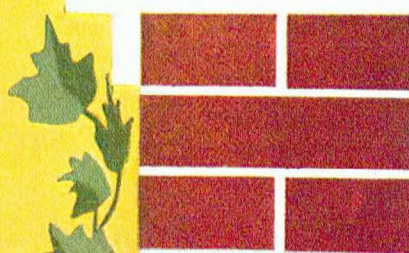
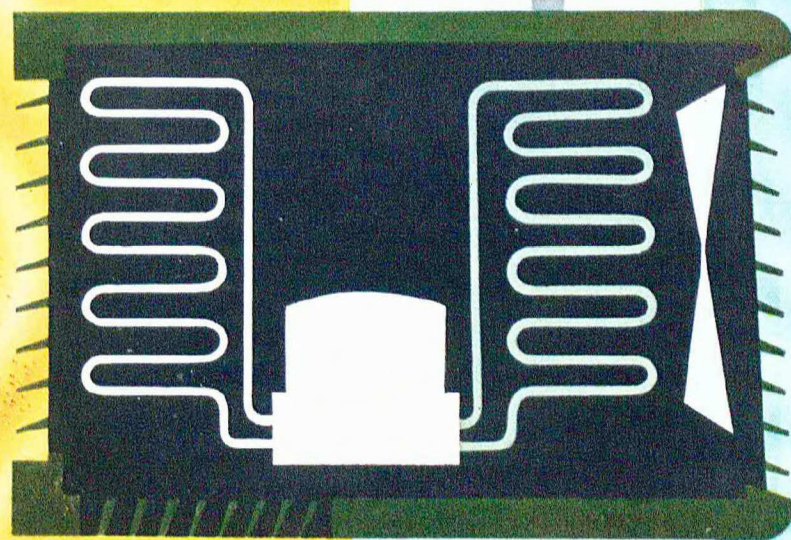


DU PONT

m a g a z i n e



Better Things for Better Living



shed water and repel stains.



The Du Pont water repellent retains its effectiveness through many launderings.

ON WASHABLE OUTERWEAR

it's "ZELAN" for lasting water repellency

Washable rainwear, storm coats, jackets and outerwear generally are now a reality, thanks to your demand and that of other consumers for clothes that can be laundered safely at home. But this promise of easy care is an empty one unless you can count on *complete* washability. And that means a water and stain repellent that lasts through repeated washings—"ZELAN" durable water repellent.

So whenever you buy washable outerwear, look for the tag that means dependability—the tag that says the fabric has been treated with Du Pont "ZELAN".



DU PONT

ZELAN

REG. U. S. PAT. OFF.

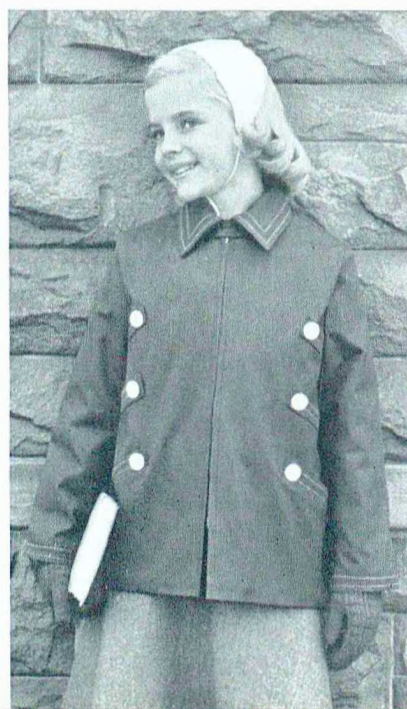
durable water repellent



REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Easy care is combined with good looks in this collection of washable coats, all treated with "Zelan" durable water repellent.



OUR COVER

A good deal of space in this issue is devoted to something you can't see, smell, taste or feel. We're talking about "Freon" fluorinated hydrocarbon refrigerants and propellants. This being the 25th anniversary year of "Freon", it seems particularly fitting that we should feature its uses in the *Magazine*. As a result, you'll find an article on the human benefits of industrial air conditioning, another on aerosol products, and a brief history of "Freon" itself.

When it came time to design the cover, we quickly agreed that we wanted to show "Freon". Here, however, we bumped squarely into the problem of portraying a substance that is all but imperceptible. Ideas for a design turned out to be almost as elusive as "Freon" itself. Summer advanced, and as temperatures crept upward, we decided that a cover based upon air conditioning would keep everyone cool. It worked for us—and we hope for you.

Meanwhile we got news that the Du Pont Company is investing a half million dollars in the not-so-invisible but positive future of "Freon". The money is being spent on a new sales service laboratory near Wilmington where chemists will try to learn more about "Freon" and its applications in refrigeration, aerosols, plastics and other fields. Some of the researchers will be loading aerosol cans, some operating experimental cooling units, and others searching for new ways to use and handle a versatile product that doesn't need to be seen to be appreciated.

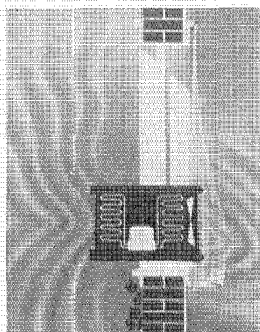


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ONWARD and UPWARD DEPT.

Nobody—well, hardly anybody—can be unconcerned about getting along with his boss. Along this line, Henry B. du Pont, a vice-president of the Du Pont Company, offered the following suggestions in a recent speech to college graduates:

"Take the job nobody else wants to do . . . the employe who will undertake what needs doing, and do it cheerfully, is bound to make a hit with any boss.

"What you can give is more important to you in the long run than what you can get . . .

"What you can hear is often more important than what you can say . . . a man who will listen, who will inform himself, who will learn, is the kind of man who is likely to register a hit with his superior under any circumstances.

"Set your own objectives . . . the American business system is founded on individual initiative, and there is constant need for individual initiative throughout its entire structure."

A PRESENT FOR DAVY

Ole Betsy, the rifle Davy Crockett unsung when he couldn't grin his opponents to death, once drew the admiration of Eleuthère Irénée du Pont, founder of our Company. Here's the story from *Life of David Crockett* published posthumously in 1865:

"Next morning, I was introduced to the great powdermaker, Mr. du Pont, who said to me that he had been examining my fine gun, and that he had wished to make me a present of half a dozen canisters of his best sportsman's powder. I thanked him and he went off, and in a short time returned with one dozen, nicely boxed up and directed to me."

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Please send your new address as promptly as possible so that you will not miss your copy.

Mail to: Editor, Du Pont Magazine
Wilmington 98, Del.

Send old address with the new, enclosing if possible your address label. Post offices will not forward this Magazine unless you provide extra postage.

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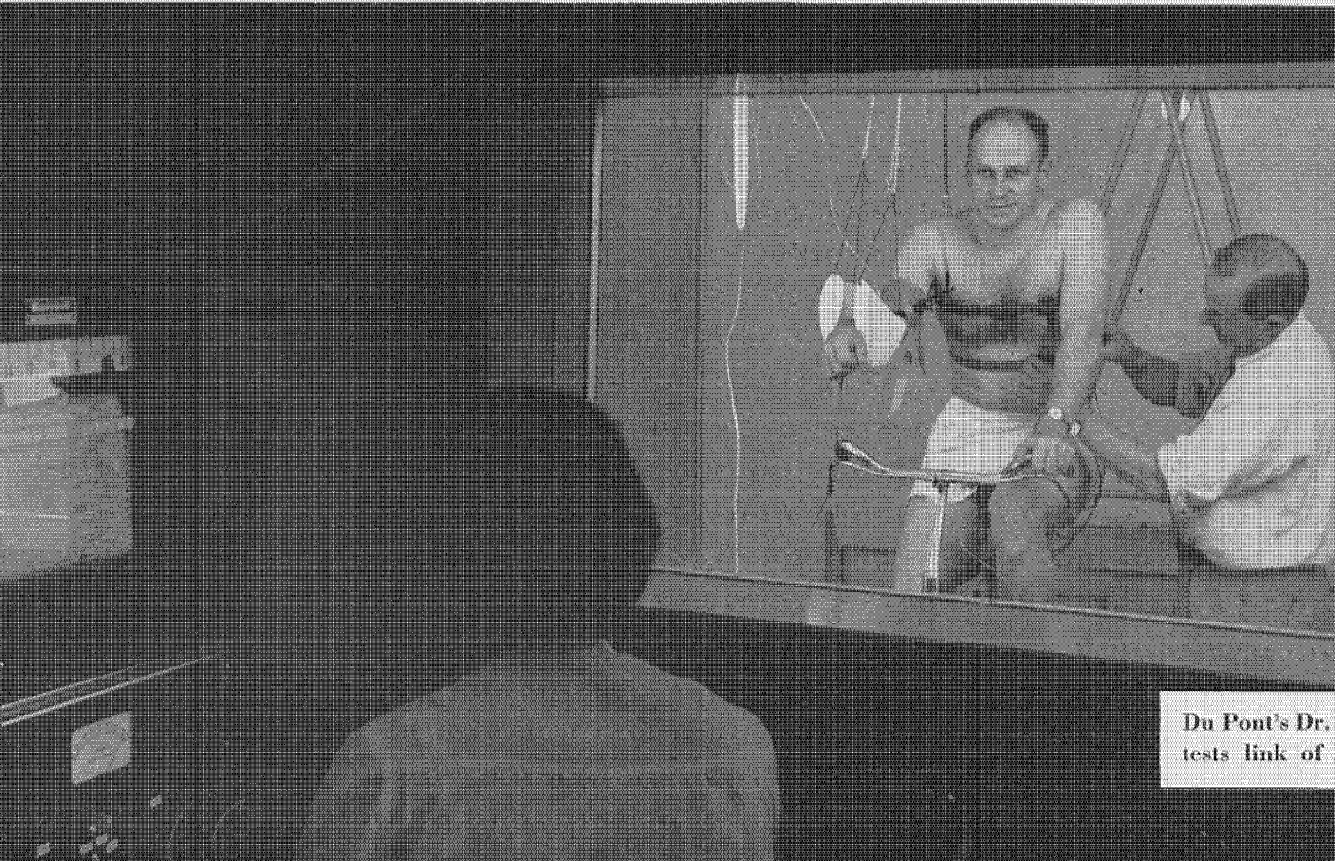
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JAMES H. McCORMICK
Editor

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Du Pont's Dr. Lucien A. Brouha tests link of heat and fatigue.

Taking the heat off industrial workers

*New studies show how air conditioning, even on a partial scale, pays off
in terms of higher production and healthier employees*

By EMILY HEINE

In the eighth century, the Caliph Mahdi of Baghdad cooled his palace by packing snow into the space between its double walls. For the next 1,100 years air conditioning remained the property of such privileged citizens.

Today, air conditioning has descended from the throne to become a necessary comfort to most of us. But while we've been learning, since the 1930s, to expect it in public buildings and to want it in our homes, most of us still consider air conditioning less than essential.

In several modern industries, on the other hand, air conditioning has long since proved its dollar value for keeping materials and machines in good working order. We reported on some new uses in our June-July 1954 issue. But only recently has anyone in industry paid much attention to the potential help air conditioning offers the third "m" of production—men.

One person who is paying attention is Dr. Lucien A. Brouha of the Du Pont Company's Haskell Laboratory for Toxicology and Industrial Medicine. For the last ten years he has been studying the effects of high working temperatures on men. His goal is to reduce stress and fatigue and thus to promote better health.

One highly effective way of preventing fatigue among industrial workers, Dr. Brouha believes, is through air conditioning. Moreover, even measured solely in terms of human comfort, industrial air conditioning saves money, he says. And he has some convincing statistics to back him up.

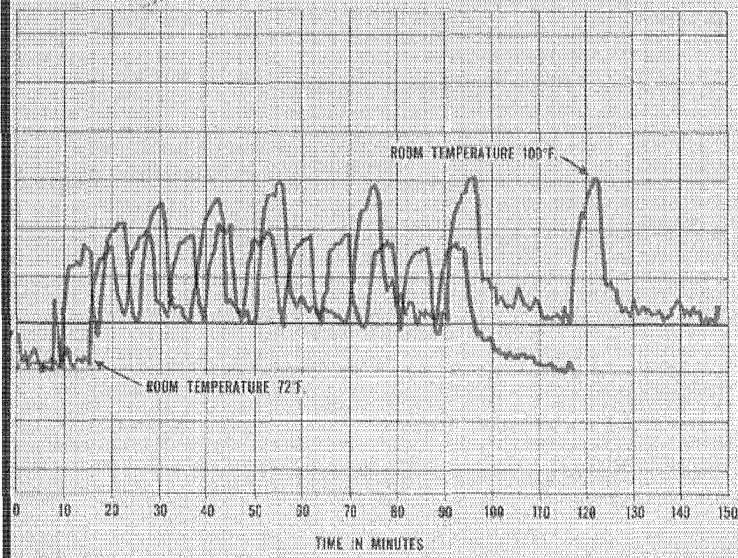
Comes the obvious objection: "But our buildings can't be air conditioned." There's a way around even that difficulty. When it's not feasible to air condition an entire plant, Dr. Brouha suggests giving workers short rest periods in air-conditioned "recovery rooms" several times a day.

Such rooms, he says, are particularly needed in the so-called "hot industries," like metal making, where men work in temperatures as high as 150°F.

The Aluminum Company of Canada Ltd. installed air-conditioned recovery rooms in several of its smelting plants in 1946. Dr. Brouha ran tests to compare fatigue of workers who rested in these rooms with fatigue of men who rested in the plant or outside in the shade.

In a typical study, the average heart rate of men after three minutes rest in the air-conditioned room was 97 beats a minute. Average for men who rested in the shade was 109 beats a minute, close to what Dr. Brouha calls

The higher the temperature in the work area, the more likely you are to get overtired. Rapid heart rates indicate fatigue.



▲ When a man rides a bicycle, resting at five-minute intervals, in room temperature 72°F., a graph of his heart rate is much like the blue line above. If the room is 100°F., heart rate leaps upward (red line). Recovery heart rate of 110 a minute hits fatigue zone.

In most "hot" industries, such as steel making (right), it would be impracticable to air condition the entire work area. To protect men from fatigue caused by exposure to very high temperatures, Dr. Brouha suggests installing air-conditioned "recovery rooms" where workers can take several brief rests during the day. This reduces stress.

the alarm level. When his heart is still beating about 110 times a minute after a minute of rest, a man is likely to complain about being tired. He has reached the alarm level. But fatigue control should start long before this point is reached, Dr. Brouha says.

In his studies, now being carried on and expanded for Du Pont, Dr. Brouha has collected data which show that air conditioning, even on a partial scale, represents a good investment for industrial plants.

The Aluminum Company of Canada reported a sharp drop in absenteeism and rate of turnover among employees after the air-conditioned rooms were used. And production increases alone soon far outweighed the total over-all cost of the installation.

MEN SPEND PHYSIOLOGICAL CAPITAL

A man, as Dr. Brouha looks at him, owns a "physiological capital" which he spends as he works. When he works too hard and too long without a rest, he is forced into debt. In physiological terms, a man gets progressively fatigued when certain bodily functions—like heart rate, blood pressure and oxygen consumption—do not return to their lower level after each work period.

The reason air conditioning can make a difference in



workers' well being and production is that a direct connection exists between heat and fatigue. All of us are well aware that we seem to tire more quickly when we work in a warm environment than in a cooler one. This is true, physiologists tell us, because working in high temperatures produces more stress than working in a cooler environment does. Therefore, fatigue appears sooner. If we stay in surroundings with a temperature above 90°F., our bodies do not return to their lower physiological levels even when we rest.

When we are too tired, we work slower and with more effort, yet make more mistakes. In industry, fatigued workers are a safety hazard to themselves and others. They wreck the teamwork so essential to smooth-running

high temperatures. Therefore Dr. Brouha checks physiological stress of men under working conditions in various Du Pont plants before suggesting how long and how frequent rests should be.

There are other environmental handicaps besides high temperatures. "Taint the heat, it's the humidity" is still a valid observation. Here again air conditioning can help. When workers rest in the dry atmosphere of air-conditioned rooms, their comfort is increased and they recover faster and more fully.

Recovery rooms are not the only form of partial air conditioning that has proved effective in industry. At several Du Pont plants, particularly in warmer regions, portions of the work areas are air conditioned both to

improve operations and maintain product quality. Dr. Brouha's studies of men from these plants show that, in addition, cooler working conditions help protect workers' health. There is less evidence of physiological stress among men who work in relatively cool climates or in air-conditioned buildings than among men who work in high temperatures and humidities.

Air conditioning was included in the designs for buildings at one of Du Pont's new plants which began operating a couple of years ago. Originally the air conditioning was intended to control humidity. Temperatures were kept about ten degrees below those outside.

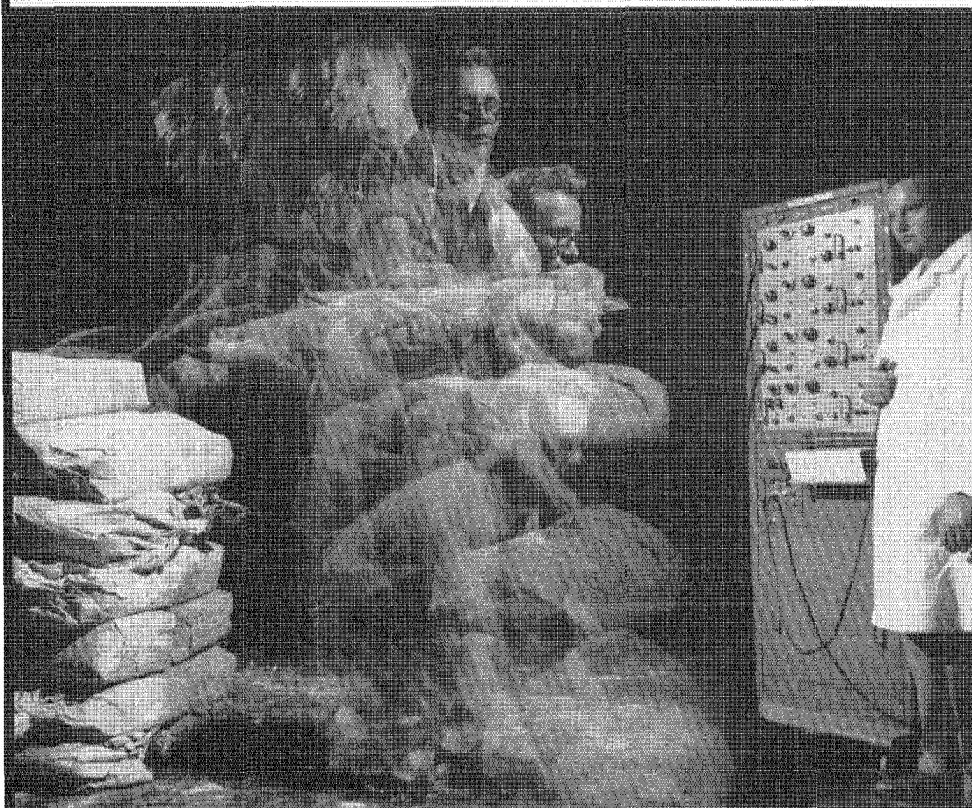
Largely on the basis of Dr. Brouha's recommendations, engineers and plant managers decided to try keeping temperatures near 70°F., even when outside temperatures were 20 to 25° higher. The same humidity level was kept. Results, after nearly two years, have been highly satisfactory.

In many industries—textile manufacture, for example—it's possible and practicable to air condition entire buildings. In industries where air conditioning is gaining acceptance as a product improver, studies of health records could be expected to show that workers are benefiting, too. In fact, advantages in terms of employees' health and morale may well become a big plus value of air conditioning.

One of the most widely believed ideas about air conditioning is that our bodies suffer if we go back and forth between cool areas and much warmer ones. Dr. Brouha's studies effectively discount this belief. Medical histories of several thousand workers who were involved in fatigue studies show no ill effects from sudden temperature changes. University of Illinois scientists reached a similar conclusion after performing tests with both normal persons and cardiac patients.

But in the end, physiological data can only tell part of the story of air conditioning. The benefits in terms of how much better a man feels are no less real because they are intangible.

As Dr. Brouha says, "It is still true for many men that they earn their food by the sweat of their brows. But today sweat can be controlled and stress held within healthy and safe physiological limits."



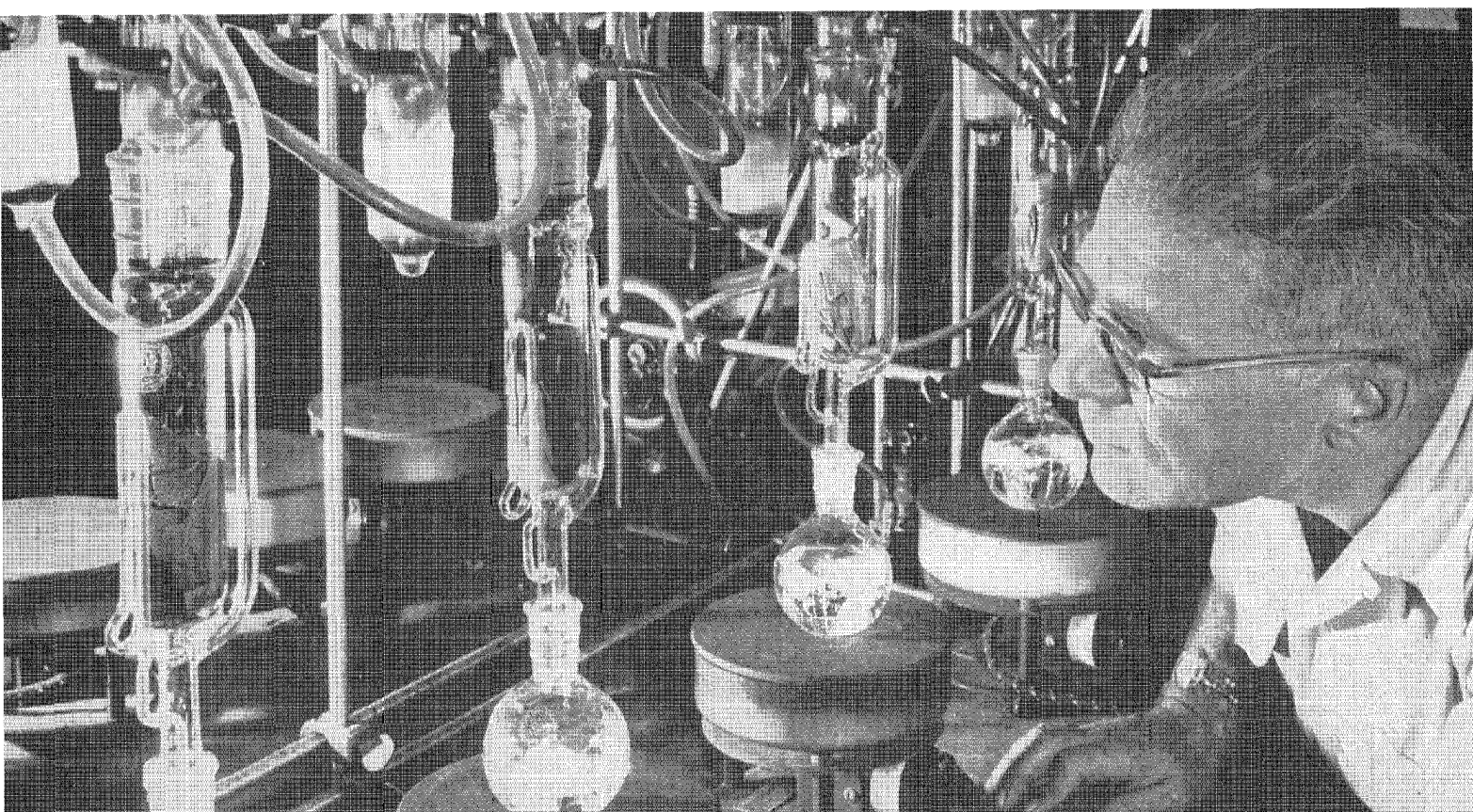
Unusual device called a Luru Platform, one of only two in the world, helps Dr. Brouha measure how much energy it takes to perform a task.

production lines. The goods they spoil reduce profits or make it necessary to raise prices. From the human standpoint, these workers are likely to be unhappy because they are overtired. And eventually their health as well as their morale may be affected.

In Dr. Brouha's laboratory, a young assistant sits quietly while a recording machine traces his heart rate. The assistant has just finished five minutes' pumping on a stationary bicycle. The length of time it takes for his heart rate to return to normal is a convenient measure of the physiological cost of such work to him.

From data collected in such experiments as well as in industrial situations, Dr. Brouha can judge work loads and heat loads that produce fatigue.

Individuals vary widely in their ability to withstand



Checking plasticizer in samples of vinyl sheeting. Du Pont adipic acid is an important ingredient in plasticizers for vinyl plastics.

Rising chemical stars

Du Pont's Polychemicals Dept., after a recent look at its catalog of chemicals, tagged three as most likely to make sizable gains in the next few years. They are adipic acid, "Hexalin" cyclohexanol and "Hytrol" O cyclohexanone.

Adipic, "Hexalin" and "Hytrol" O have been derived from coal tar for years, but their swing into prominence waited for the magic of nylon. Once used principally as chemical intermediates in the manufacture of "Zytel" nylon resin and nylon yarn, they are now full-fledged members in their own right of Du Pont's chemical family.

KEY USES IN PLASTICS

Take adipic acid, for example. Nearly every major enterprise has some potential use for this white crystalline acid. Key uses are in the field of plastics, for making plasticizers for vinyls and other synthetic resins. The chemical industry uses adipic for synthesizing such compounds as salts, esters, amides, nitriles, diamines, glycols and ketones. The acid serves the electrical field as an intermediate for electrical insulation resins. The aviation industry is indebted to the acid, too, as it is used in making ester lubes as well as sealing and caulking compounds for fuel tanks.

"Hexalin" cyclohexanol is technically defined as a cyclic aliphatic secondary alcohol. "Hexalin" has been used

to make plasticizers, as a stabilizer and homogenizer for soap and detergent emulsions; as a solvent for a sizable list of products including oils and waxes, dyes, lacquers, shellacs and varnishes; as an intermediate for petroleum additives; and an ingredient in dry cleaning fluid.

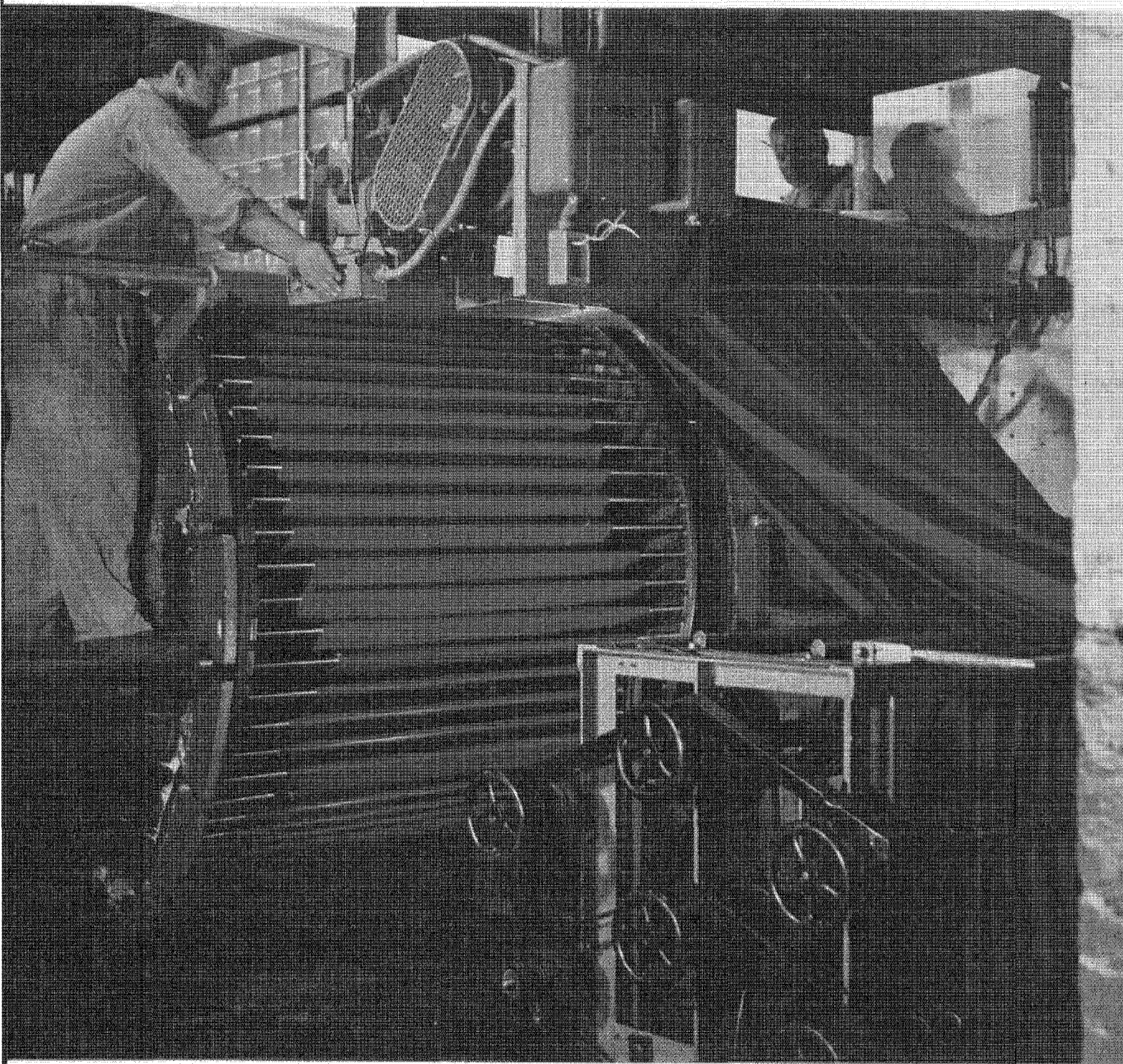
The third of this promising trio, "Hytrol" O cyclohexanone, is another water-white liquid. "Hytrol" O is, first and foremost, a strong solvent. It has a high-boiling point and is valuable in making adhesives and as a thinner for finishes, especially those containing nitrocellulose or polyvinyl chloride and its copolymers.

HERE ARE OTHER POSSIBILITIES OF BROAD INTEREST

As often happens when a chemical is used steadily in a few major ways, lesser known applications are sometimes sidetracked. Adipic acid has the properties needed for many other jobs. For example, it is an intermediate for lubricating oil additives. "Hexalin" looks promising as a degreasing agent for a variety of such things as metal, leather and furs, and as a solvent in polishes. The possibilities of "Hytrol" O as a solvent alone have hardly been touched.

If any of these applications or other uses for these chemicals sound interesting, we will be glad to send you technical data to speed your work and studies.

"PRESSURE COOKING" SQUEEZES



Using new Du Pont colors like "Latyl" and "Sevron" dyes, pressure dyeing works well with full width fabrics of man-made fibers. Barotor pressure-dyeing machine (above) is in use at Waldrich Co.

COLOR INTO THE MAN-MADE FIBERS

Last time we mentioned the Barotor, this pressure dyeing machine was still in the laboratory.

Here's a report on its industrial debut

By GEORGE NEILSON

A few years ago, so the story goes, a new man-made fiber emerged from the laboratory and was turned over to Du Pont's Organic Chemicals Dept. "Find a way to dye it," the fiber men asked. To the chemists the challenge was too familiar. "Someday," one of them threatened, "we're going to invent a dye that won't stick to anything and tell those people to find a fiber it'll work on!"

The threat never had to be carried out. Eventually, the teamwork of dye specialist, textile chemist and mechanical engineer found a satisfactory way to dye this and other new fibers.

The difficulty was this: Most dyeing is done in water systems, yet one of the big advantages of synthetic fibers is that they *resist* water. Therefore, they do not readily accept dyes. Something was needed to make them more receptive.

One way around this obstacle is to use an expensive chemical carrier to help the fiber pick up the dye. Another way is to dye the fiber at temperatures above the boiling point of water in a pressure vessel.

This kind of pressure dyeing—much the same process as preparing your meals in a pressure cooker—works fine for yarns, since yarn-dyeing machines are readily adapted to it. But woven fabrics made of man-made fibers present a different problem, particularly where dark shades are desired. Dyers need a method of dyeing them in full width, without folding or tension which might make the dyeing job uneven. And machines normally used for fabric dyeing were not easily adapted to pressurization.

GREEKS HAVE WORDS FOR IT

The Du Pont Company, wishing to extend the usefulness of its new fibers, assigned mechanical engineer Paul Cole to the problem. His invention—the Barotor (from the Greek words *baros*, meaning pressure, and *rotor*, meaning to revolve) went into operation at Du Pont's Textile Fibers Laboratory in 1952. There its performance brought approving nods from the dyers. The next step was to see how it performed in commercial operation.

Du Pont, as it had done earlier with the pad-steam method for continuous dyeing of cotton, licensed several companies to make the Barotor on a non-royalty basis.

The first commercial installation of a machine was made at Waldrich Company, a commission dyer in Delawanna, N. J. For nearly two years the Waldrich Barotor has been working fine, mostly in dyeing fabrics of "Dacron" polyester fiber for use in dress goods and outdoor wear. Other companies, including two fabric manufacturers, report that Barotors installed in their plants save them up to seven cents a yard over the chemical carrier method of dyeing fabrics of "Dacron". In addition, it gives them improved dyeing quality.

The Barotor consists, in part, of a huge cylindrical autoclave. Inside is a cage of gleaming rods on which the full width of the fabric is loosely draped. Into the Barotor go hot water, wetting agent and dye solution. The temperature is raised to 250°F. and the cage revolves inside the autoclave at the rate of about two and a half times a minute. With each turn of the cage, the fabric advances a small distance without being under any tension. During the dyeing operation, and without interrupting it, operators use a special device to remove samples of the fabric for testing. When dyeing is completed, a scouring solution removes dyeing assistants and the small amount of unfixed color.

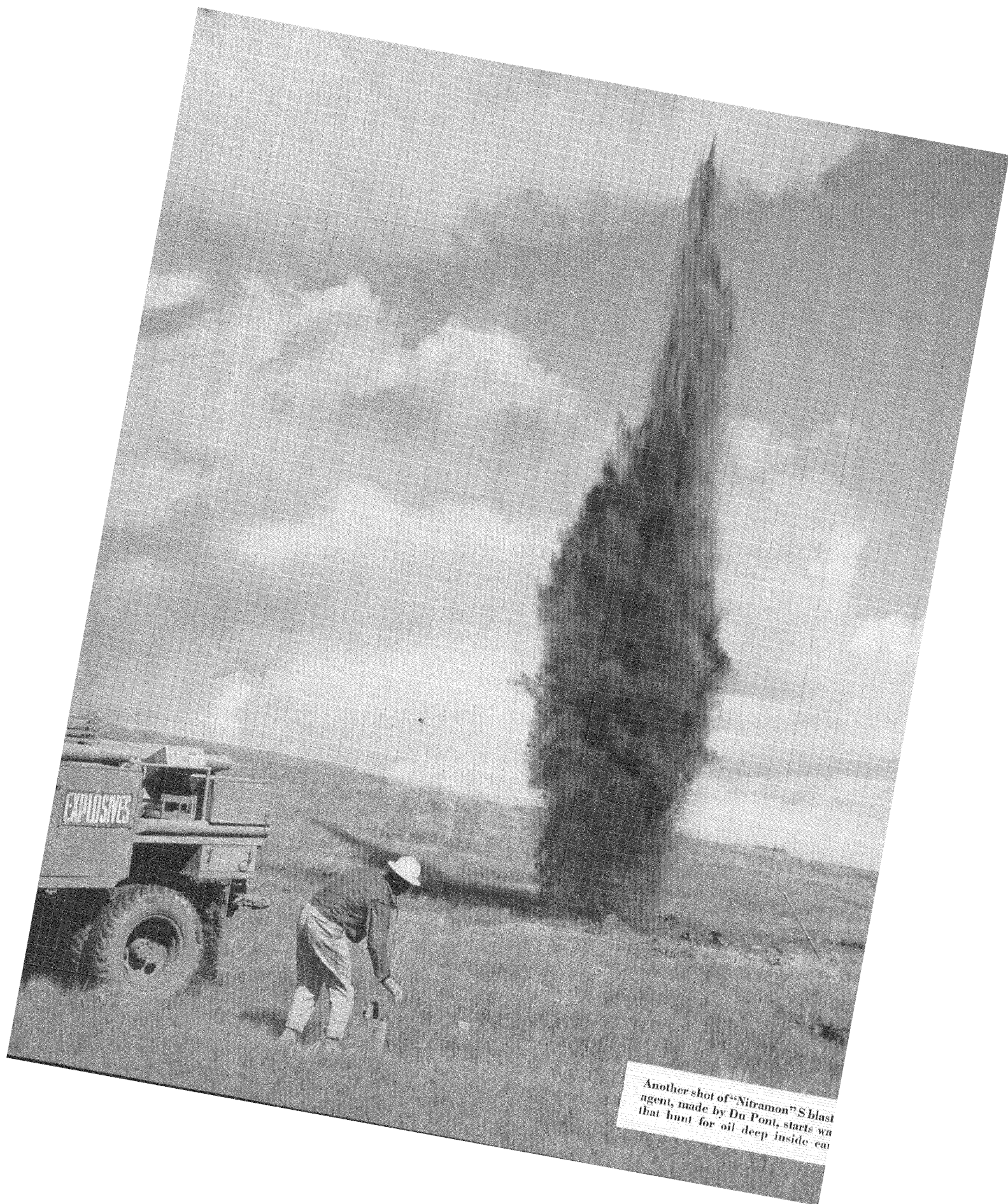
SHORT FIVE-HOUR CYCLE

The whole operation, including loading, dyeing, scouring and unloading, takes about five hours. The average load is about 1,000 yards of fabric. While two men are required to operate a Barotor, they can run several machines simultaneously without difficulty because of the operating cycle.

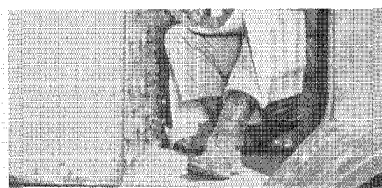
Major modifications in the Barotor have not been necessary since early development days. One flaw that did show up was the excess friction between the ends of the bars and the slots they ride in. The use of "Teflon" tetrafluoroethylene resin in the bushings solved that.

Although used mostly in dyeing fabrics of "Dacron" so far, the Barotor and other pressure dyeing machines are successful with a variety of other fibers, alone or in blends. Du Pont "Latyl" dyes, developed especially for fabrics of "Dacron", work fine in the new machines and so do "Sevron" dyes for cloth of "Orlon" acrylic fiber. These newly developed colors give high light fastness and washing fastness. In addition to developing formulas for fabrics of one fiber, the Du Pont Dyes Division has worked out a range of formulas for pressure dyeing fabrics of man-made and natural fiber blends.

These new formulas and the rapid development of pressure dyeing techniques are helping the new fibers meet the dictates of fashion with a wider range of colors than ever before.



Another shot of "Nitramon" S blast agent, made by Du Pont, starts war that hunt for oil deep inside earth



Seismic crews are explorers whose job it is to open

New horizons 10,000 feet down

By J. R. SMUCKER, III

NEWTOWN, N. D.

Newtown, as its name implies, is young. It was born when the spreading Garrison Dam reservoir in central North Dakota forced the abandonment of two nearby villages.

In its short life, however, Newtown has seen a lot of excitement. Like the boomtowns of the nineteenth century, this village had no time for a placid babyhood. Before it reached the long pants stage, men found oil in the hills to the west. Today that search jars the countryside in both a literal and figurative sense.

The roar of trucks at 6 a.m. breaks the early morning silence of the little town. The 11 trucks, striking out for another day's work, belong to Stanolind Oil and Gas Company's Seismograph Party No. 3. On this particular day the 16 men will continue the quest for oil in a small section of the vast Williston Basin.

The basin covers a major portion of North and South Dakota, eastern Montana, and southern Saskatchewan and Manitoba, Canada. It is one of the largest geologic basins not yet fully explored for oil.

Oil exploration activity began here in the 1920s. No concentrated search, however, was made until after the spring of 1951 when the first producing well was drilled near Tioga, N. D.

Then some 20 major oil companies and many more independent operators flooded the basin with seismograph crews, landmen, geologists, drilling crews and petroleum engineers. The landmen leased tracts of land from farmers and ranchers. Next, the geologists and seismologists surveyed the country to determine likely drilling sites. The drilling crews followed, sinking holes as deep as 10,000 feet to find the pay zone. If drilling proved successful, petroleum engineers set the limits of the field and maximum allowable production per well in order to prolong the life of the field. Today more than 500 wells are producing oil in North Dakota alone. Production is about 20,000 barrels a day.

Stanolind's parent company, Standard Oil Company of Indiana, recently started operating a new 30,000 barrel a day oil refinery at Mandan, N. D. This refinery undoubtedly will cause an increase in oil exploration, drilling and production.

But let's drink our morning coffee and catch the last truck on its way to the field. What does a seismograph crew do? And how does this work fit in with the drilling of an oil well?

Heading out of Newtown, Party No. 3 turns west and crosses the Missouri River, entering the Fort Berthold

Indian Reservation. After jolting over 40 miles of rough ranch road, the crew reaches the work area. Only thick prairie grass covers the rolling hills.

200 FOOT HOLES TO "LISTEN" FOR OIL

With three truck-mounted drills, crew members begin drilling four-and-one-half inch holes 200 feet deep. These are strung out a quarter of a mile apart across the prairie. Meanwhile, the cable truck spreads seismic detection "jugs" at specified intervals between drill holes. Soon the shooting truck pulls up to the first hole and lowers about 25 pounds of Du Pont "Nitramon" S blasting agent to the bottom. Preparations for taking the first seismic record of the day are complete.

"Give me the first shot," Wayne Dixon, the recording truck operator, calls over the intercom.

"Ready, one, two, fire," shooter Hugh Guinn answers. He pushes the blasting machine plunger, detonating the shot. The shock wave generated by the explosion of "Nitramon" S runs through the earth. As it hits various geological formations, it bounces back to the surface detectors. The time it takes for this to happen is registered on photographic paper in the recording truck.

"'Nitramon' S really fits our need for a safe, easy-to-handle explosive for seismographic work," Hugh Guinn says. The "Nitramon" S and Du Pont SRN static-resistant caps, he believes, make an ideal charge for use in deep holes where water pressure must be overcome and dependability and accuracy are required.

Back in Newtown, the seismologist plots a cross section of the geologic formations from the times that elapse before various shock waves return to the surface. By combining a number of records, he draws a contour map showing the likelihood of oil-bearing structures many thousands of feet below the surface.

MANY RIBS No. 1

As a direct result of such records, the party's company drilled New Year Many Ribs No. 1 oil well. This well shares its colorful name with the Indian on whose property it is located. The second well in the Sanish Field, it was drilled to pinpoint one of the extremities of the area.

The Stanolind crew will come in this evening hot and tired after a full day under the blazing North Dakota sun. But their job is not without satisfactions. They share in the excitement that always walks with explorers. And they know, too, that their part is a vital one in opening new oil fields. Again early tomorrow morning Stanolind Party No. 3 will leave Newtown to continue its search.

"Dacron" on duty

*Du Pont's polyester fiber improves appearance
and comfort of uniforms*

Men and women who work in uniforms have a particular reason for dreading the hot days of summer.

Uniform fabrics are usually made in heavy weights because these wear better and are less likely to muss than lighter weight fabrics. In warm weather, however, most wearers find such heavy uniforms just plain uncomfortable.

A few years ago, uniform manufacturers started watching with growing interest the popularity of men's suits containing "Dacron" polyester fiber. Addition of high percentages of the Du Pont fiber, they learned, can greatly improve the appearance, comfort and serviceability of garments. They found, too, that fabrics which are at least 50 per cent "Dacron" resist wrinkling, hold their shape and tailor well.

Manufacturers began selling uniforms of "Dacron" and wool about three years ago. Many users have now had time to evaluate long-run performance. For this report we checked with police, firemen, railroad conductors, stewardesses, bank guards and others who are wearing uniforms of "Dacron" and wool.

All of these users are enthusiastic about the way "Dacron" improves uniforms. Wrinkle resistance is mentioned often. This means that less pressing is needed and maintenance costs are cut. Many men note that the uniforms take rough wear well. Others are especially pleased with the hot-weather comfort of these lighter weight uniforms.

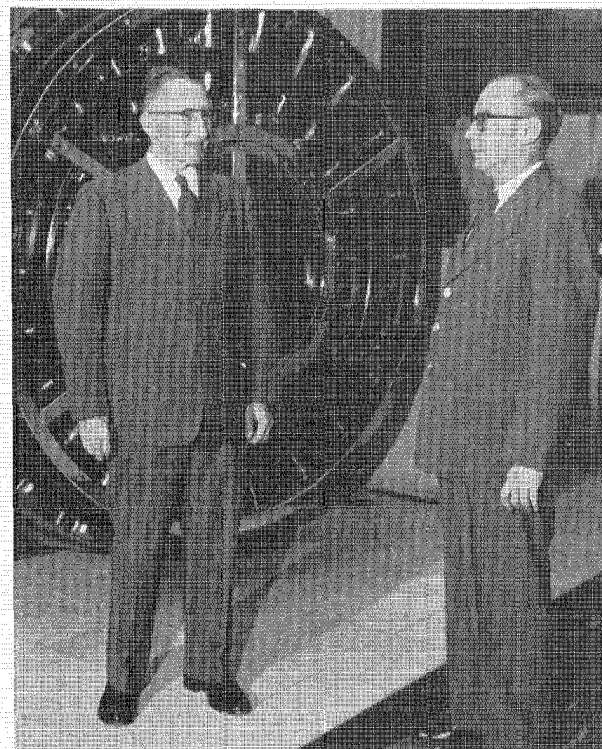
H. N. Kirkman, Director of the Florida Department of Public Safety, reports that uniforms of "Dacron" and wool worn by state troopers stay neat with a minimum of care. "If the men get caught in the rain," he says, "the uniforms dry and retain their shape instead of getting baggy."

The city of Columbia, S. C., likes uniforms of "Dacron" and wool well enough to outfit its police, firemen, water meter readers and parking meter collectors and repairmen in them.

"Dacron" is also effective when substantial amounts are blended with fibers other than wool. Service station dealers of Socony Mobil Oil Company, Inc., are well pleased both with the looks and also with the easy maintenance of their new business clothes of 65 per cent "Dacron" and 35 per cent rayon.



U.S. Navy officers are authorized to wear optional uniforms containing "Dacron" (above), as are men of the Air Force and Marine Corps.



Guards at Girard Trust Corn Exchange Bank in Philadelphia have worn uniforms of "Dacron" and wool for three summers, like the comfort.



On advice of Tina Leser, Northwest Airlines stewardesses wear suits of 55% "Dacron" and 45% wool.



Servicemen for the Automatic Canteen Co. of America praise sturdiness of their uniforms of "Dacron" and wool.



Police in Columbia, S. C., and elsewhere find uniforms of "Dacron" and wool are comfortable as well as easy to keep neat, even in rainy or hot weather.



Uniforms of "Dacron" and wool in two weights keep Illinois Central conductors trim all year around.



Uniforms of "Dacron" and wool which dry without losing their shape make a hit with Columbia, S. C., firemen.



Business clothes of 65% "Dacron" and 35% rayon are worn by Mobilgas service station dealers. Company chose fabric after extensive wear testing by men.

TEN OF THE MOST POPULAR TASKS
ASSIGNED USED TOOTHBRUSHES

- to clean, polish and brush shoes
- to clean jewelry, especially rings
- to clean the typewriter
- to clean motor and engine parts
- to clean stoves, especially gas burners
- to clean tools
- to remove stains
- for spatter painting
- to clean bathroom and kitchen fixtures
- to clean between household tiles

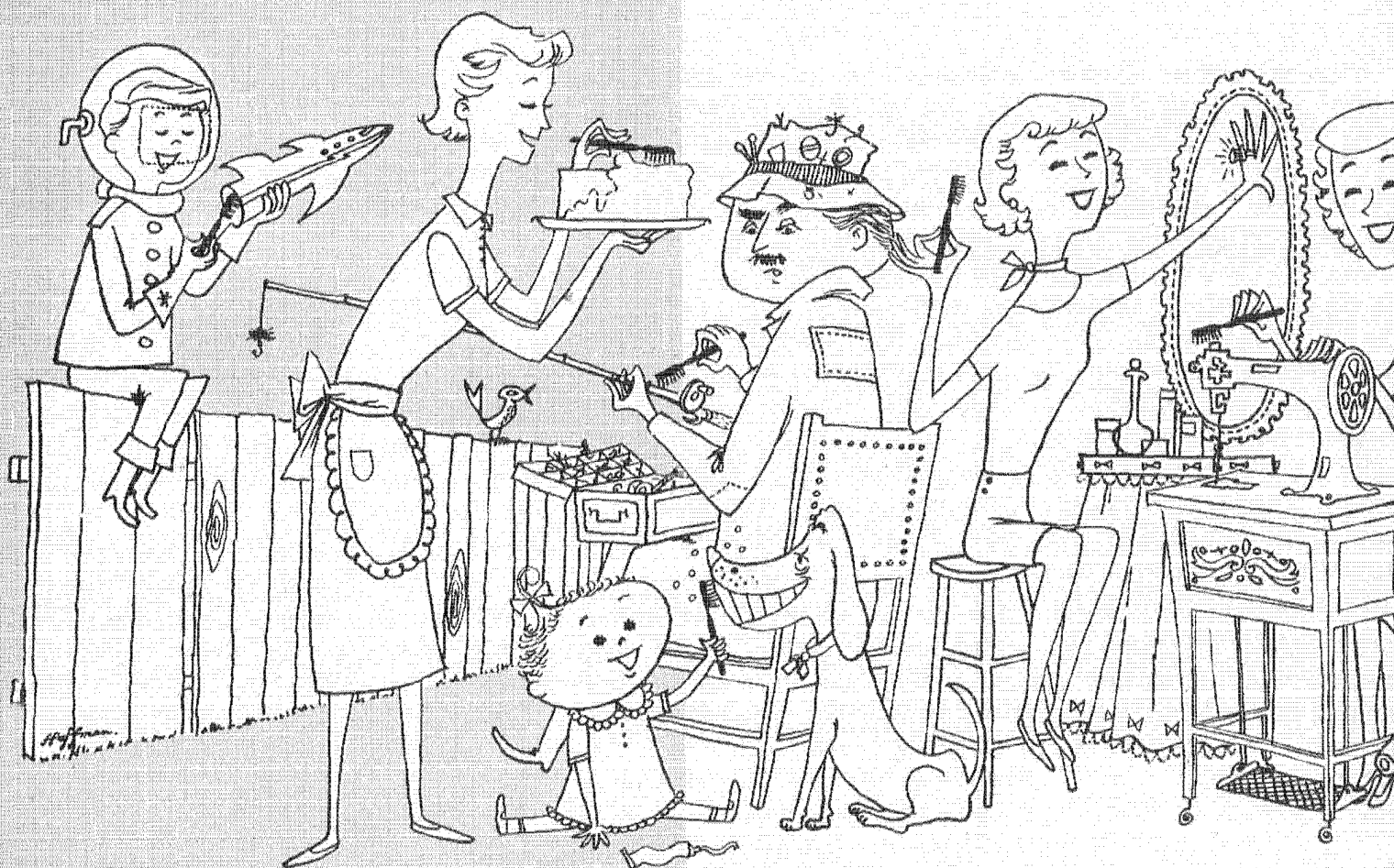
Spare tha

Even an all-nylon Du Pont toothbrush wears out eventually. But there are 200-odd good reasons why it shouldn't go in the bathroom wastebasket

Seems that we've been grossly unimaginative about those used toothbrushes we've been giving the old heave-ho.

According to a recent survey among a group of our readers, toothbrushes have barely begun their careers when their dental chores are over. Two hundred and sixty industrious souls all over the country replied to our question, "What do you do with old toothbrushes?" They suggested a total of 222 different jobs to which they have applied their bathroom outcasts.

Many persons listed more than ten uses. Most-mentioned were an amazing variety of cleaning and applying tasks. As we expected, shoe cleaning led the list with 128 mentions; jewelry maintenance came second with 83.



toothbrush

Not in the top ten but often given were the cleaning of fixtures, gun parts, files, eyeglass rims, fishing tackle, electric razors, bicycle parts, golf clubs and leather articles.

Housewives also mentioned cleaning toasters, sewing machines, window corners, picture frames and mortar between tiles.

Hobbyists find toothbrushes useful for sprucing up their collections of coins, stones, shells and antique salt shakers, aquaria, model railroad tracks and flower bulbs.

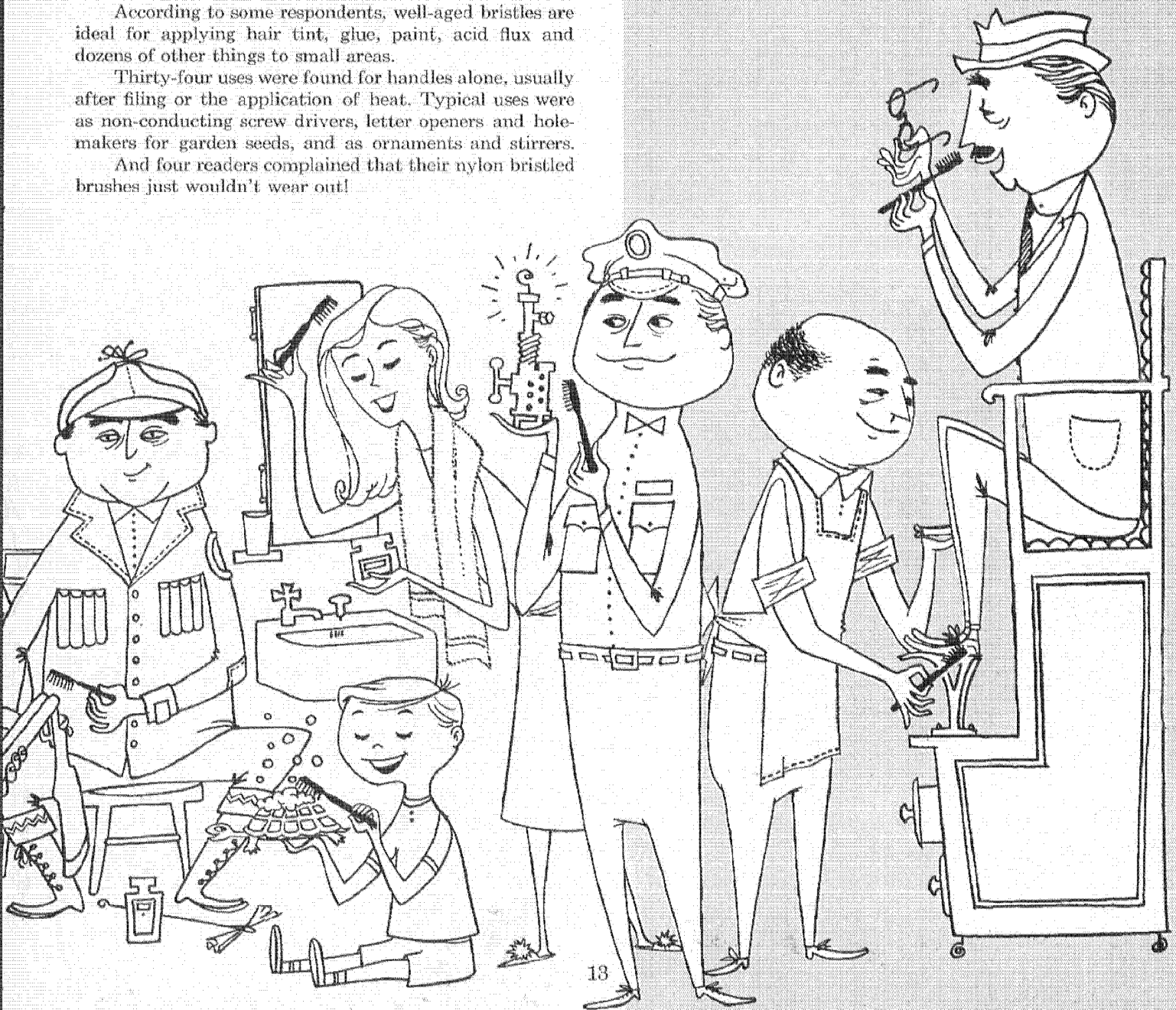
Hunters oil their boots with the brushes, and artists have a variety of specialized uses for them.

According to some respondents, well-aged bristles are ideal for applying hair tint, glue, paint, acid flux and dozens of other things to small areas.

Thirty-four uses were found for handles alone, usually after filing or the application of heat. Typical uses were as non-conducting screw drivers, letter openers and hole-makers for garden seeds, and as ornaments and stirrers.

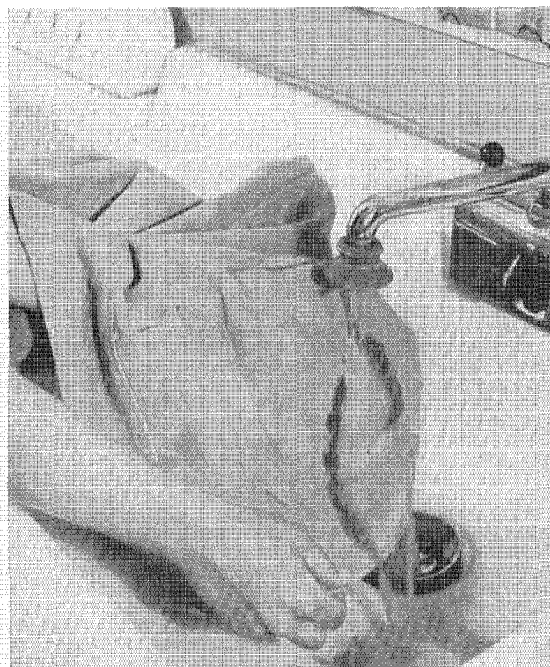
And four readers complained that their nylon bristled brushes just wouldn't wear out!

- to scour pet turtle's back
- to clean mousetraps
- to apply wax or dye to mustache
- to brush silk from corn
- to clean gum off bedposts
- to brush dog's teeth
- to apply ink to stamp pad
- to smooth frosting on cakes
- (Bristles alone)—as cat's whiskers on greeting cards
- (Handles alone)—flint chipper in making stone arrowheads





Model shudders at thought of squirting ketchup on suede jacket in kitchen test.



Worry was needless. Water flushes most foods off suede treated with "Quilon".



Coat is easily blotted dry because sued treated with "Quilon" is water resistan

Here's a further report on "Quilon" for suede leather, a chemical treatment that's

Giving suede a new face

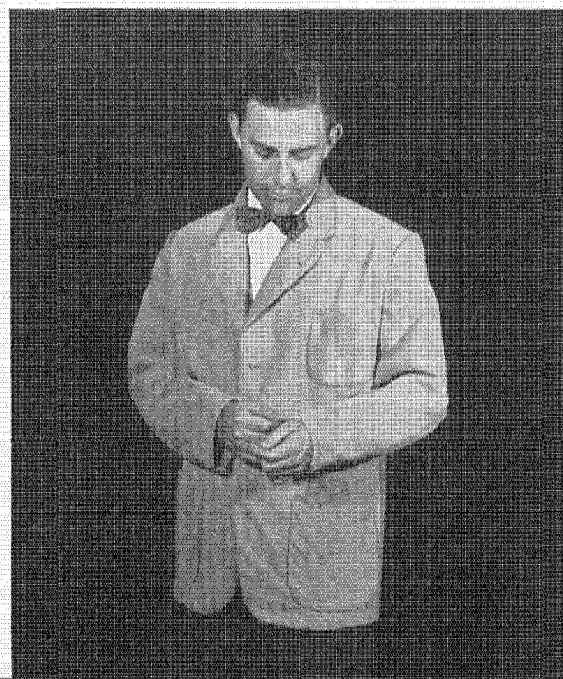
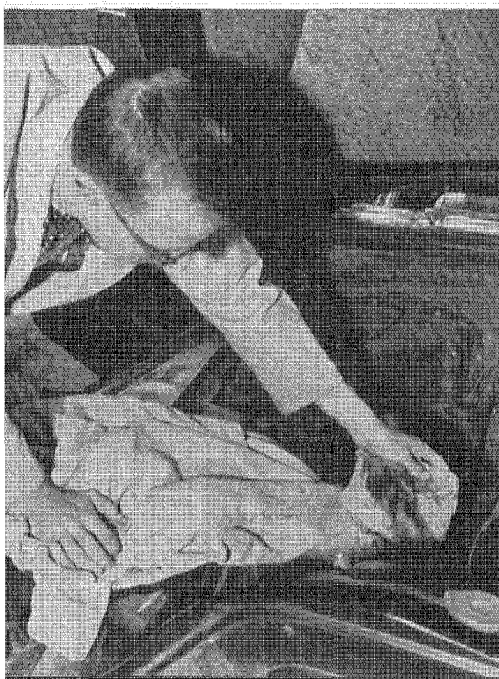
By DONALD G. FERTMAN

The pretty model grimaced. "I really haven't the heart to do it!" she said.

On the kitchen table before her lay a beautiful new suede jacket. The young lady had just been handed a bottle of ketchup and told to dump it on the front of the coat.

"It'll never look the same," she protested, reluctantly following instructions.

On this assignment, we were documenting with a camera what we knew other people also would find hard to believe: the fact that today suede leather actually can be easy to care for.



Wiping engine block with suede jacket is cruel and unusual punishment. Dry cleaning took grease out, however, because the leather had been treated with "Quilon".



Relieved model smiles as she finds jacket good as new following simple home-care job.

A year and a half ago we reported here in the *Magazine* that "Quilon" chrome complex was exciting interest in the leather industry as a treatment for sheepskin suede. That's because "Quilon", we stated, left suede water-resistant, stain-resistant and dry cleanable.

Now well out of the development stage, the Du Pont chemical is big news in the suede industry. This fall department stores and specialty shops will feature suede treated with "Quilon" in high fashion apparel for both men and women.

Heretofore suede, long recognized for its luxuriousness and natural beauty, just hasn't been practical. If

you've ever owned a suede jacket, coat or vest, you know its weakness. It soaks up rain and develops water spots. Anything spilled on it stains and streaks. Dry cleaning has been a major undertaking. Only a few cleaners were willing to touch suede because it required special techniques and extra steps. And even those who would clean it could scarcely guarantee success. It has come back too often with its original texture gone, the leather dry and stiffened, and the color ruined.

NOW A PRACTICAL LUXURY

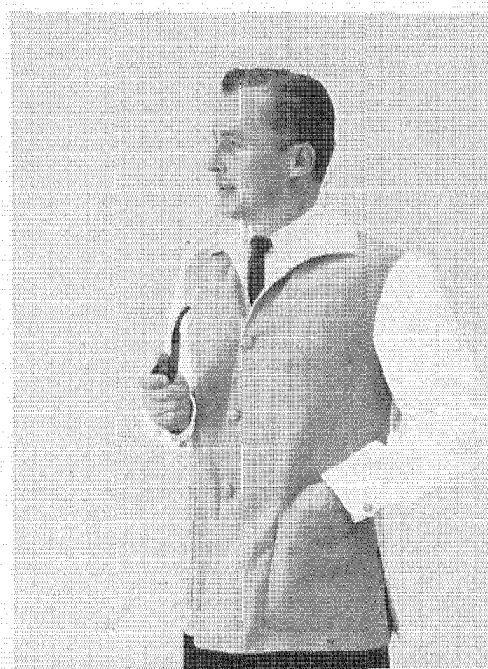
Suede is still a luxury, but a practical one when it's treated with "Quilon". This is what we set out to prove when we asked our model to dump ketchup on the jacket. After the ketchup treatment, we guided her through the simple steps it takes to remove such staining materials from treated suede. The pictures here show you why she was convinced.

These same steps can be followed to take off spots left by coffee, ice cream, chocolate sirup, mustard, beer and many other substances. Only the most stubborn materials, like lubricating grease, butter, olive oil and tar, require dry cleaning. But it's a simple matter to dry clean suede treated with "Quilon". Ordinary commercial methods work well and the garment can be cleaned again and again without harm.

Stanley E. Crewe, superintendent of dry cleaning at the Associated Wilmington (Del.) Laundries, reports, "'Quilon' has revolutionized the whole idea of suede dry cleaning. There's no reason why any competent dry cleaner can't handle the treated suede with excellent results if he will just rinse it thoroughly to remove any soap remaining after the usual dry-cleaning cycle."

Crewe, like our model, was skeptical at first. But now he has dry cleaned a number of suede jackets treated with the Du Pont chemical. One jacket, cleaned six times, has remained as soft and supple as it was when brand new. Even the original color is still in top condition. Such attributes, you'll agree, certainly have given suede a new face.

Smart new garments are both practical and luxurious, now that "Quilon" makes suede easy to keep clean.



They don't look very fancy, but these *Magazine-size* sheets of coated cardboard are powerful agents in

Harnessing the x-ray

The light of Thomas Edison's genius fell on many an uncharted area in the realm of science. One of the least known, although certainly not the least important, of his contributions greatly increased the usefulness of the x-ray.

Wilhelm Konrad Röntgen discovered x-rays in 1895 as he performed an experiment with electricity. In his darkened laboratory he suddenly saw some nearby crystals fluorescing brightly and realized that he had found a new phenomenon. Scientists quickly recognized the potential importance of the x-ray. In 1896 Edison started a search for a luminescent chemical that would aid in putting it to work. After testing some 1,800 materials, he decided calcium tungstate was best. Today that compound and others are a standard part of x-ray equipment. Similar phosphors are used in your television picture tube.

For use in x-ray equipment, these chemicals are coated on sheets of cardboard to make what are called intensifying screens. The screens convert the invisible x-rays into fluorescent light. In this way, they expose the film more completely than the x-rays alone could. Exposure time to the rays is cut to split-seconds, where otherwise minutes might be needed. Without these screens it would be almost impossible to make the x-ray pictures that greatly aid in medical diagnosis and treatment.

INTENSIFYING SCREENS WELL HIDDEN

Even if you've been x-rayed, you've probably never seen a pair of intensifying screens. They are hidden inside the metal film holder or cassette, where they form a sort of sandwich with x-ray film as the filling.

While intensifying screens are essential, no one type fits every situation. Sometimes an x-ray picture with extremely fine detail is necessary. In other cases, some detail can be sacrificed to shorten what might otherwise be too long an x-ray exposure.

To meet varying demands, over a period of many years Du Pont has developed three different speeds of screens. Company research chemists learned, however, that even these didn't cover the field completely. For example, the user of small, low-powered equipment often didn't get good films because his machine simply wasn't powerful enough unless a long x-ray exposure could be used. This, in turn, was often impossible.

To fill the gap, Du Pont has developed the new

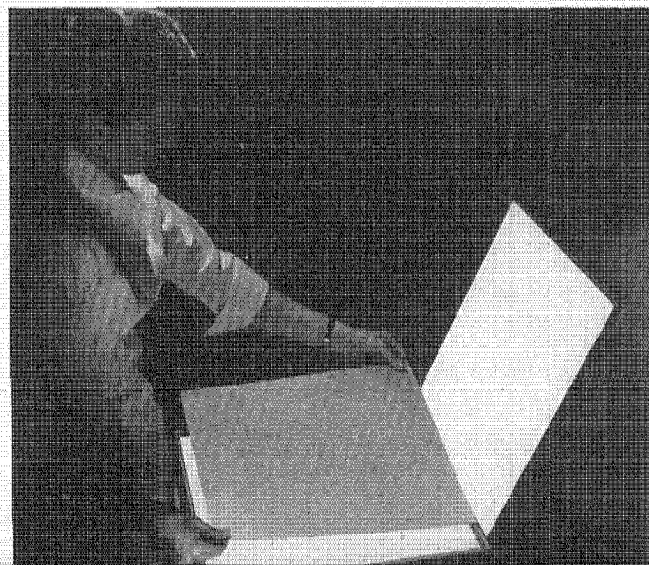
"Patterson" Lightning Special intensifying screen. It is intended to supplement rather than to replace Du Pont's present intensifying screens: the Par Speed, the Hi-Speed and the Detail. The fastest screen available, the Lightning Special is designed for exceptional situations where speed of exposure is the principal requirement.

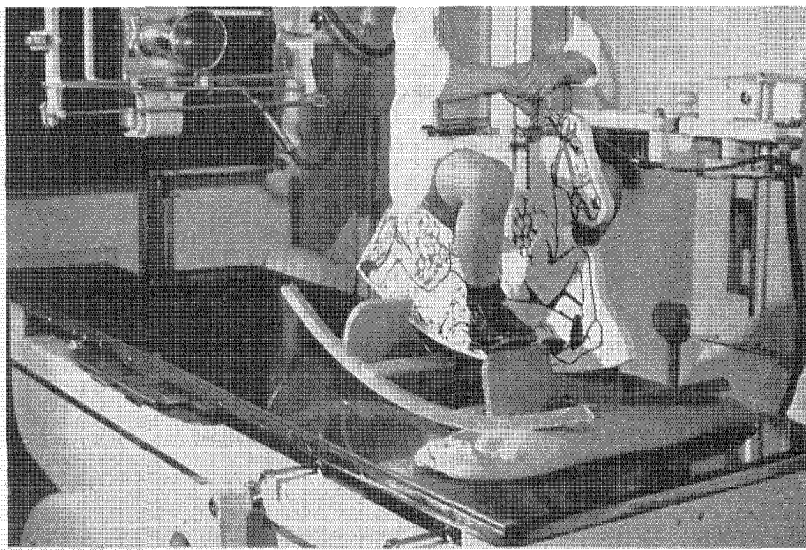
Such an exceptional case was that of a 225-pound woman who fell and broke her hip. She faced a long and tedious operation to pin the bones into proper positions. X-ray technicians, called in to make radiographs, had their difficulties, too. It's hard even with high-powered equipment to get a clear radiograph through layers of fat. With the small, portable equipment used in operating rooms, the problem is made still worse. Here, then, was a case made to order for the Lightning Special, and with its help the technicians successfully got around their double trouble: the obese patient and the low-powered equipment.

But that wasn't the end of the new screen's usefulness in this particular case. By deliberately over-exposing the film, the technicians were able to cut developing time and furnish doctors with wet radiographs in only two minutes.

An exceptional case, it's true. But medicine has a good many of those. Situations, of course, do not have to be so dramatic. A good many doctors, particularly those in general practice, own small equipment. So do veterinarians. The Lightning Special gives these men a chance to get better radiographs than before because the new screen doubles the effective milliamperage output of the smaller x-ray machines. Motion—whether of animals or of children who won't hold still, or of organs like the heart that move involuntarily—ceases to be a problem. Since x-ray exposure time can be cut in half, the chance of blurring while the film is being exposed is greatly reduced.

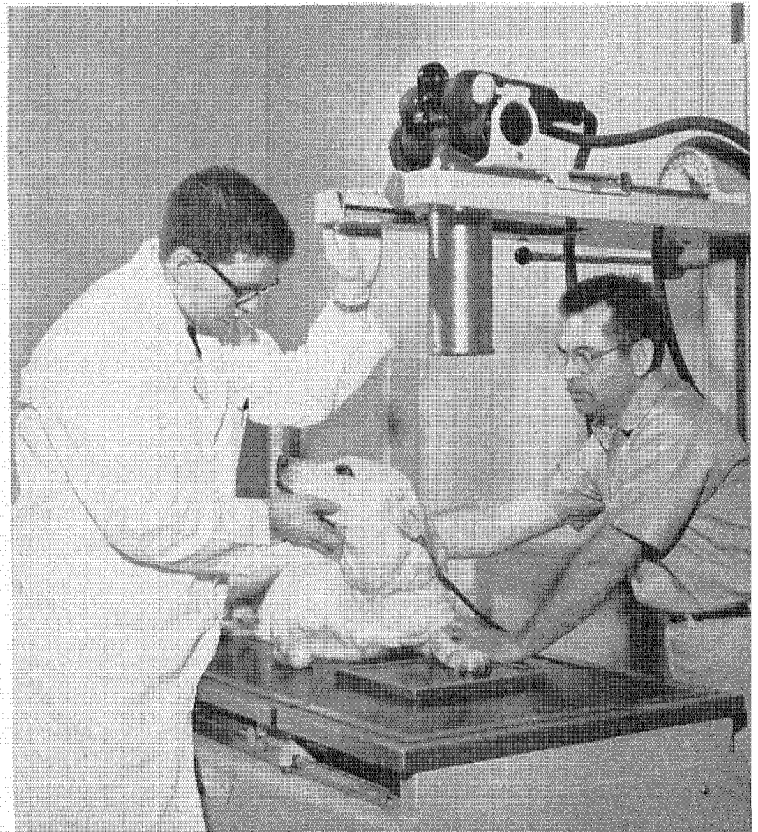
Technician makes a sandwich by placing x-ray film between intensifying screens, which are inside holder.





◀ Shorter exposure time to x-rays is possible with Lightning Special intensifying screens. This helps reduce blurring of radiographs by children's movements.

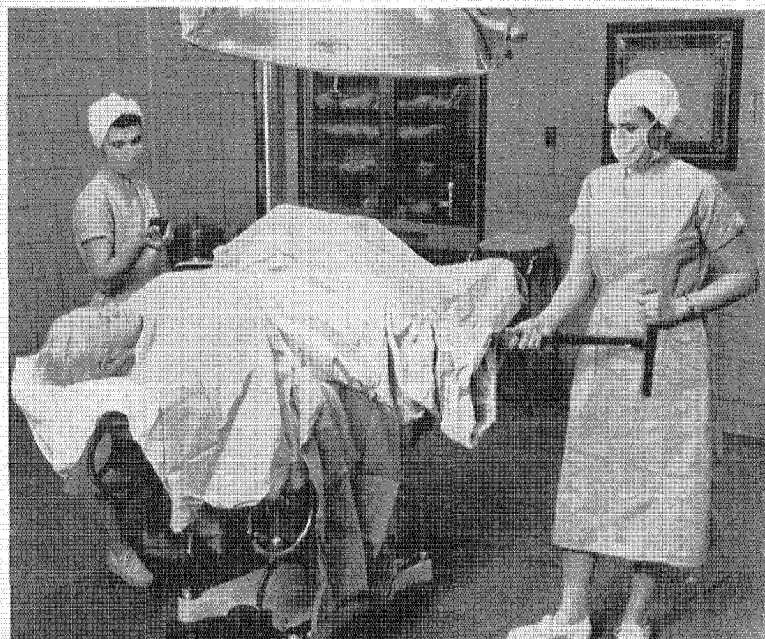
Faster screens also make movement less of a problem in x-raying animals. Thus they give better pictures with the smaller units used by many veterinarians. ▶



Low-power portable equipment is used in bedside x-raying. The Lightning Special helps technicians make sharper pictures without moving very sick persons to the x-ray room. ▼



In hip-pinning operations, x-ray pictures must be made several times to check bone positions. With Lightning Special, developing time can be reduced. ▶



The bomb that exploded into a \$250 million business

How research—and “Freon” propellents—led to the wartime “bug bomb,” granddaddy of the hundreds of push-button aerosols on the market today

By MARY ELLEN EVANS

Any veteran of South Pacific or North African battles will tell you he had one enemy that could not be halted by guns or strategy—the female anopheles mosquito. This insect-world Mata Hari depended entirely on her ability to spread malaria, and she was an old hand at it. In the early days of World War II she accounted for more casualties in tropical areas than enemy fire.

The anopheles didn't meet her match until the arrival of a small black container that sprayed out a fog, or aerosol, of insecticide dissolved in Du Pont “Freon” fluorinated hydrocarbon, a refrigerant turned propellant. As millions of these “bug bombs” were put to work in the tropics, the anopheles literally dropped dead. Incidence of malaria skidded downward and morale went up.

It has been ten years since the bug bomb was introduced on the civilian market. Today, a quick survey of shops might prompt one to call this interval the Aerosol Decade. Estimated output during 1954 was 185 million packages of more than 80 different types of products for both household and industrial use.

Two things first made the aerosol package industry a practical reality—research by two men in the U. S. Department of Agriculture plus the existence of a ready-made propellant.

In the late 1930s, Lyle D. Goodhue, chemist, and William N. Sullivan, entomologist, at the Department's Bureau of Entomology and Plant Quarantine, were at work on low-grade surplus tobacco as an insecticide. Scientists knew nicotine was poisonous to certain insects. And the idea of an aerosol of smoke for controlling insects was far from new. For instance, the Mono Indians of California had used smoke to stupefy insects to be collected for food. The Indians cleaned off the ground under trees harboring the full-grown larvae of the pandora moth. Then they built a smudge fire. The smoke caused the caterpillars to drop to the ground. The Indians raked them into the fire and roasted them to have on hand for future stews.



Goodhue and Sullivan tried burning not only tobacco but also other plants such as derris, an East Indian legume containing rotenone, and pyrethrum, a plant of the chrysanthemum family. The two men reported success in killing houseflies with derris smoke, but they found smokes had the disadvantage of leaving a deposit and an unpleasant odor. In addition, burning destroyed a large portion of the insecticide before it could be dispersed. But they did find smokes to be more effective than sprays, then in common use, because the insecticide remained suspended and active much longer.

In June 1940 they wrote: “If an aerosol of solid insecticide could be prepared without resorting to burning, a great advance would be made, but a generally applicable procedure is as yet unknown.”

By this time, Goodhue and Sullivan, as well as many others, were concerned with the eradication of mosquitoes, especially those hitchhiking from one country to another in airplanes. Hitler was goose-stepping across Europe and our allies were already at war.

Along with thousands of wartime problems was the protection of fighting men from disease. In 1940 the application of insecticides by our armed forces was, by and large, the same as that used in World War I. The old type oil-base spray was still the only available insecticide.

After smokes, Sullivan and Goodhue produced an aerosol by boiling solutions of derris and pyrethrum in



solvents to create a vapor or steam. They soon left this for another method—spraying rotenone and pyrethrum in a solvent from an atomizer onto the surface of a hot plate. A cloud of tiny, suspended particles rose to kill the insects. This was the most effective method to date, but the equipment was awkward for general use, a fire might be started, and the odor was objectionable. However, the two researchers and John H. Fales, an associate, suggested that this method be used for the control of mosquitoes in planes.

About this time Sullivan read a paper by a scientist in France who suggested that the insecticide ideal for planes should be nonflammable, nontoxic to man and animals, nonstaining, practically odorless, should contain its own source of power, and should kill mosquitoes in five to ten minutes. If developed, it could be useful for barracks, houses, tents and other habitats of man.

"This paper," says Sullivan, "set us to thinking of liquefied gases. Our job was to find which one would fill these requirements. We determined to find the answer."

To avoid a coarse wet spray, they were looking for a solvent whose components are gaseous considerably below the spraying temperature. Contact with the warmer atmosphere would then cause the low-boiling solvent to vaporize. They started on refrigerants.

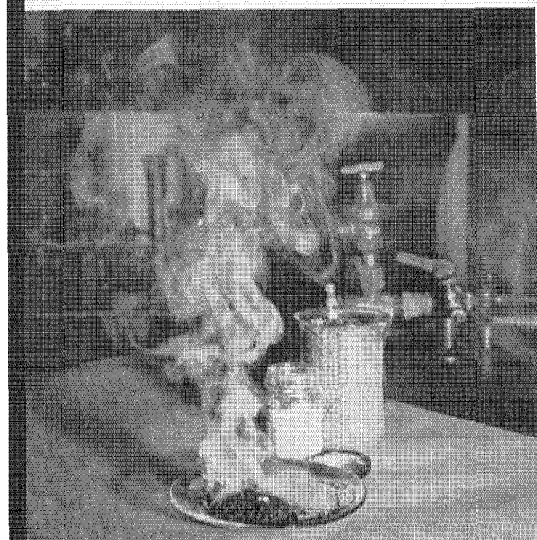
One day Goodhue suggested dichlorodifluoromethane, the tongue-twisting chemical name of Du Pont's "Freon-12" refrigerant. They dissolved pyrethrum oleoresin and sesame oil in the liquid refrigerant, cooled the container, sealed it and then let the pressure of the solvent force the contents out of the oil-burner nozzle they had used. The aerosol that came forth was very toxic to mosquitoes and houseflies—three times more so than a spray—and it was odorless, nonstaining, nontoxic to man and animals, and nonflammable. They had it!

Now how could they package their discovery for easiest use? The experimental container was a five-pound carbon dioxide cylinder, too heavy for convenience. Manufacturers were briefed on the problem, and Westinghouse suggested the steel high-pressure float-valve tank of about one-pound capacity used in its refrigerators. A nozzle was improvised and about a dozen containers filled.

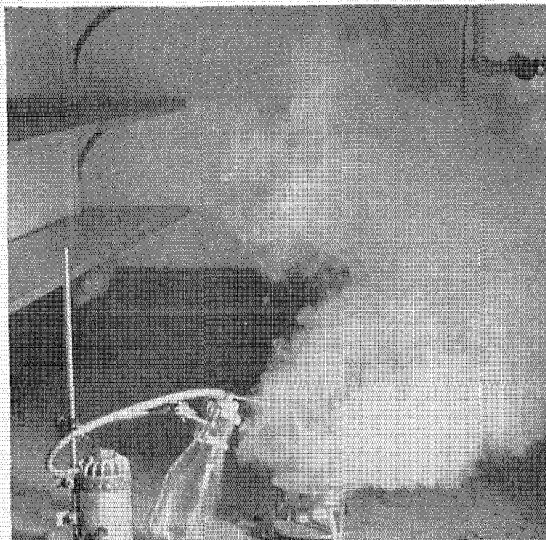
With these in hand, they approached the Air Force. After a demonstration, the Air Force ordered 155,000 to be delivered as soon as possible. Westinghouse, which had surplus containers of "Freon" because of wartime restrictions on refrigerator production, was called upon to produce the aerosol insecticides. Du Pont enlarged its facilities for "Freon" production, and the battle against the mosquito and other noxious insects was on.

On July 29, 1941, Goodhue and Sullivan applied for a public service patent, to be assigned to the Secretary of Agriculture. In April 1942, Sullivan received his greetings from Uncle Sam and applied for an assignment with the Sanitary Corps of the Air Force to continue work on aerosol insecticides. He received a commission and an assignment that took him to Accra on the Gold Coast of

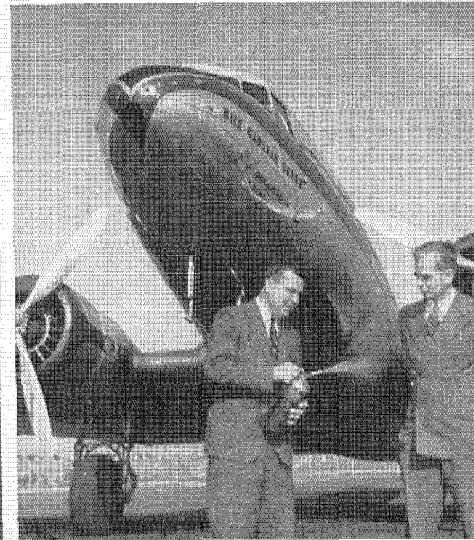
Early insecticide research at USDA covered burning of plants containing bug killers.

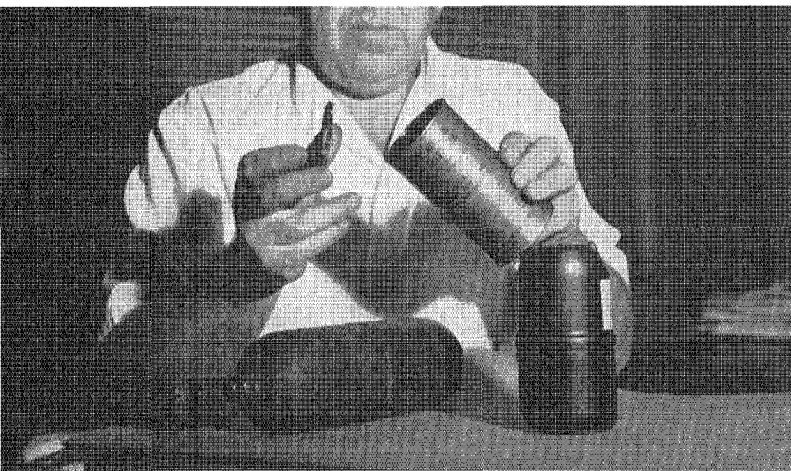


USDA also explored feasibility of vapors made by spraying insecticides on hot plate.



Goodhue (left) and Sullivan with original 1941 aerosol, a bulky 5 lb. CO₂ contain





Expert R. A. Fulton of the USDA holds familiar low-pressure aerosol adapted from beer can. On right is familiar World War II bug bomb.

Africa, to North Africa, and Karachi, India, where it was his job to see that planes bound for South American bases didn't have any insects aboard.

Goodhue continued his research on aerosol insecticides during the war. In cooperation with John H. Fales and E. R. McGovran, USDA, he evaluated containers, valves and formulas for use by the armed forces.

In the meantime, bug bombs by the million were arriving at U. S. bases around the world. In all, more than 40 million were made for the armed forces by various manufacturers. In 1943 DDT made its debut as an aerosol insecticide. In late 1945, the bug bomb, now included in war surplus items, reached the civilian market. But its container worked against it—the steel was too heavy and the cost of production too great for a competitive item.

However, the seed of an idea had been sowed, and industry started its cultivation. Can companies went to

work on a lightweight container, others dug into the creation of a suitable valve, the intricate stumbling block of the whole container.

Robert A. Fulton of the Bureau of Entomology and Plant Quarantine, and now a leading authority on aerosols, saw in the beer can the possible answer for a container. The adaptation of the can for low-pressure aerosols kicked off the industry. On March 7, 1947, the first of these inexpensive, disposable cans was filled for experimental use. Within a year, large scale production was under way. From insecticides, the contents of the can moved rapidly to room deodorants, paints, cosmetics, inks, textile dressings and penetrating oils. In the meantime continuing research on aerosol insecticides has brought the output to some 60 million cans for 1954.

What the low-pressure aerosol can started was a "working package." It was more than a can; it also dispensed the product as needed. Convenience-minded Americans liked it. Evidence: the personal products field. Last year more than 30 million units of hair spray were filled—double the 1953 total. More than 42 million cans of shaving lather were turned out—better than a 50 per cent rise over the previous year.

Spokesmen in the aerosol packaging industry say history will repeat itself when the push-button really hits the drug and pharmaceutical field. Estimates for 1963, based on forecasts for all aerosol products, run between six and seven million units for this category alone.

The Chemical Specialties Manufacturers' Association presented its coveted Achievement Award for 1954 to Goodhue and Sullivan for their work in developing aerosol insecticides.

"The far-reaching effect of their research," the citation read, "has not only benefited the American people by providing them with aerosol products that contribute to better, easier living but has stimulated a new type of business and thereby made a significant contribution to the packaging industry and the American economy."

A COOL 25 YEARS LATER...

In a few months, Du Pont's "Kinetic" Chemicals Division will celebrate the 25th anniversary of the first sale of "Freon" fluorinated hydrocarbon refrigerants.

The quarter of a century since Dr. Thomas Midgley, Jr., Dr. Albert L. Henne and associates announced their discovery of "Freon" has seen refrigeration and air conditioning mushroom. Today 93 per cent of all U. S. homes with electricity have refrigerators. Fresh foods are available year 'round because of refrigeration from field to table.

Safer and more efficient refrigeration has made new manufactured products possible. Many pharmaceuticals, elastomers, and even "Freon" itself, require refrigeration for processing. Controlled temperatures have brought standardization to other products.

The simultaneous conditioning of temperature, humidity, circulation and cleanliness of air (in short, air conditioning) has made the office and plant worker more comfortable and efficient. It has made shopping, movie going, eating and travel more enjoyable.

Back of the evolution of mechanical cooling has been the continuing research and development of the "Freon" refrigerants. From "Freon-12" the family has expanded to 21 members. Of these, five are the major "Freon" refrigerants—"F-11", "F-12", "F-22", "F-113" and "F-114".

The latest, "Freon-13" and "Freon-14", are being used in low-temperature test work. Relatively unexplored, this field is concerned with such questions as how will steel or lubricants act below -300°F.

Aerosols, featured in the preceding story, are blossoming out in all directions—more types, more brands, and many more consumers in home and industry. Du Pont has kept in stride with these booming sales by supplying "Freon" propellents to fit the varying needs of the aerosol industry.

Some of the "Freon" compounds are good fire extinguishers and have been introduced recently into fire-fighting equipment for the Army and Air Force. Several passenger airlines are converting their fire extinguisher systems to use "Freon".

The demand for "Freon" has brought about an expansion in manufacturing plants from one at Carneys Point, N.J., in 1931 to four in the U.S.A. and one in Canada today. A few years ago the East Chicago plant was opened to serve the Midwest better. The Louisville, Ky., plant will be completed this month. By fall of '56, the Antioch, Calif., works will begin operations. All are the result of keeping one eye on new processes and new compounds and the other on the needs of the American people.

Du Pont changed some molecules
to increase the heat- and abrasion-
resistance of "Alathon". The result:

A better jacket for wire

Polyethylene wire and cable insulation that is tougher and more heat resistant than earlier formulations has been announced by Du Pont. The improved "Alathon" polyethylene resin can be used at higher temperatures and has greater abrasion-resistance.

The wire and cable industry uses polyethylene for electrical insulation and jacketing because of its good electrical properties as well as its toughness, pliability and light weight. In one place or another, the plastic's other properties have proved essential. These include resistance to chemical attack, excellent weatherability, and flexibility at temperatures as low as -95°F . The added heat- and abrasion-resistance of this improved "Alathon" will put the material to work on even more jobs.

BOTH INSULATION AND JACKETING

A recent industrial application of "Alathon" polyethylene resin is as both insulation and jacketing of a 12,000 volt primary feeder cable for an Eastern chemical company. On a comparative basis, "Alathon" reduced both the initial cost of the cable, and the expense of installing it. Because the material is chemically inert, it needed no protective conduit when buried in the ground.

"Alathon" is widely used for insulating wires and cables in the television field. The large, flexible cables that carry the camera image, the microphone cables, and lead-in wires to home sets are all protected by the material. The Du Pont resin also is a standard for covering outside telephone wires and for jacketing on the line and service drop wire used by public utilities to bring power to homes. One of its newer uses is to insulate fire alarm cable.



\$380 a pound — and worth it

That's the current price of ultra-pure Du Pont silicon, used in remarkable new electrical and electronic devices. Fortunately, a little goes a long way

Because scientists at Bell Telephone Laboratories have succeeded in harnessing the sun's energy with the use of Du Pont silicon, more telephone subscribers can be added this fall to an experimental system in rural Georgia without the necessity of additional telephone lines.

Storage batteries installed along the experimental line to boost the strength of telephone signals will be kept charged by Bell solar batteries, which use thin wafers of Du Pont silicon to convert sunlight directly to electricity. The solar batteries convert 11 per cent of this energy to usable power.

While Bell scientists predict a sunny future for their infant solar battery, Du Pont silicon is finding its way

without too much trouble into quite a few more conventional devices for regulating the flow of electrical current.

Among products already available are tiny silicon transistors, which replace bulky vacuum tubes in high temperature locations; diodes and power rectifiers which again are useful at high temperatures; and an oil-cooled aircraft generator which uses silicon rectifiers in place of commutators, slip rings and brushes.

Silicon, like germanium, is a semiconductor. This means that, as far as the flow of electricity is concerned, it is neither a good insulator nor a good conductor. But exactly measured traces of certain impurities added to sections of a semiconductor give it the ability to control current flow. This is how semiconductor devices are made.

Paradoxically, the addition of impurities to an already impure material gets you nowhere, electrically speaking. That's why semiconducting materials must be extremely pure to begin with. Germanium, from which the first transistors were made, is easier to purify than silicon, and has excellent properties up to about 212°F. Silicon, however, can operate up to 400°F.

Because its purification is so difficult, semiconductor grade silicon costs \$380 a pound. This price is deceptive, actually, for a transistor requires only a tiny sliver of silicon worth two to five cents.

Ordinarily, a chemical process that yields a product 99.99 per cent pure is adequate. But the silicon Du Pont sells today must contain less than one part per million of critical impurities. Even this is not good enough for some projected uses. That's why Du Pont is continuing its efforts to produce a silicon of even higher purity.

A uniform crystal structure is required in semiconductor devices. This is achieved by lowering a perfect seed crystal of silicon into a molten bath of the material and building up a larger single crystal structure. Electronic devices may be made by slicing this crystal into segments and soldering wire leads to the segments.

Commercial grades of silicon have been used for years in metallurgy and more recently in making silicones. It is the second most common element, forming 28 per cent of the earth's crust. Semiconductor silicon, because necessary purity is so hard to attain, is a horse of a different color. Du Pont first became interested in the pigment possibilities of its compounds, and developed a process for making pure silicon in quantity. During the second war the Company was asked to supply this pure silicon for radar use.

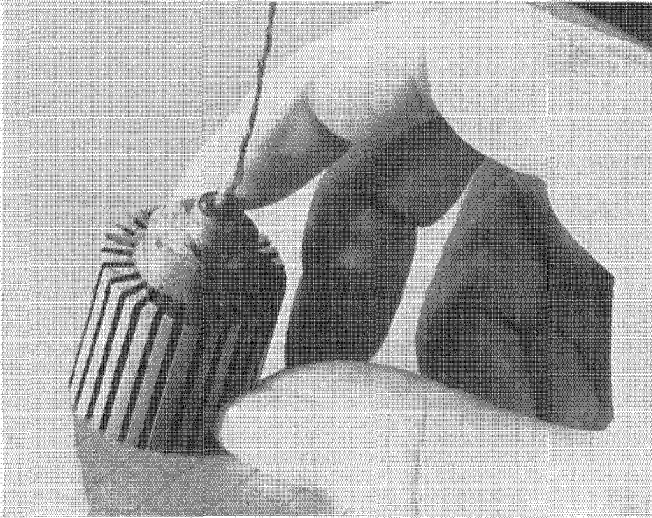
As the supplier of chemically purified silicon, Du Pont is helping put a new and potent tool in the hands of equipment designers. Silicon devices will make possible a degree of control over electricity not possible before.

Du Pont technician wearing welder's goggles watches silicon crystal form behind quartz window. Slices of crystal are then checked electrically for purity.



Some predictions of things to come: the replacement of complicated gear reduction systems by direct current electric motors containing small but highly efficient silicon power rectifiers or power transistors; a sizable reduction in the weight of electronic gear aboard ships and aircraft; silicon devices to help cars meet more efficiently the demands of power steering, power brakes, air conditioning and so on.

Rectifier made with Du Pont silicon delivers over 1,200 watts, enough to run 1½-horsepower motor.

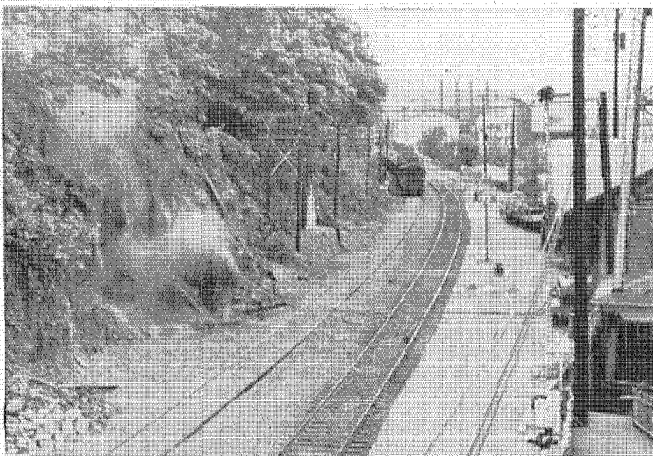


Solar battery, developed by Bell scientists, uses silicon strips size of razor blades to convert sunlight to electricity. Here a solar battery's power is used to transmit sound of human voice.

Oregon City's vertical street

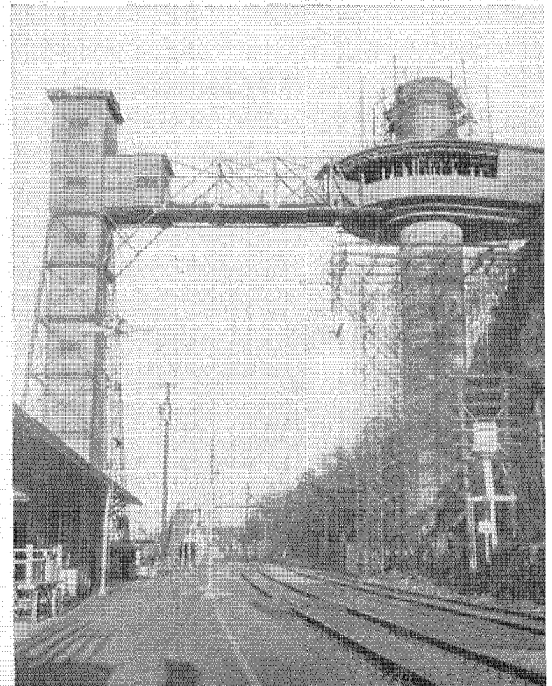
"Built on a troublesome cliff which separates business and residential sections, Oregon City, Ore. (pop. 7,700) made a virtue of necessity when its old city elevator wore out. It put up a lift that is also a flashy civic trademark." Thus *Life* ably describes the town's new municipal elevator, but there's more to the story. Building that elevator in the heart of the business center presented some real

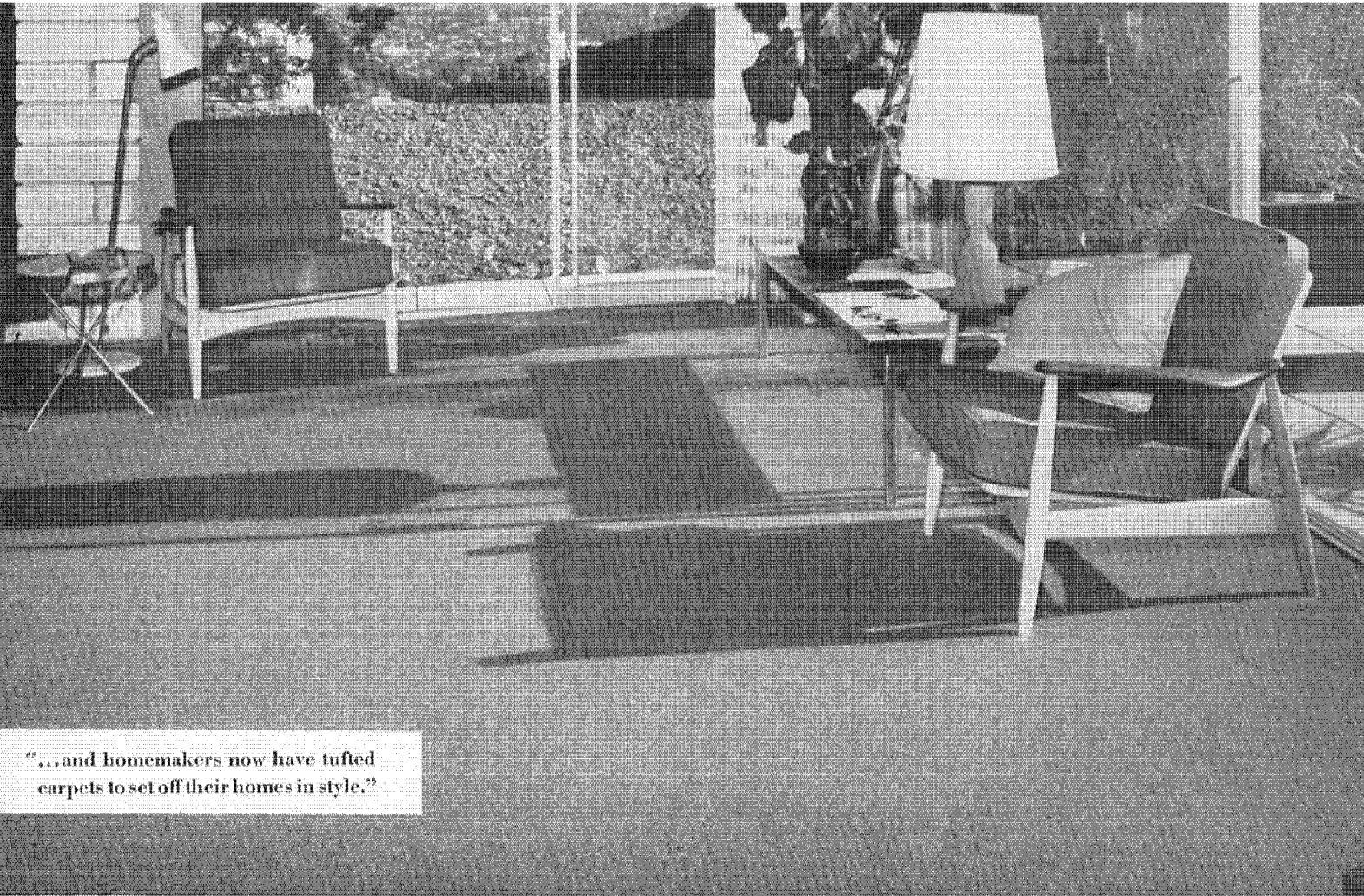
construction problems. In addition, excavation for the elevator tower base was in solid rock, smack up against the Southern Pacific Railroad. It was also necessary to put in a passageway under the tracks to connect the elevator with the street. All this called for the most careful blasting work. But the job went off without mishap, and Oregon's oldest city is happy about its newest landmark.



Du Pont dynamite blasting base for elevator tower. Close-by tracks and city called for carefully controlled work.

Concrete elevator tower and passageway replaced 1914 model on left. Contractor for the project was James & Yost, Inc. of Portland, Oregon. ►





Those new tufted carpets

By JAY H. MACKEY

"Within ten years, more than 60 per cent of all soft floor covering will be made by the tufting method."

That's Gene Barwick, 41-year-old president and owner of E. T. Barwick Mills, Inc., talking. When he plunked down his total savings of \$4,500 some five years ago to back his faith in tufted carpets, carpet makers didn't even hear him. Today his voice probably calls the shots for more tufted carpeting than anyone else in his field. His business has raced from a flat zero to \$26 million a year.

Many of you probably have heard about the success of this soft-spoken, golf-playing Southerner and his famous carpet. Business magazines have raved about him in their columns, other carpet makers have changed their production plans to compete with him, and homemakers by the tens of thousands who felt they couldn't afford quality floor covering now have tufted carpets to set off their homes in style.

Sharing the starring role of this success story with

Gene Barwick is the relatively new technology of tufting. Supporting players include the man-made fibers, especially Du Pont nylon.

Tufting is an outgrowth of Georgia's old homecraft chenille bedspread and robe industry. "The modernized method is relatively simple," *Business Week* reports. "You build a machine big enough and wide enough to accommodate the width of carpeting you want to make (Barwick machines are up to 18 feet wide). Across the width of the machine, you put up to 1,500 needles in a line, each threaded and connected to its own spool of yarn. These needles puncture the back of the retainer cloth—usually burlap—resulting in thousands of U-shaped threads called tufts. (Cut pile is achieved on a variation of the loop-pile machine. In this process, the loop is cut as soon as it is formed by the needle.)

"Next step is to apply a latex-plastic backing to lock the tufts and serve as an antiskid finish. Then the carpet is dyed and 'bloomed' to bring out the color, and cut to

size." Often the yarn is dyed before it is tufted.

Tufting makes carpeting at a phenomenal rate. It takes only 46 seconds to tuft a standard 9 x 12-foot rug. In about 20 years, tufting has increased its share of America's yearly 80-million-square-yard carpet market more than 30 times. Because tufting is less expensive, savings passed along to consumers take fine carpeting out of the luxury class.

Some of the twisted yarn used by Barwick Mills to make carpeting is all nylon and some of it is a blend of rayon with Du Pont nylon added for extra wear life. With quality control almost a fetish at Barwick—this reporter saw inspectors and operators check each and every step—the company didn't turn to nylon as a matter of course. Far from it. Barwick Mills makes carpets of cotton, rayon and nylon. Nylon has earned its place, Plant Superintendent Joseph Nix says, because of its unmatched durability, its ease of cleaning, its crush-resistant resilience, and its eye-appeal.

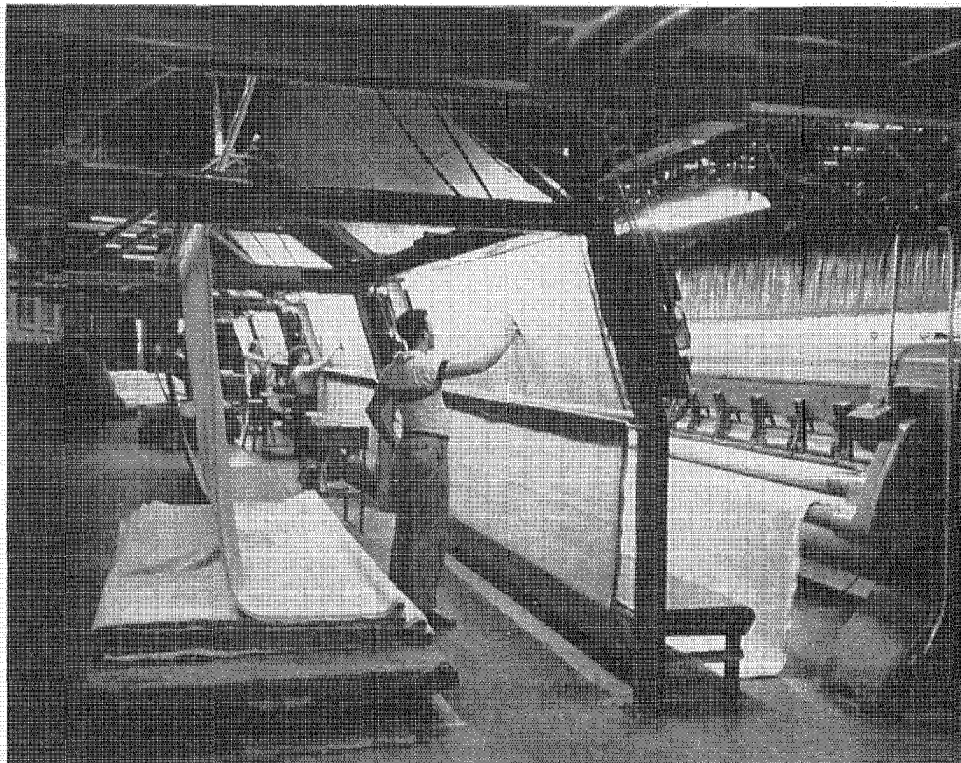
"Nylon," he added, "is the most trouble-free product we've ever had. Our dealers tell us there are no adjustments to make next year or later. A nylon carpet keeps selling itself."

NEW CARPET FOR FALL

"Here at our LaFayette plant," Nix continued, "we are tufting a new 100 per cent nylon carpet for the fall market. It has everything. The high and low pile profile designs look like a sculptor had been cutting right into the face of the rug. Not only is the carpet durable and resilient, but bugs don't eat it and it's so quick drying that on-location cleaning is no problem."

Barwick Mills, which has had to do much of the labor in developing its own tufting machinery, is looking ahead to turning out Jacquard-effect rugs in addition to the sculptured ones now in production.

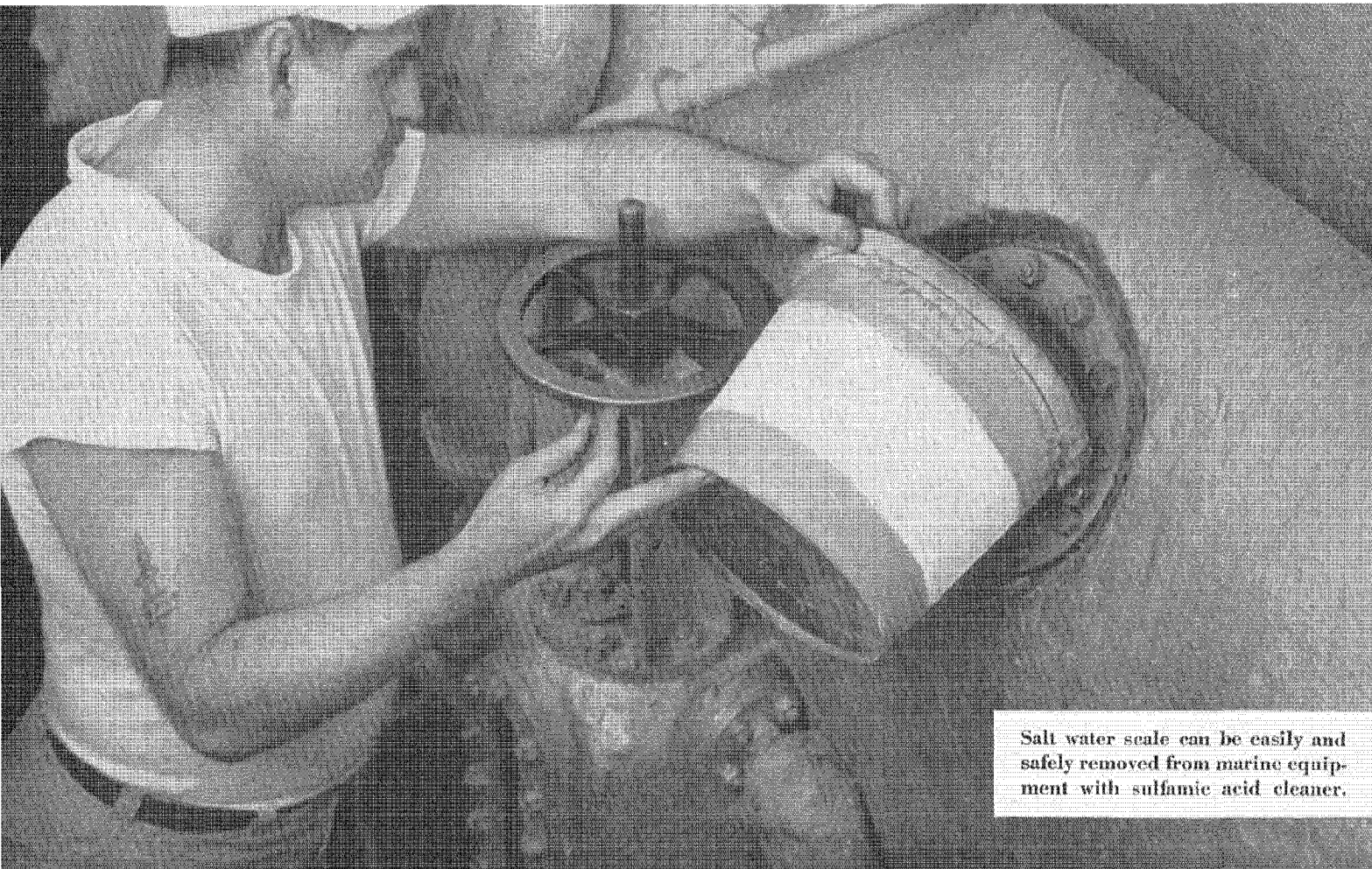
"There's no standing still in this business," comments Barwick. "Look at the potential market: a million new homes that should average at least 60 yards of carpeting; replacements for all the other homes in the country; carpeting for commercial places like offices and restaurants where such floor covering hasn't even scored its first touchdown. Barwick Mills doesn't plan to sit still with these markets tempting it!"



"Across width of the machine, you put up to 1,500 needles in a line, each threaded and connected to its own spool of yarn. These needles puncture back of retainer cloth resulting in thousands of U-shaped threads called tufts."



Barwick Mills makes carpets of cotton, rayon and nylon. Nylon has earned its place, Plant Supt. Joseph Nix says, because of its unmatched durability, its ease of cleaning, its resistance to matting and its exceptional eye-appeal.



Salt water scale can be easily and safely removed from marine equipment with sulfamic acid cleaner.

Sulfamic at sea

Du Pont-made acid finds new application in marine cleaning

Sulfamic acid, nicknamed "industry's housemaid" because of its many uses as an equipment cleaner, has gone to sea.

Bull & Roberts, Inc., New York City, has developed a way to use the acid to remove scale from ship equipment in contact with sea water.

Scale deposits that form on the sea side of heaters and condensers long have been an annoyance to ship engineers. The accumulation must be removed or efficiency of the equipment is sacrificed. Several liquid acids are effective in cleaning off the scale, but being liquids they require more careful handling in order to avoid accidents and injury to the crew.

Fifty-two-year-old Bull & Roberts pioneered control of scale formation in the distillation of sea water. This interest, plus a growing concern with accidents from mis-handling of acid cleaners, led Bull & Roberts to search for something better and safer.

In 1953 the firm began working with mild organic acids. They looked good in the laboratory but fell down in sea trials. Other acids tested were thrown out because they were hazardous to use in liquid form or because of unfavorable side reactions.

Research through available technical literature showed that sulfamic acid might do the job. And because it is crystalline rather than liquid, chemists reasoned that handling problems would be solved. After several months' work in the laboratory, Bull & Roberts scientists finally hit upon a compound based on sulfamic acid that did a thorough cleaning job and was safe and easy to work with.

In the spring of 1954 the cleaner was ready for extensive trial tests on clients' ships. Tests were convincing by October and Bull & Roberts decided to start sale of the product under the trade name H-400 scale solvent.

The cleaner is made by adding an inhibitor and wetting agent to Du Pont sulfamic acid. It is packaged in a disposable waterproof container stout enough to withstand more than its share of rough handling.

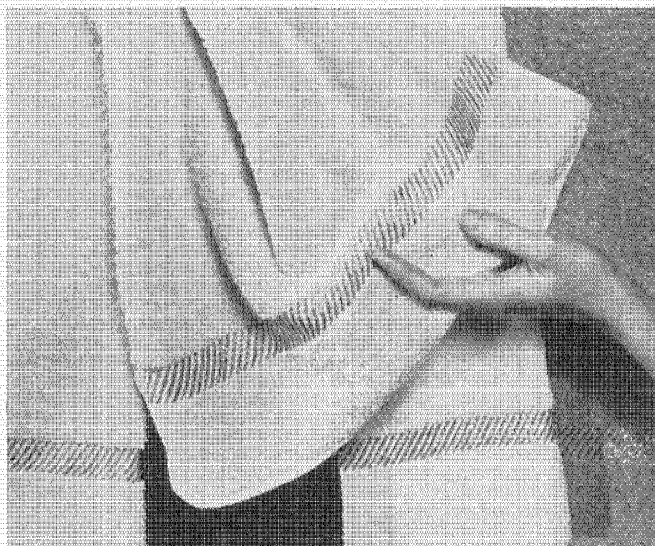
Ship engineers are highly enthusiastic about the new sulfamic acid cleaner. Because the safety factor is so high, cleaning can be done safely on shipboard, by the crew, greatly reducing shipyard or other outside costs. New cleaning jobs aboard ship are constantly being discovered for the product. They are tested by Bull & Roberts and, if an idea looks good, the firm tells other clients about it.

What's New

• **STRONGER MULTI-WALL PAPER BAGS** are possible when "Super Cordura" high tenacity rayon is used as the stitching. The Du Pont fiber minimizes danger of seam breakage. Quality is uniform, costs are reasonable, and sewing machines are easily converted to handle it.

• **PUSH-BUTTON DISPENSING OF DRY POWDERS** from an aerosol container may open up a new area of packaging applications. Among the first powder aerosols is a zinc stearate mold release for use in plastics industry. Dry graphite lubricants in aerosols, using Du Pont "Freon" fluorinated hydrocarbon propellant, now are also available in many locations.

• **STANDING MATS** in new colors and designs are made by the Buxbaum Co., Canton 1, Ohio. These Akro-Foam sponge mats are made of neoprene to resist wear and deterioration from oils, grease, soaps, fats and acids.



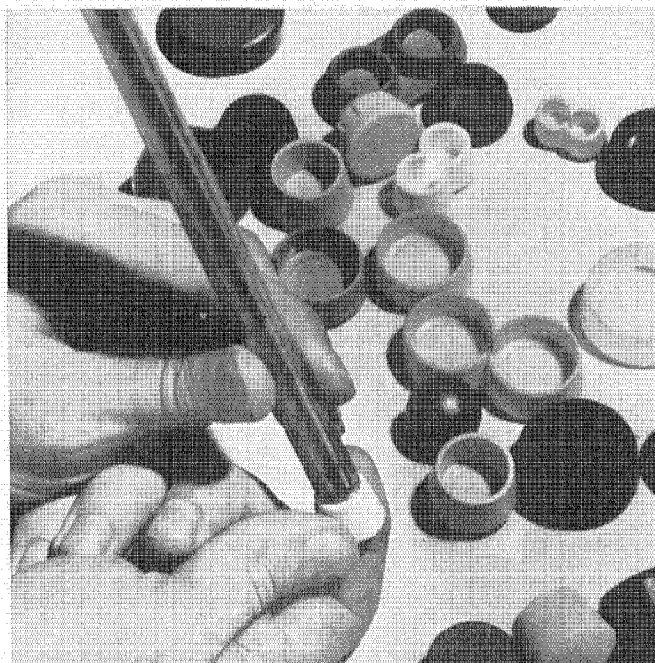
• **METALIZED YARN** of "Mylar" polyester film is used in gold borders of towels by Callaway Mills, Inc., 295 Fifth Ave., New York, N. Y. Combining strength with thermal stability, the new yarn can be machine-laundered or ironed at high temperature. Curtains of "Dacron" polyester fiber, and tablecloths decorated with metallics using "Mylar" will soon be available from other manufacturers.

• **"ORLON"** acrylic fiber and silk are blended in a new kind of satin notable for its richness, luster and easy spot removal. Made by mills in a wide range of colors, the fabric is being used for coats and cocktail and evening dresses.

• **CHEMICAL BRIEFS**, a quarterly four-page newsletter on Grasselli industrial chemicals, will be sent to chemical directors upon request. Address Desk F, Grasselli Chemicals, Du Pont Company, Wilmington 98, Del.



• **A SELF-SOAPING DISHWASHER** called Eversudz consists of a Du Pont cellulose sponge and a hollow handle for feeding liquid detergent. Manufactured and sold by Adpak, Inc., 23622 Woodward Ave., Pleasant Ridge, Mich.



• **FURNITURE CASTERS** of "Alathon" polyethylene resin are made by National Plastic Products Co., Odenton, Md. They come in assorted shapes and sizes and a wide range of colors.

Something new in paints

What's the low-down on the new emulsion or

latex base paints that have been making

such inroads in the finishes field?

For the answers,

we turned to Herbert P. Beardsley,

one of Du Pont's experts in the field

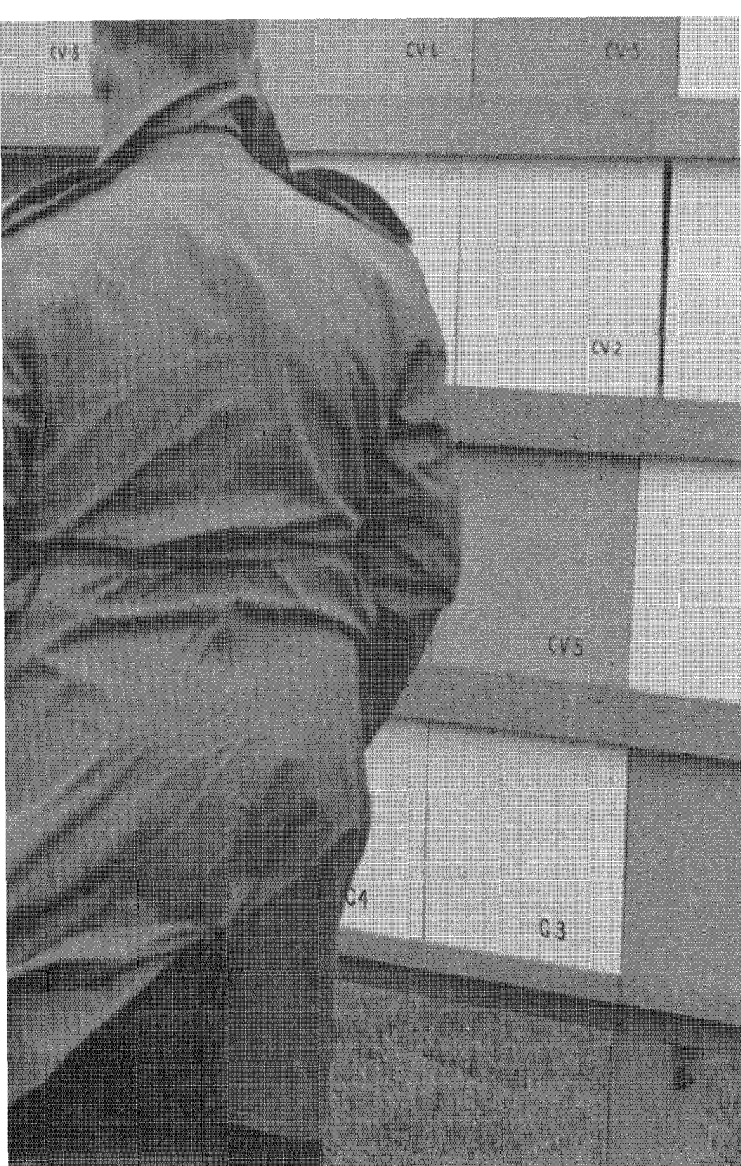


Q. What are these latex or emulsion paints, such as those containing "Elvacet" polyvinyl acetate emulsion, we have been seeing and hearing so much about in recent years?

A. Like oil paints, they consist of pigments and a vehicle. In earlier days, the vehicle of emulsion paints contained dispersions of oils or alkyd resins in water. Now preferred are synthetic polymer dispersions, such as butadiene-styrene, polyacrylates and polyvinyl acetate or PVA. A water dispersion of butadiene-styrene is often called a latex. PVA and acrylic water dispersions are generally referred to as emulsions.

Q. Exactly what does this vehicle do in the paint? Why is it necessary?

A. The vehicle does several jobs. It is a carrier for the pigments, which give the paint film its color. It binds the pigments to the surface and provides a protective film. In oleoresinous paints, the films form slowly over a period of several days or weeks. In emulsion paints, the films form quickly—by a physical fusion of the resin particles when the water evaporates from the wet paint film.



At Du Pont paint test farm, expert Herb Beardsley points out weather resistance of PVA-base paints.

Q. Where are these emulsion-base paints used?

A. In many places. As primer-sealers and topcoat paints on interior walls, for example, and exterior masonry paints. Butadiene-styrene latex is widely used in the interior topcoat type of paint and PVA is finding a market in primer-sealers and exterior masonry paints.

Q. Are they preferred over other types?

A. Yes, primarily because emulsion-base paints are so easy to apply. In addition, the brush, roller or spray gun can be cleaned with water. The emulsion-base paints dry fast, too, and do not have a painty odor.

Q. Are all of these latex and emulsion-base paints pretty much alike?

A. I assume you mean the newer types of synthetic polymer emulsion and latex paints. In all of them, the binder is dispersed in water. However, PVA emulsion-base paints, made with a quality product like our "Elvacet" 81-900 polyvinyl acetate emulsion, offer a number of additional advantages.

Q. Such as?

A. Versatility, for instance. PVA emulsions can be used in primer-sealer, exterior masonry and interior topcoat finishes. Here's just one specific case in point: Sealer-Coater, a primer-sealer based on "Elvacet" polyvinyl acetate emulsion, was introduced about five years ago by Du Pont's Finishes Division. This type of primer-sealer is now in widespread use. During the past couple of years the use of PVA emulsion in exterior masonry paints has been growing rapidly. Recently, interior paints based on PVA emulsion have been introduced in modest volumes.

HOW PVA PAINTS HELP CONSUMER

Q. We are probably anticipating you on this, but how do these PVA paints help the consumer, including the "do-it-yourself" home painter?

A. Here ease of application becomes important. In addition, exterior PVA paints are very durable on sound masonry surfaces. Color uniformity is excellent even on porous surfaces, and resistance to fading of colored paints is excellent. Because these paints will allow moisture to escape through the film, they resist blistering.

Q. Can PVA paints be used indoors? You have been stressing exterior application so far.

A. Definitely yes, for while interior topcoat paints made with this vehicle are new, interior primer-sealers based on PVA emulsion have been in wide use for some time. These interior paints are easy to keep clean because the PVA binder resists oils and greases. The paints resist discoloration from age because the resin is stable to light. Previously cost has delayed the widespread use of PVA in interior topcoat paints. Du Pont's recent price reduction of "Elvacet" polyvinyl acetate emulsion will change this, however. Now the product can compete with the lowest cost synthetic polymer emulsions, and its use in interior topcoats will pick up.

Q. What about painting wood? You haven't touched on this application yet.

A. PVA emulsion-base paints adhere well to new wood. However, a few technical questions must be answered before these paints can be suggested for use on wood. For instance, on red cedar and redwood, the dyes from the wood are leached into the paint film, causing streaking and discoloration. On some types of wood, raising of the grain is a problem. Also, present PVA emulsion paint formulations do not adhere too well to weathered oil paints. Du Pont is working on these problems. A look at the not too distant future indicates PVA emulsions may prove to be the high water mark in the centuries-old search for a truly universal paint.

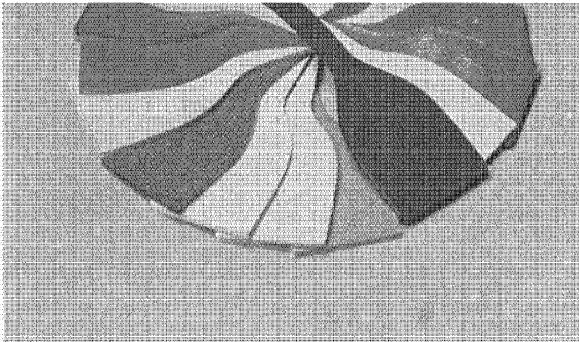


New color in your kitchen

Better living today, home designers tell us, means brighter living, too. Very much a part of this sweep to color are gay housewares like these. What's more, their performance is even better than their looks.

To describe them fully would take pages. They are all made of Du Pont's "Alathon" polyethylene resin, a lightweight, flexible plastic. "Alathon" is nonbreakable, water resistant, and free from odor, taste or toxicity. It is pleasant to the touch and remains flexible even at very low temperatures. Except for onions and garlic, it is not affected by foods, spices or seasonings.

For ten years after Du Pont started making "Alathon" in 1942, military and industrial users swallowed up almost all of it. Even a few years ago you wouldn't have found many kitchen products of "Alathon" in the stores. Today they are known as the "hottest thing in housewares." The resin is used for everything from baby bottles to wastebaskets and drinking straws. Colorful refrigerator dishes and mixing bowls are especially popular.



white or unlimited range of colors, needs no addition of carbon black for strength.

The outstanding performance of this Du Pont chemical rubber offers

Resistance Plus

By L. J. GRUBER

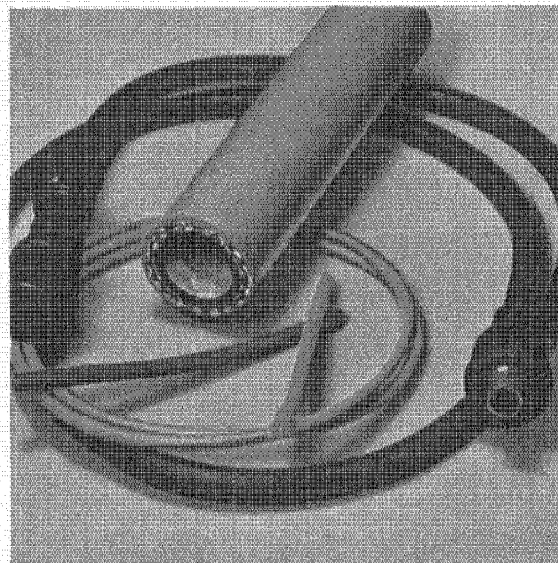
Du Pont's youthful elastomer, "Hypalon" chemical rubber, is fast becoming known as the family tough guy.

Like a brat, "Hypalon" shows qualities of stubborn resistance. But in the case of "Hypalon", this is a distinct virtue rather than a fault. Big reason for its steadily increasing use is that it is highly resistant to the effects of ozone, oxidizing chemicals and heat. The rubber-like elastomer has other desirable characteristics like weatherability and colorability, too.

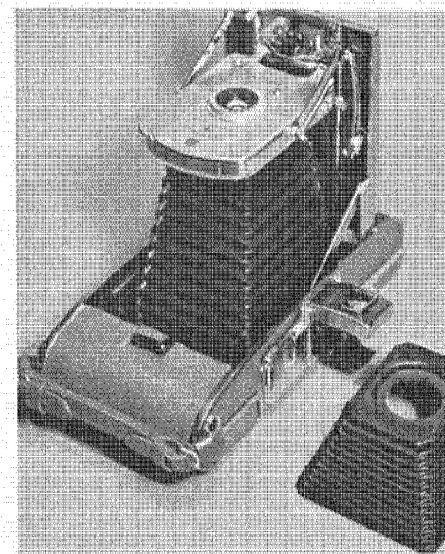
"Hypalon" was first introduced to *Du Pont Magazine* readers in the fall of 1953 while still in the pilot-plant stage. The material, a chlorosulfonated polyethylene, is made by treating polyethylene with chlorine and sulfur dioxide. Like other elastomers, "Hypalon" may be compounded with curing ingredients and then vulcanized. Vulcanization changes it from a thermoplastic product to a resilient, thermosetting material that retains its properties over a wide range of conditions. Products may be made of "Hypalon" by molding, extrusion or calendering. Coatings may be applied with solutions of "Hypalon".

Ozone, a highly active form of oxygen in the air, is one of the worst enemies of rubber. "Hypalon" provides excellent protection against ozone attack and deterioration. It has never been known to fail in any concentration of ozone tested. Therefore, the new elastomer has become highly important to such users as Welsbach Corporation of Philadelphia, makers of industrial ozone generators for industry. Gaskets of "Hypalon" have been used by Welsbach for about three years and, according to Percy B. Williams, director of engineering and production, there have been no failures even in atmospheres containing up to six million parts ozone per hundred million of air. Two to eighteen parts ozone per hundred million of air is normal in our atmosphere and is enough to seriously affect many other elastomers.

Another way in which "Hypalon" is outstanding is in its resistance to attack by corrosive chemicals which deteriorate ordinary rubber. As a result, the chemical rubber is now being used to line tanks and other chemical equipment. It's going into acid hose, industrial rolls and other applications involving oxidizing chemicals such as



Heat resistance fits new elastomer for service in steam hose, ignition cable and in spark plug boots.



Rubber goods are not the only items to benefit from coating of ozone-resistant "Hypalon". New elastomer adds to life of camera bellows.



OZONE? BRING IT ON!

Ozone, a highly active form of oxygen, is a deadly enemy of ordinary rubber. In an accelerated test, the rubber strip above was exposed under tension to concentrated ozone for less than 15 minutes. It's about to break. Strip of "Hypalon" below, subjected to same treatment for more than 100 hours, was unaffected.

pickling and chrome-plating solutions or concentrated acids. Maintenance coatings also have been developed for surfaces of equipment and other areas exposed to corrosive fumes.

The Hilfinger Corporation, an electroplating concern in Toledo, Ohio, began using acid hose constructed with a tube of "Hypalon" chemical rubber in 1952. The hose conveys plating solution containing 40 per cent chromic acid at a temperature of about 105°F. It has yet to show cracks or signs of deterioration.

"The best service life we had on previous hose was six to eight months," vice president Donald Hilfinger reports. "Our acid is so strong it will eat the clothes off your back. This 'Hypalon' makes the best acid hose I have ever seen."

Heat resistance is another highly important characteristic of "Hypalon". In 1953 engineers developed spark plug boots made of "Hypalon" that would provide valuable protection against destructive engine heat as well as ozone. This year, one-half million of the nation's new cars had spark plug boots made of "Hypalon".

ITEM: Hose with a tube of "Hypalon" has carried electroplating solution since 1952 without incident. Best service from previous hose: six to eight months.

ITEM: Heat of 450°F. gave rubber belt a life averaging 3 months. Belt of "Hypalon" lasted about twice as long.

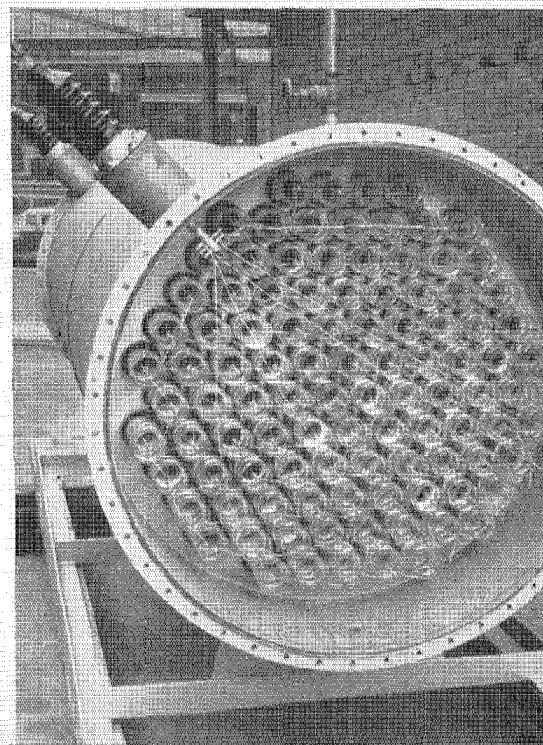
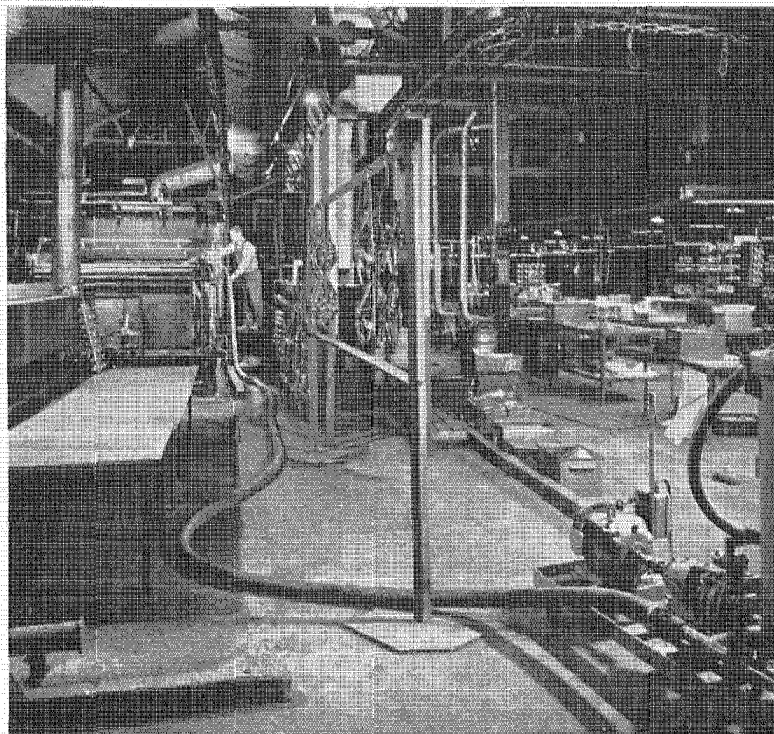
Here's another case where the youthful Du Pont elastomer had the heat resistance necessary to save a user money. Frequent replacement of a conveyor belt used to lift hot salt from a rotary drying kiln to a loading tower had for many years been a worry to a large chemicals manufacturer. A series of metal buckets, attached to the belt by metal bolts, carried salt at temperatures of 300-450°F. The belts absorbed enough heat around the bolts to become hard and brittle and then to crack. Their life span was three months at best. Last December there was every indication that this headache had been relieved when a belt covered with "Hypalon" was installed.

In the photographic field, a camera bellows material has a thin coating of black-pigmented "Hypalon" applied on one side. The coating provides a permanent light seal, and generally adds to the life of the bellows through the resistance of "Hypalon" to flex-cracking and sun-checking.

"Hypalon" is also right in step with the color-consciousness of this age. Unlike other commercial elastomers that require the addition of carbon black for strength, "Hypalon" can be compounded successfully in white or a limitless range of light-fast, bright or pastel colors. A surface coating of the Du Pont rubber may be added to dark-colored products before vulcanization, giving lasting color at a cost under that of products having color throughout. Test panel exposure tests made in Florida not only showed the color of the rubber unchanged, but the same hardness and strength still remained after two and one-half years of continuous exposure.

Today many of the cars and trucks on the highways have weather stripping coated with "Hypalon". This eliminates cracking due to oxidation that sometimes occurred even before the vehicles left the factory showroom.

On tomorrow's cars—and on many other industrial items as well—look for that "resistance plus" industry is finding in "Hypalon", the bright new member of Du Pont's family of chemical rubbers.

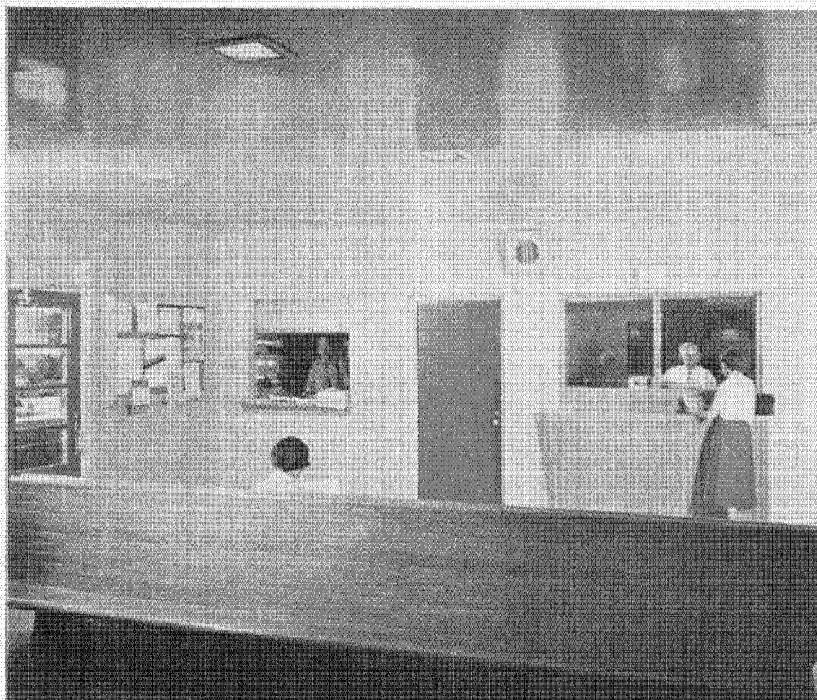


ITEM: Gaskets of "Hypalon" on ozone generator withstand 6 million pphm ozone without failing.

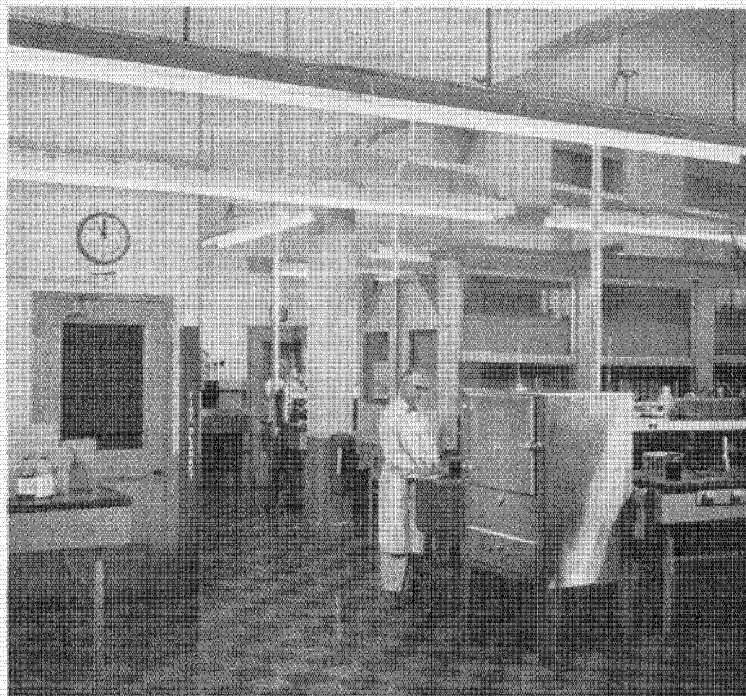
Railroads are becoming increasingly aware that paint can be pretty as well as functional.

That's one reason why, to keep travelers and railroad men happy...

Color has been



More attractive passenger stations are one lure the railroads are dangling before travelers. Du Pont color conditioning finishes make this station on the Pennsylvania Railroad lighter, brighter, more inviting.



B&O laboratory at right was repainted with Du Pont color conditioning finishes, fitted with new lights. One at left is due for same treatment.

workin' on the railroad

By GERALD KING

Railroaders are busily looking for ways and means to make their passenger services more attractive to a discriminating public.

One promising lure is the new high speed trains you've heard so much about—the ACF Talgo, for one. The first of these lightweight, low-to-the-rails streamliners to appear on an American railroad will be delivered late this year. Other trains of this type are on order.

Sprucing up dingy stations is another way railroaders feel they can improve their public relations. Fast disappearing, especially in areas where passenger traffic is heavy enough to warrant it, are the dull, lifeless paint jobs that used to be the trademark of depots all over the United States.

The Pennsylvania Railroad, for example, used Du Pont color conditioning finishes for the interior of its year-old station in Paoli, Pa. Using high-reflectance yellow "Dulux" has made the Paoli station a cheerful contrast to some of its older predecessors.

Old stations needn't look their age, however. The oldest American railroad station, now part of the Baltimore & Ohio's transportation museum in Baltimore, has been given a cheerful look with Du Pont finishes. Painted with "Dulux" sunlight yellow and medium green, it compares favorably in appearance with many of its juniors.

Station exteriors are being made more inviting, too. The Pennsylvania, which once painted all its stations tan and dark brown, recently reviewed its color standards on the advice of Malcolm McFarland, a Du Pont finishes salesman. Result: the Pennsy now has three new standard exterior color combinations—maroon and gray, buff and dark brown, and buff and sage green.

Farther west, Du Pont salesman Don Koontz of St. Louis has worked with the Missouri Pacific Railroad and St. Louis-San Francisco Railway Co. on dolling up their passenger stations with coats of durable "Dulux" station paints.

Using color for its psychological and physical benefits doesn't stop with the passengers. Like others in business and industry, the railroads have found that employees work better and more safely in pleasant, well illuminated surroundings.

The Du Pont color conditioning program is designed to supply just this type of cheerful, safe work environment.

Salesman McFarland, for example, worked with the B & O in refinishing and modernizing the interior of its Baltimore laboratories. In the main laboratory, which

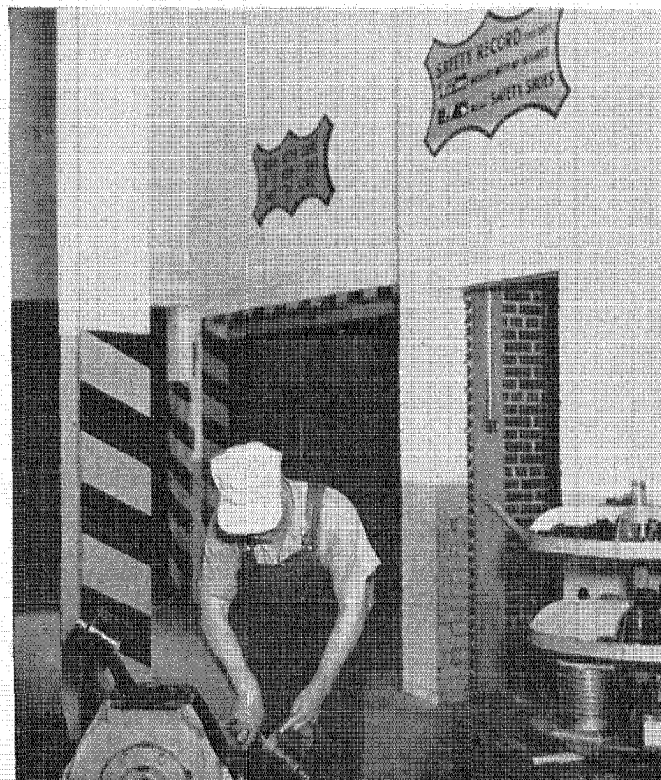
has a light-starved northeastern exposure, McFarland recommended yellow walls for brightness and a terra cotta lower wall trim for easier maintenance. Another B & O lab, which gets more daylight, drew walls of two-tone green. In each case the amount of light in the room and the reflectance of the paint color were considered.

Salesman Koontz advised the St. Louis-San Francisco Railway Co. on the painting of its maintenance shops in Springfield, Mo. Here he followed one of the cardinal principles of color conditioning in work areas—avoid sharp contrasts in brightness. When a worker looks up from a dark work surface to a bright wall, the adjustment his eyes have to make adds to fatigue. When all surfaces in the room are of the same relative brightness, eye fatigue is lessened significantly.

In stations, offices, laboratories and shops—wherever people relax or work—railroad men are learning what properly used color can do to win friends.

"After all, if anyone's going to paint he might as well paint right," says McFarland. "It costs no more to do the job scientifically."

Color conditioning, as in this Frisco railroad shop, improves seeing conditions on job.



AGRICULTURALLY SPEAKING

Recent research has pointed out that worm control in apparently healthy cattle can be a paying proposition. Even in northern states, where severe winters were once thought to control them, worms cut profits by slowing livestock growth. Fortunately, control is both simple and inexpensive. Adult worms first are removed by large doses of phenothiazine. Then small amounts of phenothiazine, added to feed supplements, minerals or salt mixtures, are fed regularly to prevent reinfection.

Getting crop, brush and weed sprays to spread and stick is relatively easy today with products like Du Pont Spreader-Sticker. On fruit, for instance, Spreader-Sticker gives better coverage with the spray and helps avoid spotty coloring due to concentration of spray residue.

To evaluate Du Pont methionine in rations for broilers, tests on 34,276 birds were made in Georgia by J. D. Jewell, Inc. The chickens were fed to a market age of about ten weeks, and 18,057 had methionine added to their feed. Those fed the protein-building amino acid averaged 36 extra pounds of meat per ton of feed.

Another contribution of research is a new formulation of "Karmex" herbicide. The product, "Karmex" DW herbicide, is specially suited for weed control on irrigation ditchbanks in areas where light, sandy soils predominate or where rainfall is high, such as in Florida, Louisiana and the Pacific Northwest. Like all of Du Pont's substituted urea weed killers, "Karmex" DW is economical and effective for long-term control in killing unwanted growth.

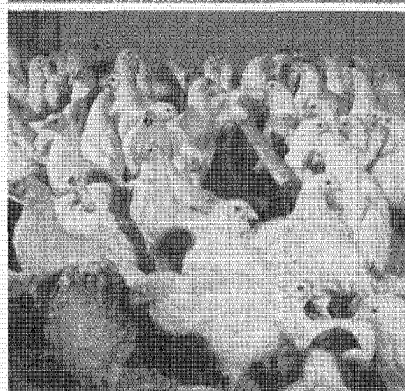
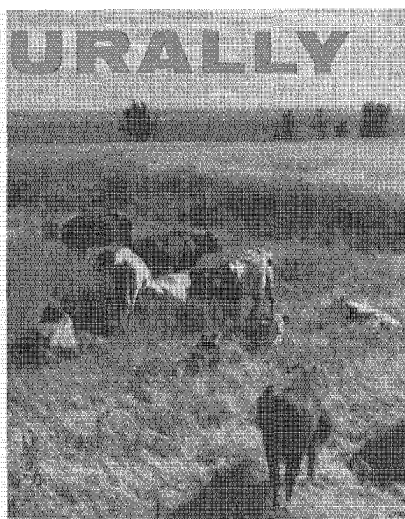
Custom wood treaters tell us that Texas, Oklahoma and New Mexico cattlemen, who often find wood almost

as scarce as water on their land, are ordering post and rail timber pressure-impregnated with Du Pont CZC. The CZC treatment insures long-life protection against attack by rot and insects, and makes the wood more resistant to fire. Even under the scorching Southwest sun, the wood remains clean and odorless, free from health hazards, and non-staining.

Farm boys the country over are taking part in wildlife conservation, the Remington Arms Co. tells us. Last year, Ohio Future Farmers of America did a tremendous job of wildlife habitat improvement. The boys saved about 850 nests from destruction, representing an estimated 5,000 rabbits, quail and pheasants. In addition, 2,500 F.F.A. members left grassy fence rows to save nests and young, and 1,600 left farm lanes and road hedges unmowed until after the hatching season.

Another new Du Pont agricultural product is a seed disinfectant, Liquid 365. It is designed for use in slurry treaters and other treaters not requiring the conventional premixing. Liquid 365, available in 5- and 30-gallon drums, contains a greater percentage of volatile ethyl mercury acetate than its predecessor, and hence will be more effective in controlling soil-borne and certain seed-borne diseases.

Before the frost line begins its annual migration southward, many Midwest farmers have already started calculating ways to handle next spring's peak workload. Corn growers fighting for extra bushels per acre—especially those who know they'll be shorthanded in the spring—will be plowing down nitrogen fertilizer in the next couple of months. Concentrated, free-flowing "NuGreen" fertilizer compound is favored as a nitrogen source for fall application because it resists leaching.



TECHNICAL-GRADE CMC

FOR DRILLING MUD



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- ✓ Low fluid loss at low-viscosity levels
- ✓ Thin, tough filter cake
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- ✓ Improved emulsifying action
- ✓ Versatile application in a variety of muds

Du Pont Sodium CMC Grade DM is a low-viscosity, technical grade CMC for controlling fluid loss in drilling muds. It is made to the same high standards of quality as Du Pont's other grades of CMC for paint and paper, and for improving the performance of synthetic detergents.

Grade DM has proved highly satisfactory in laboratory and field tests with a wide variety of contaminated and uncontaminated muds, including both lime-treated and sea-water muds. The low viscosity of Grade DM CMC permits low fluid loss without excessive mud viscosity. And CMC's resistance to thermal and bacterial degradation makes it ideal for high-temperature wells.

Grade DM CMC comes in 6-ply, asphalt-lined, marine-type paper bags containing 50 pounds. It can be added to the mud system through conventional hopper or jet-mixing equipment.

If high cost and high mud viscosity have limited your use of CMC, ask your local mud dealer for Du Pont CMC Grade DM. For further information on this and other grades of Du Pont Sodium CMC, write to E. I. DU PONT DE NEMOURS & Co. (Inc.), Explosives Dept., Nemours 11502, Wilmington 98, Delaware.

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SODIUM CMC

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BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

SKY COLORS

A breakfast room lacking that all-important eastern exposure? Brighten it with Du Pont "Tontine" window shades in warm Morning Yellow.

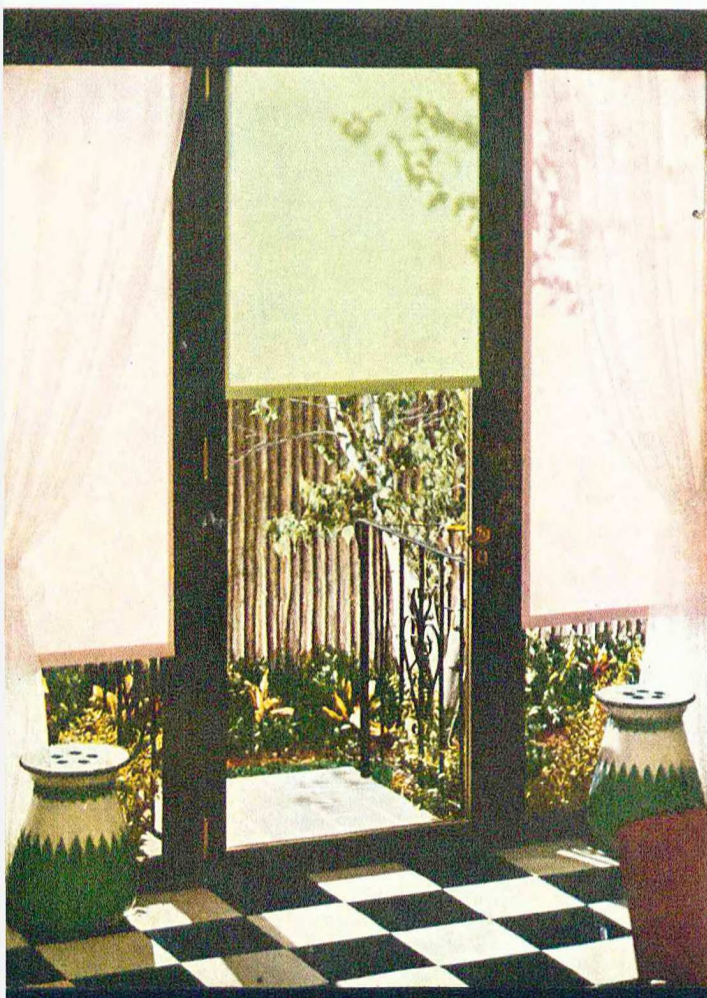
A living room that takes the full rays of a hot afternoon sun? Light condition it with "Tontine" shades of cool Evening Mist Green or Reflection Blue.

These are some of the fresh Sky Colors you can choose from when you let "Tontine" shades solve your window decorating problems. Others are Horizon Pink, Cloud Gray, Vista Green and Zenith Blue. All of them go with today's smartest home furnishing colors in drapes, rugs and upholstery.

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"Tontine" shades in Morning Yellow brighten a room.

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