is news.

That is the conviction I brought back from Paris. As a representative of Du Pont, I attended the Paris openings to cover the use of man-made fibers in the spring and summer collections. I found that French designers are choosing fabrics of these fibers for variety and unusual style effects. In sheer diversity the synthetic fabrics are impressive, and their combination of esthetic and "easy living" qualities is making them increasingly popular.

Attending the Paris openings during "collection week" is an exhausting but exhilarating experience. The collections by Dior, Fath, Balenciaga, de Givenchy, Chanel, Balmain, Patou, and the other top designers all open within a week. On a crowded day there are as many as four collections, each usually lasting a full two hours or more. A typical schedule might include showings at 10:30, 2:30, 5:30 and 9:00, in the course of which the observer would see five or six hundred costumes.

For press people in particular the schedule is a crowded one. They must attend the showings, cable regular reports to their publications, take photographs in whatever time is left—sometimes until two or three in the morning—and still attend social events, not only for recreation but to see what is being worn.

In viewing the collections, the editors or buyers or designers must spot major trends, first and foremost in silhouette, but also in fabrics, colors, accessories and related aspects.

As one of the really significant trends in the new collections, I would cite the greater use of pastels and white for spring and summer town wear.

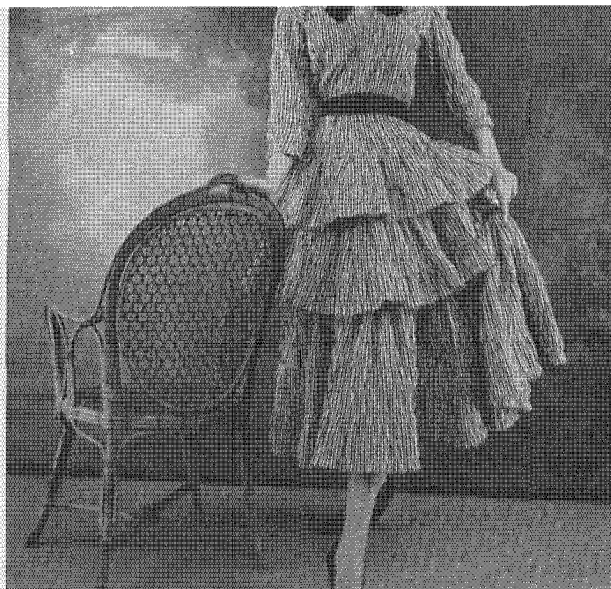
Nylon was used by Christian Dior, world-renowned for his daring and originality. For example, he chose a lightweight nylon and silk shantung for a lavishly pleated daytime dress with a softly

bloused top. These same fibers were combined in a crisp, corded sheer used for a simple dinner dress and an elaborate cocktail gown.

In the collection of Hubert de Givenchy, brilliant young French designer, a beautiful, washable douppioni surah of "Orlon" acrylic fiber and silk was used in high fashion pastels for three widely acclaimed dresses. A softened shirtwaist dress was in pink; a sleeveless princess dress, intricately pleated, was in turquoise; and a style with pleated back panels was in yellow.

Chanel, whose first collection in 16 years was the talk of Paris, also made outstanding use of nylon. Plissés, cloqués, and other textured fabrics were prominent in her collection, particularly for evening wear.

Nylon tulle, always popular, was shown in



Afternoon dress of nylon plissé by Chanel. Bow tie is typical.

White evening gown has a short, full skirt of silk and nylon, and embroidered bodice. Designer is Dior.

Far right is Dior afternoon dress of silk and nylon shantung. Designer favors supple, bloused look.



bouffant evening gowns. Another hardy perennial, a beautiful, chiffon-weight nylon jersey, was seen in styles that utilized its beautiful draping qualities. Nylon taffetas were prominent, and there were many mixtures of nylon with other fibers.

Rich-textured rayon fabrics provided interesting coat news. Extremely luxurious, heavy rayons, some in modernistic and warp-printed effects, were very new looking, and gave tremendous distinction to otherwise simple coat styles.

Some of the most exquisite fabrics of the collections were in magnificent after-five costumes. Here again, rayon and acetate were prominent in rich, heavy fabrics of great elegance and distinction.

Personally, I was delighted to find chemical fibers so extensively used by the Parisians. On my next trip, I hope to find the trend to these "easy living" fibers even more pronounced.



Another Chanel design. This ultra-feminine gown of nylon is washable.

What's New

- **"IVORA"** sensitized white photographic film for projection printing is now available in a Warmtone emulsion. It is specially suited for making high quality miniatures from portrait negatives.



- **PINK NYLON NET** and Chantilly lace are combined in this bridal gown by Murray Hamburger of New York. Nylon makes this gossamer fabric both beautiful and practical, strong, long wearing and easy to keep fresh-looking, so the gown could easily become an heirloom.

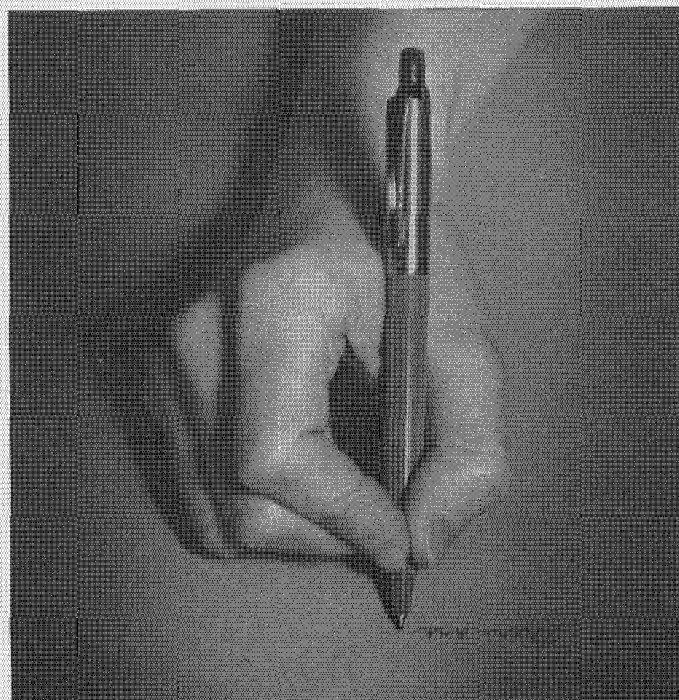
- **BRAKE FLUID** in moderate and heavy duty grades is the latest addition to the Du Pont No. "7" line of products for the motorist. No. "7" brake fluids are formulated to meet the needs of modern, high-powered vehicles under all weather conditions.

- **"TASLAN"** has been adopted as the trade-mark for textured yarn made by Du Pont's bulking process, a mechanical method of putting tiny loops on individual filaments of yarn to add bulk, covering power and a warmer feel. Manufacturers licensed by Du Pont to produce textured yarns by this process may use the trade-mark "Taslan" under certain quality control conditions.

- **TWO NEW BOOKLETS** give detailed help to business-industry users of photographic materials. "Du Pont Products for Industrial Radiography" provides exposure and processing data for the Company's films used in industrial radiography. The second booklet, "Du Pont Photographic Reproduction Papers," describes photocopy and reproduction papers and their applications. It also includes a chart listing the causes and prevention of print defects. Write Du Pont Photo Products Dept., Nemours 2496M, Wilmington 98, Del. for the booklets.

- A **FLEXIBLE KITE** made of Du Pont "Mylar" polyester film, metalized with aluminum, may result in better air-sea rescue operations. Introduced as a toy, the kite is now being tested for possible inclusion in rescue kits of life rafts and planes. The Flexikite is made by Aeroflex Corp. of New Haven, Conn.

- **DU PONT TWINPACK**, a combination package of 24-ounce bottles of new Du Pont Dental X-ray Developer and Du Pont Dental X-ray Fixer, means added convenience, easier mixing and economy for dentists. Contents of each bottle make a gallon of working solution.



- **MOLDED DU PONT NYLON** has made its debut in the writing field. The Parker Pen Co. selected nylon as the major material for its first ball point pen, the Jotter. Among the features claimed for the pen are 600 per cent more writing from a single cartridge and a new type ink chamber that permits all ink to be drawn out.

- **SPUN-DYED ACETATE YARNS** in bright colors are being marketed by Du Pont. Colors available are navy blue, black, scarlet, maroon, Irish green and gold. Under consideration are chartreuse, copper, Oriental blue, coral and old rose.

- A **ONE-COAT OUTSIDE WHITE** house paint is being introduced by the Company to repaint surfaces in reasonably good condition. The new paint is easy to brush on and is "self-cleaning."



- **CRUSHED ICE CHIPPER** tray made by Gits Molding Corp., Chicago, freezes 60 slim ice wafers. A twist of the tray and crushed ice tumbles out for dozens of uses. The ice chipper is made from "Alathon" polyethylene resin. So is another new Gits product: a **FLASHLIGHT** whose case is made of noncorrosive, unbreakable "Alathon", a boon to outdoorsmen and men who work around chemicals.

- **BELTS** of extruded Du Pont nylon plastic studded with diamonds are being used to polish ultra-hard carbide in tube and rod drawing dies. Long-wearing nylon furnishes a cushioning effect to keep diamond grits from tearing out of their sockets. Belts are available from Hartford Special Machinery Co., Hartford 12, Conn.

- **DRESSES**, so wrinkle-resistant they show scarcely a crease after being rolled and left in a 4- by 6-inch tube for hours, are being made in a Cavalcade sheer of "Dacron" polyester fiber. These washable Martha Manning dresses, made by Forest City Dress Co. of St. Louis, keep their fresh appearance even in humid weather.

- A **LEATHER REPRODUCTION** in durable "Fabrilit" elastic supported vinyl plastic upholstery has been introduced for office and home. Called Seville, the new material has a knitted support and adds the "soft look" to plastic. Seville is available in a wide range of colors.

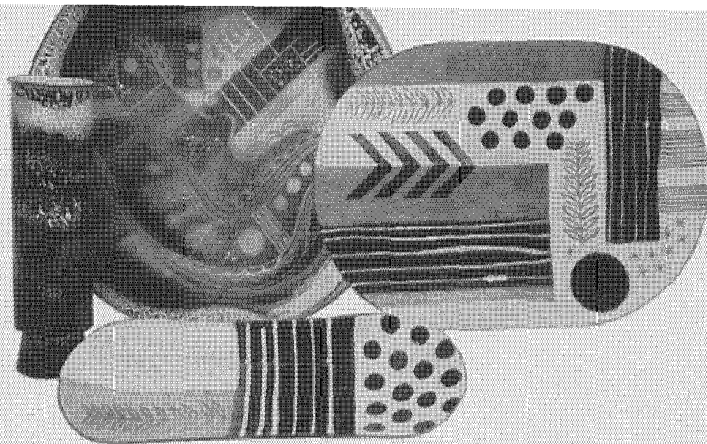
- **"ELVADEX" VINYL POLYMER**, now available in commercial quantities, is a unique vinyl acetate copolymer soluble in aqueous alkali. "Elvadex" is used as finish for dope dyed acetate yarn, as sizing for man-made fibers; and is suggested for use for paper coatings, paints, lacquers, waxes and inks. For more information, write Du Pont Electrochemicals Dept. D-6, 11507 Nemours Bldg., Wilmington 98, Del.

- **"MECHANICAL ENGINEERING AT DU PONT,"** a 22-minute 16mm movie in color, has been produced by the Company for vocational guidance of college engineering audiences. Its scenes show mechanical engineers at work in Du Pont plants and laboratories on problems of research, development, production supervision and plant engineering. For print on loan, write Du Pont Advertising Dept., Motion Picture Distribution, Desk M, Wilmington 98, Del.



- **HOME FIRE ALARM** that emits an ear-splitting shriek for five minutes is activated by "Freon" fluorinated hydrocarbon. A temperature of 140°F. causes the "Freon" to expand, break a seal and set off the whistle. Price is \$9.95 from Fyr-Larm Co., 243 Broad St., Summit, N. J.

For additional information on products or services mentioned in any issue of this Magazine, write to James H. McCormick, editor, Du Pont Magazine, Wilmington 98, Del.



Artist in aluminum

Du Pont's new vitreous enamel for aluminum, until now used for such utilitarian things as roadside signs, store fronts and bulkheads aboard Navy ships, is going esthetic. The man responsible is Edward Winter, a Cleveland artist who helped pioneer the enameling of metal as an American art form.

Winter has produced several pieces of aluminum hollow ware decorated with this new enamel—bowls and trays, primarily—but he sees an even more exciting future for the glamorized metal in such things as table tops, floor screens, elevator doors and lounge

murals. Since the enamel contains lead, it is not recommended for use on surfaces which might come in contact with food.

"Aboard ship, where light weight is important, it should be a natural," he said. "I wish I'd had aluminum enamels when the builders of the S.S. *United States* were shopping for murals."

The silvery sheen of aluminum contrasts nicely with the vivid colors of the porcelain coating, the artist says, and since the metal stays bright the effect is permanent. The low cost of aluminum should make the hollow ware popular in stores and gift shops which stock Winter's products. The items have an added utility, too, in their ability to stand hard knocks. The marriage of the aluminum and its porcelain coating is so complete that the porcelain resists flaking despite rough treatment.

Traditionally, enamellers have worked with copper and the precious metals, using vitreous enamels that are fired on the metal at about 1,500°F., a temperature at which aluminum would be deformed. Du Pont's vitreous enamel is a special low-fusing product that can be fired at 1,000°.

Winter shapes his hollow ware from sheet aluminum, then preheats the metal and pickles it in sulfuric acid to clean the surface. The enamels, colored with metal oxides, are sprayed on, allowed to dry, then fused to the metal in a furnace. He may put down a white enamel first, fire the piece, then apply a black enamel, scratch a design into the surface, and fire it again. One piece may go into the furnace four or five times, depending on the complexity of the pattern.

Winter and his artist wife Thelma, a ceramic sculptor and painter, live in a spacious house generously decorated with examples of their art. It's a 25-minute drive from the Cleveland plant of the Ferro



Into the oven goes aluminum ware decorated with Du Pont's low-fusing vitreous enamel. Artist Edward Winter pioneered technique.

Corp., makers of porcelain enamels, whose laboratory Winter has used nights for the past 22 years under an unusual arrangement.

Robert A. Weaver, then president of Ferro and now board chairman, met Winter in 1931 when the artist had just returned from a year of art study in Vienna. He was impressed with the young man's enthusiasm for enameling and offered to let him use the company's laboratory facilities, which included a fur-

Mrs. Winter, also an artist, is pictured with the aluminum ware. Enamel shouldn't be used on food surfaces.



nace capable of handling large metal parts. Winter accepted, and the agreement still stands.

This happy alliance between art and industry has carried over into other phases of Winter's career. Some of his biggest jobs are displayed in the halls of commerce; a Winter mural, for example, decorates a local water filtration plant. But he also has won many museum prizes, and two of his enamels are in the New York Metropolitan Museum's permanent collection.

Winter uses "sgraffito" or scratch technique in drawing design on bowl. He also makes plaques and murals.



DMH—Father of odorless formaldehyde

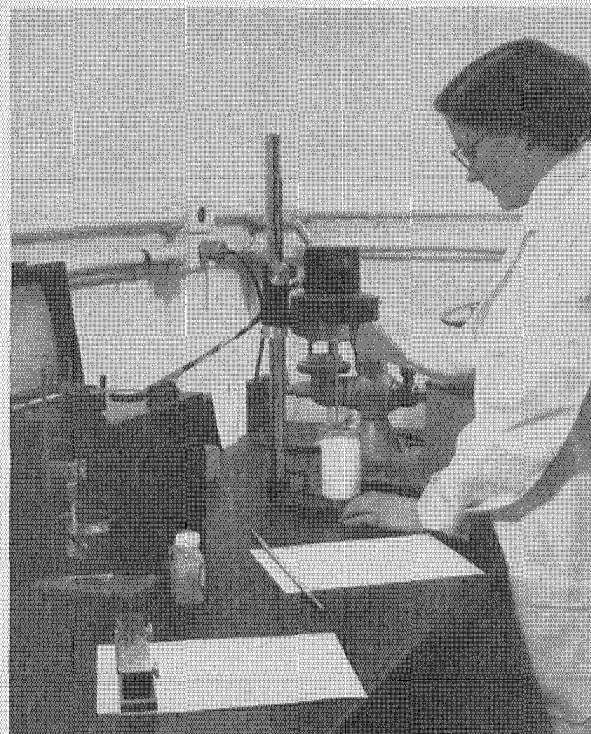
Dimethyl hydantoin, laboring under its generic name of alpha-ureidoisobutyric acid lactam, is making technical people sit up and take notice for several mighty good reasons.

DMH, a white crystalline solid, reacts to form odorless sources of formaldehyde, and can be chlorinated to form dichlorodimethyl hydantoin, used for making such things as germicides and bleaches. Other important uses for DMH past the lab-test stage are to form resins and make intermediates, primarily for textile chemicals.

An odorless DMH-derived formaldehyde donor, monomethylol dimethyl hydantoin, has been used for shrinkproofing and crushproofing textiles. It also releases formaldehyde to insolubilize protein paper coatings and glue, and to supply formaldehyde in other applications where the odorless feature is a must.

DMH is the parent of a water-soluble polymer, dimethyl hydantoin-formaldehyde resin, primarily used at this early stage in paper coatings. It adds high gloss and erasability, and, since the resin swells when moist, it has good vapor-blocking properties. Because simple chemical treatment insolubilizes the resin, maps and decal transfer papers are logical applications.

The *Magazine* will be glad to fill your requests for technical bulletins on DMH and its derivatives.



Chemist mixes MDMH formulation for paper coating.



Idaho farmer Joe Marshall and son inspect potato crop. Farmer-owned irrigation system created 200,000-acre oasis of plenty.

WATER ... magic word in a magic valley

By R. C. RICHARDS

Bernard De Voto, veteran chronicler of the American West, quotes this wry Westernism in a recent magazine article: "Sure, all this country needs is a little more water and a better class of society—but that's all Hell needs."

Like most good jokes, this one is grounded in truth—at least so far as water is concerned. Much of the West is a desert, too lacking in rainfall to be agriculturally or industrially productive. It is chiefly in the valleys, where the runoff from mountain snows can be captured and put to use, that life and society thrive.

But even in the valleys nature does not surrender her bounty easily. Vast irrigation and power projects, some executed by state and Federal governments and others by private interests, have been needed to create the farms and factories. In the process, mighty rivers like the Columbia, the Colorado and the Rio Grande have been broken to harness for the first time.

This is the story of one valley—the so-called Magic Valley of the Snake River in south central Idaho—and of a farmer-owned irrigation company that helped transform a wasteland into one of the country's most prosperous agricultural regions. It's a story also of the self-reliance which the West's yawning distances and rigorous climate demand.

The Twin Falls Canal Co. had its origin in 1900, when settlers on the parched Snake River Plains banded together to tap the river for irrigation water. The plan was not a new one even then, but raising capital to finance the work had taken time. Construction finally began in 1902, and in 1905 the first river water was turned into the main canal of the project. It has flowed there almost continuously since.

PIONEER RECALLS EARLY DAYS

Before the land could be farmed, of course, it had to be cleared. Joe Marshall, one of the original settlers, recalls the period well.

"I filed on 160 acres of land in November, 1903," he wrote me recently. "It was nothing but a lot of arid sagebrush land then. I cleared it with the aid of some hired men with nothing but a grubbing hoe, which according to present methods, you will agree, was rather an antiquated method."

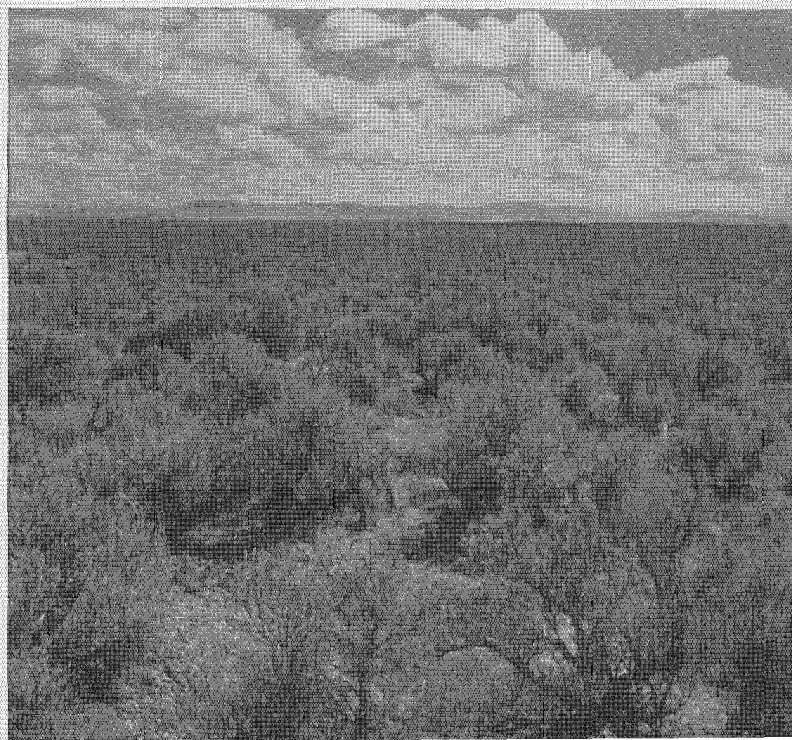
"I have farmed in this Magic Valley of ours ever since that time, and have lived to see its development in all its present glory."

Today, at 80, Marshall has turned over his land to his son, although he still markets Idaho potatoes as a farm manager. He has held the title of Idaho Potato King for 30 years.

The Twin Falls tract in its "present glory" encompasses more than 200,000 acres, a strip about nine miles wide and 48 miles long beside the river. Where sagebrush once collected dust there are rippling fields of grain, symmetrical rows of potatoes, beans and sugar beets stretching to the horizon, lush pastures and the bleat of lambs in the spring. Towns, including the county seat of Twin Falls with a population of 18,000, have grown up within the tract. Power generating stations have accompanied the growth of irrigation dams along the river, making manufacture possible.

Some 3,000 stockholders, practically all of them farmers who use the water directly on their land, own the company that created the tract. They operate it

Sagebrush near Snake River in Idaho. With water, land like this could be as fruitful as that pictured on preceding page.





Lifegiving water flows to croplands through 1,100 miles of canals and secondary waterways. Here a cut is being blasted.



Common use of Du Pont dynamite on project is in ditching and tunneling to drain surface water that collects each autumn.



through an elected board of directors and an appointed general manager, Alfred Peters. Each acre of land entitles a farmer to one share of Twin Falls stock.

Over the 50 years since it began operations, about \$3,500,000 has been invested in the Twin Falls project, all of it private capital. More than 100 miles of main canals and about 1,000 miles of secondary waterways carry life-giving water to the land. The water starts from Jackson Lake in northwestern Wyoming, 260 miles away, flows down the Snake to the American Falls Reservoir near Pocatello, on down the river to the Milner Dam, owned jointly by the Twin Falls company and two similar projects, and thence into the irrigation network. The Twin Falls farms use about one and a quarter million acre feet of water annually, an acre foot being the amount required to cover an acre one foot deep.

It's paradoxical that even in a land where water is scarce there occasionally can be too much of it. The Twin Falls company has a persistent drainage problem. Beneath the top soil lie lava sheets interleaved with sedimentary deposits. The sheets are so tightly laid one upon the other that underground water accumulated after a summer of irrigation cannot escape into the canals. Instead, it rises to the surface and collects in seepage areas.

\$2,000,000 DRAINAGE PROBLEM

Over the past 40 years the company has spent more than \$2,000,000 fighting the drainage problem. Ditches 20 feet wide at the top and tunnels measuring four by six feet have been driven through the lava rock to drain this surface water into the waterways. In these labors, which go on continuously, Du Pont explosives have played a part. Du Pont 40 Special Gelatin is used in the tunnels, while both Special Gelatin and "Gelex" No. 2 have been employed for ditching. Other explosives jobs on the tract include the shooting of ice in canals and ditches during the winter and the blasting of ditches through swampy areas with Du Pont Ditching dynamite.

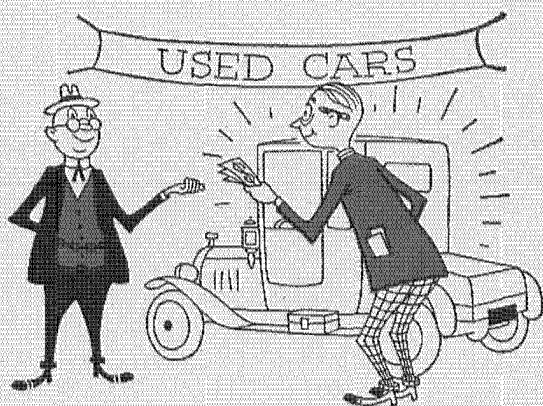
It's encouraging to report that the drainage problem is pretty well under control now, and that less money is being spent on it each year.

I asked N. V. Sharp, who began farming on the tract in 1905 and is now a director of the company, to give me his reflections on a project to which he has devoted his life.

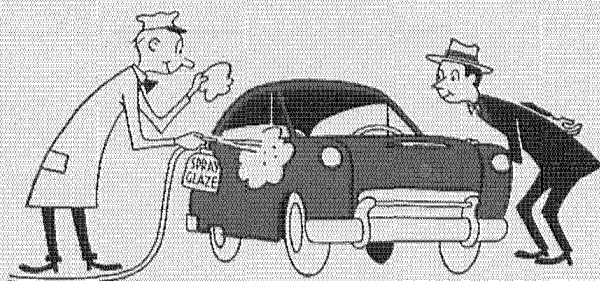
"I feel that I'm speaking for the average farmer on this project of ours when I say that it has been a very worthwhile and prosperous undertaking," he told me. "And what we have done can be duplicated by any other group of farmers. As you know, there are thousands upon thousands of acres of sagebrush land left just in this section. All that it needs is enough water to bring it into full production. We've proved that convincingly here in the Magic Valley."

In past 40 years drainage problem has cost company more than \$2,000,000. Today it is pretty well under control.

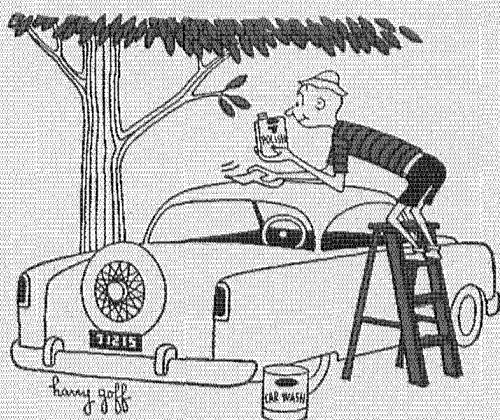
What do you know about grooming your car?



It pays to keep your automobile in what used car dealers call the "cream puff" class. "If you maintain good mechanical condition and appearance of your car, it will average 17 per cent more on a trade-in," says an executive of a large automobile credit corporation, reporting on a nationwide survey.



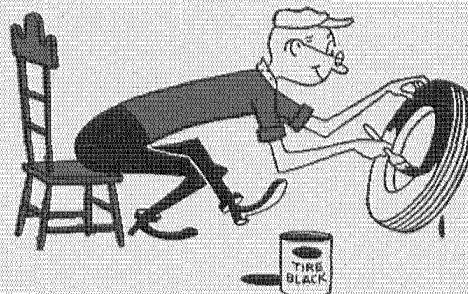
There's normally nothing worse for your car's complexion than hot sun, particularly if it also takes night dew, rain or salt air. Best preventive is a garage at night, shady parking by day, and a good protective coating. If you're buying a new car, ask your dealer to apply Du Pont Spray Glaze. Then repeat periodically, or follow up with "Seven-ite" polish to maintain high gloss without frequent cleaning.



Find a shady nook for washing and polishing your car. If the surface is sun-baked and hot, rapid evaporation of suds, polish or water can cause streaking.

Whether your automobile is new, custom or antique, you may prefer Du Pont No. "7" polish, a favorite since 1926 when it was developed to maintain the successful "Duco" lacquer finishes. Whatever the polish, for best results wash your car first with Du Pont Car Wash to remove the grime that can damage the surface.

Don't be alarmed if a little color comes off on the polishing cloth. All automobile finishes oxidize or chalk slightly and minute particles rub off, letting the original color show. Keep a protective coating on to avoid oxidation.



For beauty treatments that mean as much to your lizzy as lipstick to the American girl, you have a wide choice in No. "7" grooming products. For bumpers and trim, there's Du Pont Chrome Polish; for tires and rubber mats, Tire Black, and for upholstery, Dry Clean and Foam Cleaner.

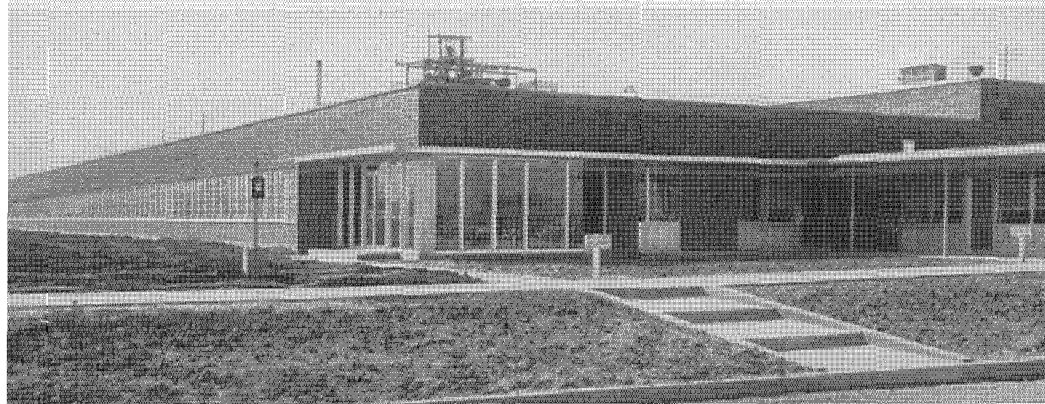


Cleaners and polishes are packaged for your convenience. There are three types. One, a single package of combined cleaner and polish, like No. "7" polish, for a quick, easy way to high luster. Another type is a two-package combination of cleaner and liquid coating containing wax and silicone, such as "Seven-ite", for those who have more time and want a more durable coating. And third, for those who prefer a wax, another combination offers Du Pont Speedy Cleaner and Du Pont Auto Wax.

As every woman knows, good grooming is not dependent on expensive cosmetics but on regular beauty routines. Your car will respond to the same good care.

After eight years of research and three years
of pilot-plant production

"Mylar" comes of age



New plant for making "Mylar" will open in July at Circleville, Ohio.

By MARIAN ELIOT

Next month the first plant for commercial production of Du Pont "Mylar" polyester film will begin operations just south of Circleville, Ohio. The opening of the new \$10,000,000 plant will mark the coming of age of a film which has shown some phenomenal abilities even as an adolescent.

Eight years of research and development and three years of semi-works production for test use by manufacturers have proved that "Mylar" offers definite advantages in the major property categories—electrical, physical, chemical and thermal. It has what its creators call "balanced properties" and affords design opportunities available in no other single film. Result: it is firmly established in certain industrial and consumer products barely hinted at in our *Magazine* report a year ago.

Since "Mylar" was first developed it has been obvious it would go far in the electrical field where its properties are excellent for insulation. Its dielectric strength, to say the least, is excellent. It keeps its dimensions and properties over extremes of heat, cold and humidity. As an insulator it can be used at temperatures as high as 150°C. and as low as -60°C.

"Mylar", in combination with asbestos paper, mica mat, or glass cloth, provides a wide range of insulation materials. Motors are being designed with slot and phase insulation of "Mylar" and laminates of "Mylar", much stronger than ordinary electrical insulation. The tensile strength of this film, about one-third that of high grade steel, permits its manufacture in gauges as thin as 1/4000 of an inch. Because of thinner insulation, the motor has more space for extra wire and thus more horsepower for its size, or the motor may be made smaller with equal power.



"Mylar", vacuum-metalized to aluminum foil, makes a bright thread for fabric.

Capacitors, transformers and other electrical equipment also can be made smaller and less costly. For example, "Mylar" is replacing impregnated paper to separate the metal foil electrodes in telephone systems. The voltage-resistant film needs no impregnation.

The balanced properties of "Mylar" have led researchers at Du Pont and other companies to look beyond electrical insulation for jobs for this film. Laminated to aluminum foil or kraft paper, it makes a strong vapor barrier for hot or cold pipes. Thermal insulation—glass, fiber, magnesia, foam glass or cork—serves well if the surroundings are clean and dry. But chemical plants, for instance, abound in fumes and moisture that reduce the efficiency of these materials. Maintenance men have used impregnated tapes or asphaltic compounds as protection over the insulation. Both are messy to apply and often decompose rapidly when exposed to chemicals. Now a covering of "Mylar" film laminated to aluminum foil is adhered to pipe insulation as it is made. Installation is simple since the cover is built onto the insulation. "Mylar" resists solvents, moisture vapor, most acids and alkalis.

Sound recording tape for radio and television is a promising field for "Mylar", as reported in the April-May '54 issue of this *Magazine*. Also in the tape field are pressure sensitive tapes for carton strapping and control tapes for machines.

Acoustical tile need no longer be colorless and dust-catching. Printed "Mylar" film can be laminated to the tile



Acoustical tile, covered with printed "Mylar", is a colorful and very easy-to-clean material for ceilings.

With "Mylar", the textile industry has a new non-tarnishable metallic yarn that withstands washing, pressing with a hot iron, and dry cleaning. The yarn is manufactured by bonding a sheet of aluminum foil between two sheets of "Mylar" with a colored adhesive. The sheets are slit into strips of yarn as narrow as $1/64$ of an inch and interwoven with other textile yarns into fabrics for clothing and for automobile and furniture upholstery.

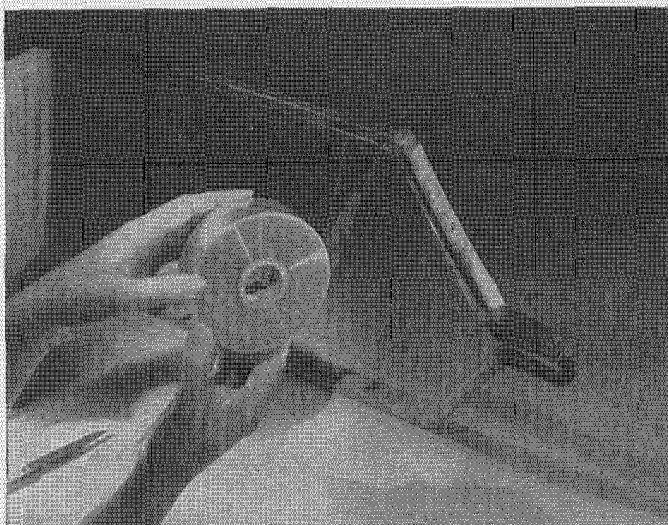
Possible new uses for "Mylar" are as kick panels and coverings for flexible dashboards in automobiles. It is the first film strong enough and sufficiently attractive for these jobs. Manufacturers are now exploring "Mylar" for wall-paper, wall paneling and movie screens.

This new film, "Mylar", is already making its contribution to better living—from electrical equipment to evening shoes.

for decorative as well as practical ceilings and walls. The smooth tiles can be wiped clean with soap and water.

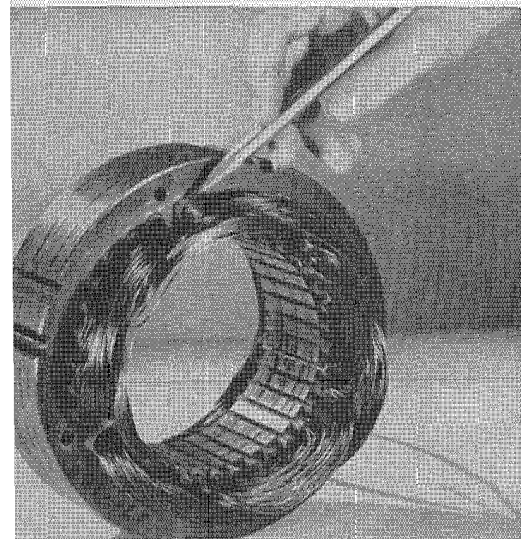
"Mylar" brings to the furniture industry a new idea for low-cost surfacing. Wood grain can be exactly reproduced, printed on "Mylar", and laminated to plywood. The surface is good-looking, impervious to moisture, and resistant to scratching.

The leather industry, with the help of this new film, has developed leathers with a delicate air but with extreme abrasion resistance. Made in metallic shades for high fashion dress and evening shoes, "Mylar" on leather retains the original grain but adds a subtle sheen and long-wearing qualities. Chemically resistant, the new type leather is unaffected by mildew and can be spot cleaned.



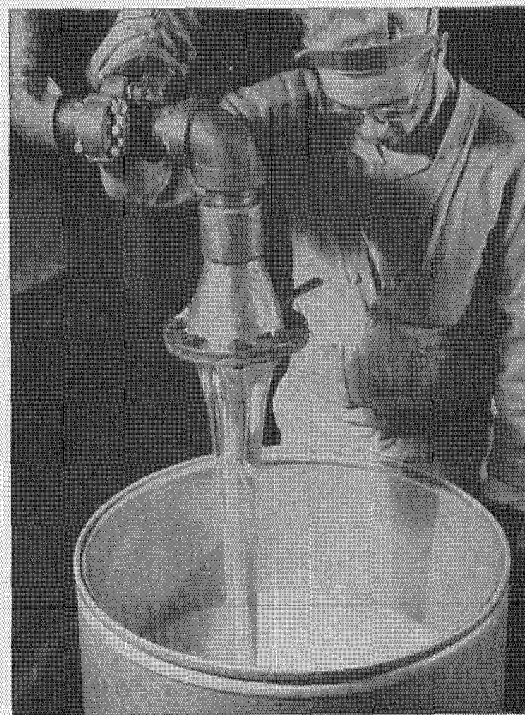
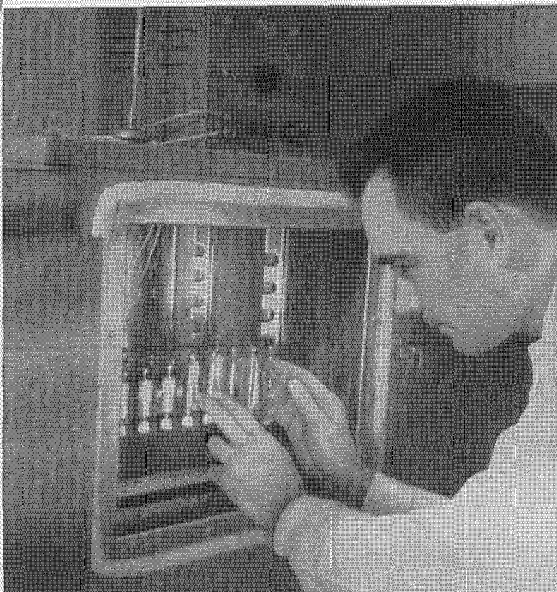
Excellent electrical properties make "Mylar" ideal for such jobs as wrapping formed coils.

Bonded to the inside of fiber-board drums, "Mylar" makes an excellent lining, resistant to chemicals, temperature changes. ▶



Insulation of "Mylar" on this stator is half as thick as conventional material it replaces. ▲

Research has shown that "Mylar" film retains its dimensions and good electrical properties up to 150°C . and down as low as -60°C . ▶



Filter quiz

Bruce Farquhar of our Textile Fibers sales development team answers questions about the role of Du Pont fibers in solving industry's filtration blues

Q. To begin with, what is filtration, and what industries use it?

A. Filtration is a fundamental process used to separate physically one form of matter from another, such as a solid from a liquid or solid particles from a gas. In some cases, the solid that won't go through the filter is what you're after; in others, the solid may be the material you're trying to get rid of. In any event, filtration is used in practically every chemical process, in the manufacture of foods, metals, pigments, plastics, fertilizers, minerals, drugs and antibiotics. That's a fair list, but it's by no means complete.

Q. Could you give us a specific example of liquid filtration?

A. A very common one is the filtration of dyes from the chemical liquor in which they are formed. This is often done by forcing the liquid through a filter press, a series of fabric-covered plates separated by frames held tightly together. The solid particles of dye are trapped within the frames by the fabric. Another example is the filtration of pulped fruit to recover juices.

Q. How about gas filtration?

A. Here we might mention the carbon black industry, which burns oil or natural gas with insufficient air, thus forming tiny carbon particles. These are then filtered from the combustion gases. Metal smelters, too, often recover their products by gas filtration. On the other hand, many noxious ingredients of stack gases are removed in this way to prevent air pollution.

Q. How much filter material does industry use in a year?

A. Something like 19,000,000 pounds of textile fibers, both natural and man-made.

Q. What fibers are used in filter cloth?

A. Many of them. Among the natural fibers represented are cotton, wool, jute, linen and sisal. Among the synthetics, nylon, "Orlon" acrylic fiber and "Dacron" polyester fiber are doing a real job in applications where, for one reason or another, they excel. This is probably as good a place as any to point out that there is no more a universal fiber for filtration than there is for any other purpose. Each fiber has specific properties which fit it best for certain jobs.

Q. Could you go into a little more detail on that?

A. Well, take nylon, for instance, the first synthetic to be used on a large scale in filter fabrics. It has high abrasion resistance and great strength, it can do its job in the presence of alkalis, and it resists heat. Nylon has been extremely successful as a dust filter in cement manufacture and in liquid filtration of caustics. Often its working life has been 10 to 15 times that of a natural fiber filter.



Farquhar, left, at a dye plant. Calls like this tell him where Du Pont fibers can best be used in filters.

Q. How about "Orlon"?

A. Nylon and "Orlon" complement each other pretty well. Where nylon resists alkalis, "Orlon" is highly resistant to acids. In the carbon black industry I mentioned earlier, bag filters of "Orlon" are doing very well indeed. There's an acid condition to contend with here—sulfur combines with oxygen and moisture in the combustion gases to form acids. "Orlon" also withstands an operating temperature of up to 275°F. As a matter of fact, because of its properties, "Orlon" made possible the readoption of cloth filters by the carbon black industry, which had given them up some time before. With "Orlon", the carbon black recovery rate has been boosted from a former high of 70 per cent to more than 99 per cent.

Q. This high operating temperature. Is it desirable in carbon black production?

A. Yes, just as it is in many other processes. In fact, they'd probably like to operate at even higher temperatures. The point is that it costs money to cool the gases, besides lowering the efficiency of the process. I'd like to add that in primary and secondary smelting of metals,

filter bags of "Orlon" are lasting from four to eight times longer than the natural fiber cloth they replaced. Despite the fact that they cost more initially, they are proving to be two to three times more economical. The producer not only saves money on filters, he also has less down time to change filters because of the new fiber's longer life.

Q. We've heard talk about this new fiber Du Pont is making in development quantities, the one made from the same raw material as "Teflon" tetrafluoroethylene resin. What can you tell us about that as a filter cloth material?

A. As I said a little while ago, there is no such thing as a universal fiber for filtration. This fiber, however, comes pretty close to making me eat crow. It has the most outstanding chemical resistance we've come across yet. You can boil it in aqua regia, a mixture of acids that will dissolve gold, without effect; alkalis don't affect it, either, and it can stand temperatures of 400° to 500°F. I said some producers were interested in operating at higher temperatures. We're in the process of testing this new material in carbon black collection and nonferrous metal smelting. Since the fiber is in limited supply right now, and the process for making it is a new and difficult one, its price is much higher than that of our other fibers.

Q. But still you think its properties are enough to justify its use in filtration?

A. We certainly do. Despite the high initial cost we are convinced that in some applications it will save the user money and permit operations that would be impossible with other fibers.

Q. How about felts of the man-made fibers? Are they likely to be used in filtration?

A. Yes. It recently became possible to make felts with the Du Pont fibers—something that had never been done before with the synthetics. Felts of nylon have shown definite promise in oil filters for truck engines, for example, while felts of "Dacron" have been used to part emulsions of water in oil, making it possible to decant and thus separate the two liquids.

Q. Has the fact that synthetic fibers can be made in continuous filament form meant anything to users of filter fabric?

A. Yes. In some cases the smoother surface of filament yarn fabrics has made it easier to remove filter cake from the fabric. Now, of course, the man-made fibers are available in staple form, too. The spun yarn fabrics made from staple are preferred for certain jobs where maximum clarification of the filtrate is desired.

Q. Suppose a reader of the *Magazine* wants some advice on a filtration problem?

A. I want to emphasize that Du Pont makes only the fibers. The filter fabric suppliers are well equipped to answer just about every question that comes up, since they are familiar with the physical properties of our fibers and others. More than that, they are people who know filter fabric construction, and the best fiber in the world is worthless if it isn't woven into the proper fabric. If inquirers write the *Magazine*, we will put them in touch with filter fabric suppliers, and any questions about the place of Du Pont fibers in this broad industrial field will be answered.





New "Fabrilit" is made to travel far in any kind of weather.

Flying start for new luggage

When grandfather left for a business trip to Europe or other far places, he waved good-bye from a formidable stack of heavy trunks and bags. As transportation has moved faster and farther, luggage has become lighter in weight, stronger and more resistant to travel damage. The businessman and his luggage must be highly maneuverable today. So the average traveler takes one or two bags packed with wrinkle-resistant, easy-to-care-for clothing—and moves fast and comfortably.

To meet the needs of today's travel, Du Pont recently announced a new "Fabrilit" supported vinyl plastic luggage material. Developed specifically for luggage, the new material is tougher, harder, and more

resistant to scuffs, gouges, stains, water and wear than the original "Fabrilit".

The improved vinyl coating is available in three different leatherlike finishes in off-white, green, ginger, suntan, gray and navy blue. Also on the market are six coatings in tiny checks and fabric effects. Separate designs are offered for men's and women's bags.

The new "Fabrilit", on test luggage, was tossed around, punched, gouged, soaked and plastered with mud. After this rough treatment, a quick rub with a soapy sponge made it as supple and spot-free as new. When it comes to luggage, that's about as far as you can go, whether it's in Kansas City or Cairo.

SHE'S A BEAUTY, MR. POPE!



It's appropriate that Junior should be showing off his new deluxe equipped Columbia bike to Albert Pope, for Pope has been called the father of the American bicycle industry. He built the original Columbia in 1877—it was the country's first commercially produced bicycle—and founded what is now The Westfield Manufacturing Co., modern maker of the Columbia.

This balloon-tired beauty of 1954 would raise Mr. Pope's eyebrows with its built-in electric horn, electric headlight, electric stop and tail light, spring fork, built-in lock, built-in kick stand and crash rail saddle.

Not to mention its chrome trim and baked-on finish of lustrous "Dulux" enamel—the same durable finish that protects and beautifies modern cars, trucks and home appliances.

The Westfield people say: "As bicycle manufacturers for 77 years and pioneers in many of the industry's advances, we demand a finish capable of withstanding the punishment a bicycle gets. We're satisfied that 'Dulux' enamel meets the test."

Du Pont Industrial Finishes

Chemically engineered to do the job better!



BETTER THINGS FOR BETTER LIVING

... THROUGH CHEMISTRY



Chemical helpers for your garden

This year, these "chemical protectors" can help you have a productive garden.

For best results, begin preventive dusting or spraying with combinations of chemicals to keep bugs and diseases away from plants. But even if pests are already in your garden, you can fight them with chemical helpers.

Fruit trees, berries, vegetables and flowers can all be protected with these effective combinations of chemicals, packaged for convenient use:

DU PONT FRUIT TREE SPRAY • Follow the simple schedule on the package for best results. Spray several times to keep fruit enclosed in a protective coat as it grows.

DU PONT FLORAL DUST • Outstanding for roses. Spray or dust, but keep ahead of the pests. The handy, ready-to-use dust gun package makes it easier.

VEGETABLE GARDEN DUST • Ready for use on all your vegetables. Helps you harvest prize-winning vegetables.

Du Pont also offers products for weed control and plant feeding. Du Pont Soluble Plant Food, for example, can be used throughout the season. It's clean, easy to dissolve in water. Spray or sprinkle on all your plants. It's excellent for lawn feeding, too.

There's a garden supply dealer near you who displays these products. See him about Du Pont Garden Chemicals.

Du Pont Garden Chemicals



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