

# DUPONT

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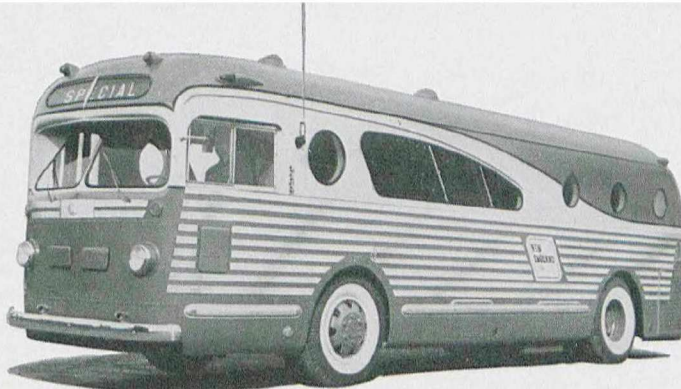


Better Things for Better Living . . . through Chemistry



# New England

chose **"DULUX"** for this office on wheels



Interior of converted bus is comfortable yet businesslike. Company uses "Dulux" on its regular fleet of trucks, buses.



Bus, converted by W. F. Lacey and Sons Co., toured New England cities last year. Here Worcester mayor, center, greets N.E.T. men.

Durable "Dulux" enamel keeps this rolling office of the New England Transportation Co. tops in appearance. Since the converted bus is the showpiece of the company's transportation fleet, appearance in this case is mighty important.

Brain child of Pierre "Spike" Dumaine, company president, the bus-turned-office boasts interior wood paneling, a radio telephone, built-in TV set, range and refrigerator. Company executives drive up to a customer's door in it. Says one: "When you invite a man inside for refreshments and a talk, he's away from the interruptions of his own office. It's not just a gimmick; it serves a practical purpose."

Turning a 15-year-old transit bus into the handsome vehicle you see here was the work of W. F. Lacey and Sons Co. of Medford, Mass. "Dulux" enamel, chosen for its brilliance of color and outstanding wearing quality, was used on the exterior.

The office-bus made a grand tour of New England cities last fall, winter trips to the area's ski regions, and a spring junket through the Middle Atlantic states. Most of the time it was parked outdoors. Still the finish is almost unblemished, and, thanks to dependable "Dulux", will remain that way through many trips to come.



## **DULUX**® enamel

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



**DU PONT MAGAZINE**

Vol. 48 No. 4

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This 9th in a series of lead articles and

cover illustrations is about Du Pont research that is both old and new.

The subject is metal . . .

## It fits the pattern

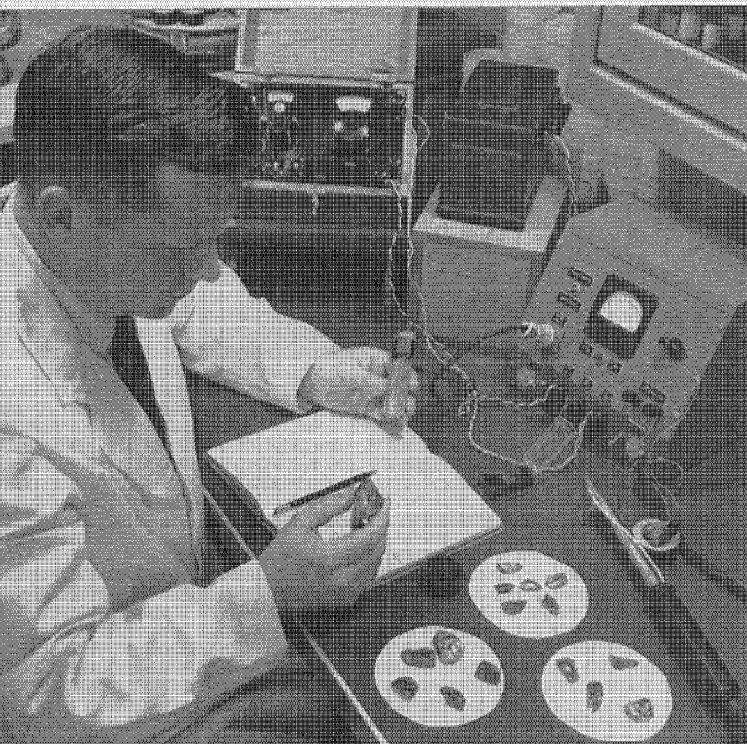
By JAMES H. McCORMICK

When the Company announces a new product, acquaintances of Du Pont might be inclined to ask, "How does it fit into the over-all Du Pont pattern?" In the case of silicon, they might have asked the question more pointedly than usual. What was a chemical company doing refining this semimetallic element? Yet, like sodium, titanium and other metallic and near-metallic elements we'll mention later, silicon fitted snugly into place at Du Pont. There was an acute need for the element, research was active

silicides with pigment possibilities. Sounds simple, but the cards were stacked against them. There was no such thing available as pure silicon, and, thus, through basic research in the pigments field, Du Pont found itself trying to make the element itself.

World War II suddenly made the silicon tail more important than the silicide pigment dog. The word was passed that a purer silicon would help the armed forces with a new thing called radar, and couldn't we help? We could. The pigments research was shelved, and production of silicon for radar microwave detectors—they're roughly equivalent to crystal detectors in old-time radio sets—began. The project was so hush-hush that 90 per cent of those working on it never knew what they were making. Impurities were measured, not in percentages, but in parts

Chemical analysis is inadequate for measuring purity of silicon. Requirements are so high that electronic methods are used.



per million. Yet production reached a weekly peak of close to 20 pounds, enough to make at least 20,000 crystal detectors. The Navy was generous with its praise. "It improved radar detection and directly helped us win sea victories in the Pacific," they said.

With the end of the war, the Company tore down the silicon unit. Silicon for peacetime use seemed far away. They had not counted on a booming electronics industry which would literally go straight from diapers to long pants. Transistors, diodes, power rectifiers and semiconductors were added to our common language, and their makers called for specialized materials of construction. Bell Laboratories asked the Company to go back into production, and offered to buy 250 pounds of silicon for electronics research at \$430 a pound.

Thus, silicon production and research are going concerns at Du Pont today. The quest now is for process improvements which hold the key to greater purity.

"The purity requirements of the electronics industry are climbing fast," it was explained, "and we must keep up. Already we are measuring impurities in tenths of parts per million. We foresee dropping them to parts per billion."

Du Pont's initial venture into metals came in 1930,

in the field, and the Company was in a position to make substantial technological contributions.

Our Pigments Dept., of course, has a long-standing interest in white pigments. About 1940, investigations in this direction led to silicides, but here progress was temporarily derailed: Was the coloration of the compounds due to the primary element, silicon, or to minute traces of impurities? The research team had to know what pure silicon looked like, and then convert it to the desired



when Roessler & Hasslacher Chemical Co., a leader in sodium research and production, wanted to sell its business, and Du Pont wanted an assured supply of sodium to make tetraethyl lead, the antiknock additive for gasoline. The purchase was a natural, and Du Pont found itself with an excellent process that needed only minor improvements. This freed the Company for research on sodium itself. New uses—ranging from heat transfer, to special alloys with other metals, to chemical processing—and ways to handle the metal more safely headed the agenda.

One phase of that search is worth special note. C. A. Vincent-Daviss, of the Electrochemicals Dept. sales development section, noted the trouble steel mills had in removing oxides from the surface of stainless steel. Sodium,

is dipped into water. Simple, quick descaling without damage to the metal is a reality.

"Our present research goal in this field," we were told, "is to lower the cost of the process so it will be feasible to descale the less expensive carbon steels with sodium hydride."

Akin to its metallic sodium research are the Company's studies of metal plating and the case hardening of steel.

In plating copper, zinc, tin and other metals the Company has been primarily concerned with better plating at lower cost. People who use copper as an undercoating for nickel and chromium, for example, want to deposit bright, smooth, thick plate as fast as possible to improve the attractiveness and corrosion resistance of their products.

Research in this connection has been concentrated on improvement of Du Pont plating chemicals and processes by studies of addition agents, operating conditions, and employment of unique current manipulation techniques. It is expected that the most recent development in copper plating, now in the field evaluation stage, will result in the development of a faster process for a bright, smooth copper plate having improved buffability.

In order to conserve tin and improve the corrosion resistance of sheeting from which tin cans are made, Du Pont developed a high-speed electrolytic tin plating process to replace the earlier wasteful "hot-melt" operation. Research is now being directed to improvements in current efficiency and further savings in tin.

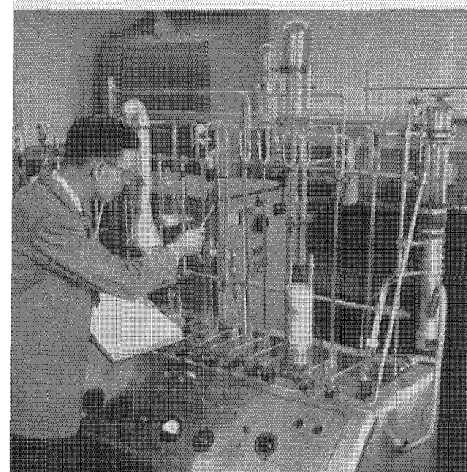
### GOLD AND SILVER, TOO

Precious metals have their day, too. For decades, Du Pont has made formulations of precious metals for decorative purposes. The gold on your dinner plate or glassware, for instance. Research in this field is primarily of the product-improvement variety, designed to make a coating that will be easier for the manufacturer to apply and will be better looking and more durable for the consumer. More recently, research on paint-thin coatings of silver to conduct electricity—used in hearing aids, television equipment and handbag radios, for instance—has increased in importance. Du Pont scientists seek better ways of getting the silver into more uniform compositions that (1) adhere better to glass, ceramic or other base materials, (2) are better conductors, (3) dry properly to continuous films, and (4) have longer in-use life.

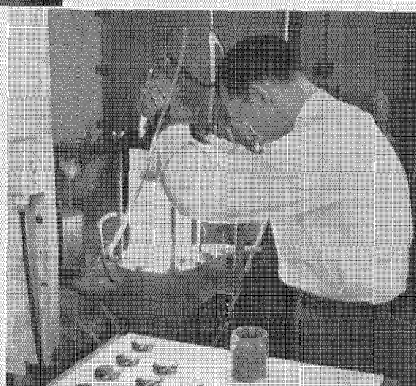
In a roundup article of this type, we can't cover research on every Company product allied to metals. A major field of our endeavor is in protective metal finishes, but a single example of this research must do.

During the Depression years, when Du Pont was just as concerned with doing research as it is in good times, R. T. Hucks of Finishes research conceived the idea of combining, in a lacquer, particles of metallic aluminum with durable pigments, such as fine particles of green chromium oxide. The idea was the big thing. Company know-how in the finishes field took it from there, and in due time—several years and thousands of tests later—Metalli-Chrome lacquers and enamels were introduced. These auto finishes have brilliant highlights and dark, deep tones in the shadow areas.

Metals research plays its part in Company explosives, too. Many *Du Pont Magazine* articles have described the devices which delay by a desired, predetermined length of time the shooting of a blasting cap and hence the explosive charge. These delays permit setting off charges in rotation, thus minimizing the amount of boom and vibration you get from the blast. Electric MS (milli-



Traces of certain gases dissolved in titanium metal can be extracted and measured by vacuum fusion gas analysis.



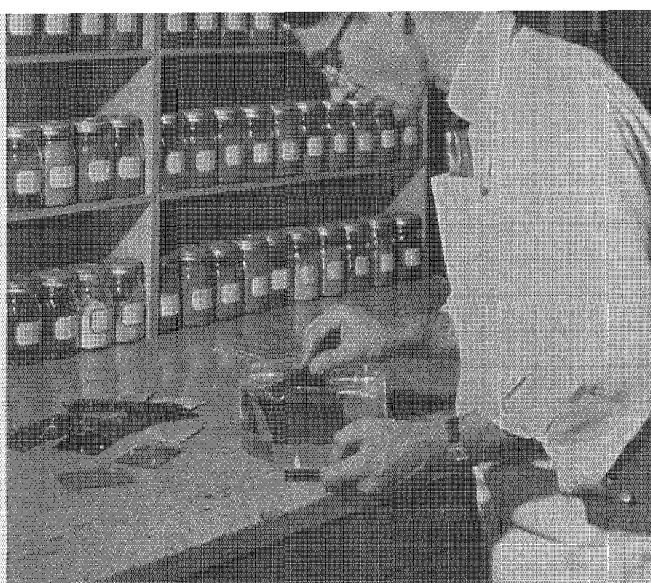
Metallurgist makes button-sized ingots from titanium sponge to measure hardness.

he knew, had a great affinity for the scale-forming oxygen. Could it remove scale, he asked research?

The researchers' first attempt was to "descale" the stainless steel in a bath of molten sodium. This worked fine to begin with, but gradually the bath became corrosive as by-product impurities built up. Mark up strike one, swinging.

Next was a called strike two. Practically everyone except Vincent-Daviss gave up the idea of using sodium for descaling metals. He was so persistent that research called on one of its sodium experts to make a fundamental study of the process. As a result, Dr. Harvey N. Gilbert substituted at bat, and decided that sodium hydride, not metallic sodium, would produce a run. And it did. Scale-covered parts or pieces of steel are dipped into a molten caustic bath containing sodium hydride. This reduces or deoxidizes the scale to a spongy mass which literally explodes off when the metal, still wet with molten caustic,





second) delay blasting caps relied on a mixture of chemicals to give the desired burning rate. They were good, but could be made more exact. That was the cue for a group headed by G. A. Noddin to look into the subject of solid, non-gaseous, constant-burning reactions for delay trains. Their discovery was the use of boron, a complete departure from past work in explosives, mixed with a lead compound. After the usual two or three years of testing, the idea proved out, and boron-lead mixtures are now standard for electric MS delay blasting caps.

#### TITANIUM TOPS IN GLAMOUR

The most glamorous metal research at Du Pont today is on titanium, already an essential stockpile material for our defense needs. Already, we say, for only ten tons were made in the United States as recently as 1948. Several years before the national interest in titanium, Du Pont, because of its interest in titanium tetrachloride for white pigment manufacture, assigned technical men to study titanium metal. By 1947, a substantial budget and staff were wrapped up in the project, and several men visited the U. S. Bureau of Mines to learn how the Bureau was making out in similar studies. They came away full of doubts, and turned their attention to other approaches. They tried making titanium, for example, by reducing the oxide and the sulfide and by cracking the di- and trichlorides of the metal. None of them worked. Back they went to an approach through their pigment intermediate, building a ten-pound batch unit to make the metal by reacting titanium chloride with magnesium metal in a process similar to the Bureau of Mines'. It did work—but just. It had more bugs than a picnic.

Incorporating so many changes and improvements that it bore little resemblance to earlier efforts, a 100-pound unit was built. Most of the time it did well to produce half that much a day, but by September 1948 Du Pont was offering titanium for sale. The Company had crowded into three or so years a development that normally would have taken several times that long.

Light shines through jet-etched silicon wafer made by the Philco Corp. for use in surface barrier transistor.

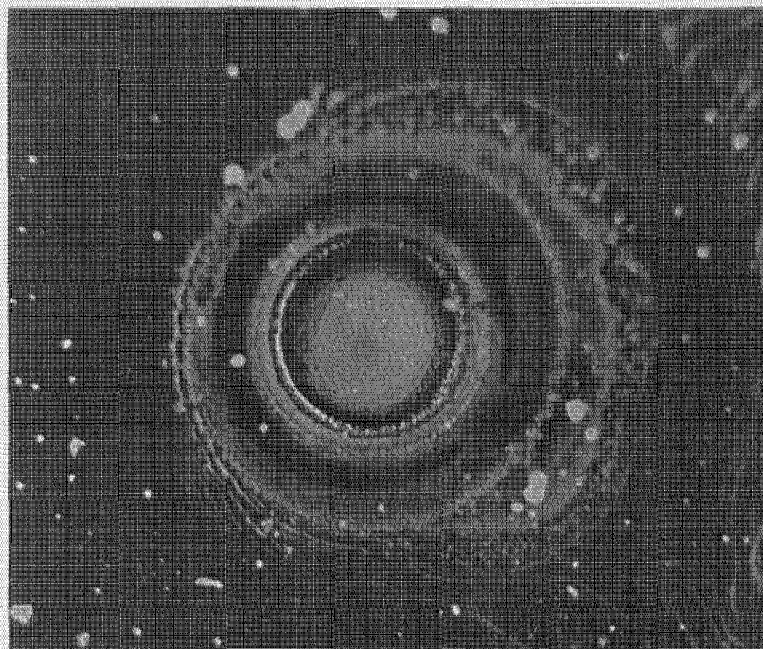
New vitreous enamels for aluminum are one result of company research in metals. Here production samples of ceramic material are given accelerated exposure test.

Moving from this unit to others of several thousand pounds' capacity called for still more research and engineering advances. The two biggest hills to climb were titanium's high affinity for gases in the air and its great reactivity with materials used in the construction of the production unit itself. This called for leakproof equipment to keep the air out and careful temperature control to keep the titanium mixture from melting or corroding the reactor. This simple-sounding job had the researchers pulling out their hair for almost five years.

Making titanium sponge was only the first part of Du Pont's research and engineering task. Having made the unwieldy mass, it had to be crushed—difficult because it deformed and yielded rather than breaking, chipping or shattering like many other materials. Two special furnaces were designed for getting the crushed sponge into solid ingots, one an induction furnace, the other for arc melting. Both were offered to customers, and are in successful operation in their plants.

Again we have covered in a few words the work of a large research team that spent years and hundreds of thousands of dollars to find satisfactory melting methods—and this was only a small part of the total program. As other companies have taken up the work on fabrication and development of uses, Du Pont has returned to its work on the chemical end of the process.

"We're spending a million dollars a year to lower the price of titanium by developing a more economical process for winning the metal from its ore. This work will continue," the Pigments Dept. technical director said. "Our work will also continue in new areas. We're doing expanded research on zirconium and other metals whose physical properties are greatly influenced by minor amounts of impurities, and for which hyperpurity is essential in critical applications. Metals belong in the Du Pont scheme."







Million cubic yards of fill were dumped in this valley to make turnpike roadbed.

They conquered the Appalachians to build  
the West Virginia Turnpike, the nation's newest

# Highland highway

*By M. M. LILLY and G. H. KESTER*

CHARLESTON, W. VA.

West Virginians have never been self-conscious about their state's being the smaller of the two Virginias. They suspect that if they ever smoothed out their wrinkled landscape, pulling the whole state out flat, they could easily dwarf their eastern neighbor.

The same Appalachian Mountains that have given West Virginia its mostly vertical real estate still keep many sections in relative isolation. In the uplands south of here, for example, there are two small towns that lie on opposite sides of a steep ridge. On the map they are separated by

only ten miles or less, but by road they are 150 twisting, up-and-down miles apart. There are people here who have never been far from the creek valleys in which they were born.

It is through this rough country, some of the most inaccessible in the East, that the new West Virginia Turnpike is being pushed to completion. Running 88 miles from Charleston at its northern end to Princeton in the south, spanning gorges, stabbing through a mountain, leaping from one notched height to the next, the concrete



ribbon between the two cities veers no more than six miles from a straight line.

There are longer superhighways in the country, and wider ones, but it's doubtful that any has presented a greater challenge to builders. Remote wooded slopes had to be cleared and roads pioneered to get in heavy trucks and shovels. One of the largest concentrations of grading machinery in road building history was employed here in moving 30 million cubic yards of dirt and rock. A total of 81 bridges carry the new toll road over rivers, creeks and railroad lines. A half-mile tunnel was blasted through one mountain.

The result will be seen by motorists some time this fall when the \$130-million turnpike is opened to traffic. Although the road starts 600 feet above sea level at Charleston, climbs to 3,250 feet, and then slopes back to 2,000 feet at the southern end, nowhere in its 88 miles does the grade exceed five degrees. Curves are gradual, designed for a steady 60 miles an hour. Two 12-foot concrete lanes flanked by blacktop-paved shoulders are the rule, although an extra lane is provided on long grades and at the turnpike's six interchanges. Tolls have been set tentatively at \$1.55 for passenger cars and up to \$6.15 for the heaviest trucks and buses.

### SCENIC TRIP FOR TOURISTS

The turnpike will bring Charleston and Princeton 30 miles and 90 minutes closer together. More than that, it will open a needed avenue through the Appalachians for passenger and freight traffic between the Carolinas and the industrial Great Lakes region. It also will be one of the most scenic highways in the country, traversing a region until now hidden from the eyes of most tourists.

To West Virginians one of the most astonishing things about their new thoroughfare is the speed with which it is being built. Every part of the grading job was tackled at about the same time last year under 21 separate contracts. An army of workers and some 2,000 pieces of equipment were marshaled for the job. The whole project, bridges, paving and all, will have been completed in about 18 months.

The most difficult grading contract went to S. J. Groves and Sons Co. of Minneapolis. In 6.3 miles along the Paint Creek valley, near the middle of the turnpike route, Groves is moving three million cubic yards, most of it sandstone and silica shale. Included in this single short section are 19 cuts, 11 bridges, and one fill that alone required a million yards of material, making it the largest on the turnpike.

Raymond E. (Hardrock) DeWitt, Groves' blasting and drilling superintendent, detonated two million pounds of dynamite on the contract, a large percentage of it bearing the Du Pont label. Hardrock, whose 40 years in the construction business have taken him to most of the states and Mexico, says the West Virginia job was one of the toughest highway assignments he ever tackled.

"Every shot was different," he said. "We ran into about seven different kinds of rock, and it was all so fissured that you had to be careful to avoid slides. On the cuts we used MS delay blasting caps to minimize back breakage. Depending on the material we were shooting, we used either Du Pont 40 Special Gelatin or 'Red Cross' 'Extra' dynamite."

Like most blasting bosses on the turnpike, Hardrock found the Du Pont Condenser Discharge blasting machine

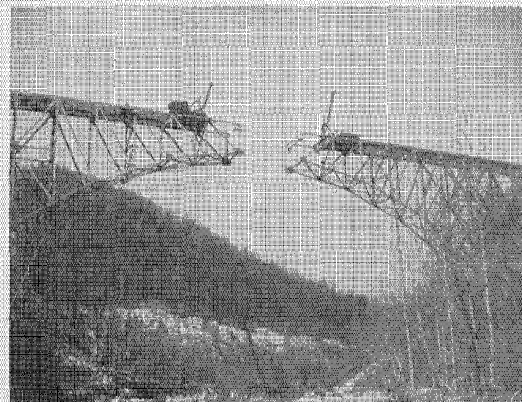
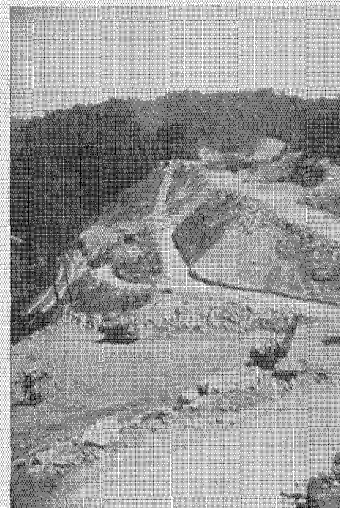
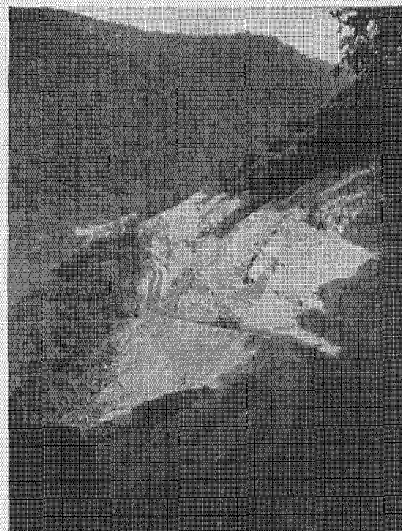
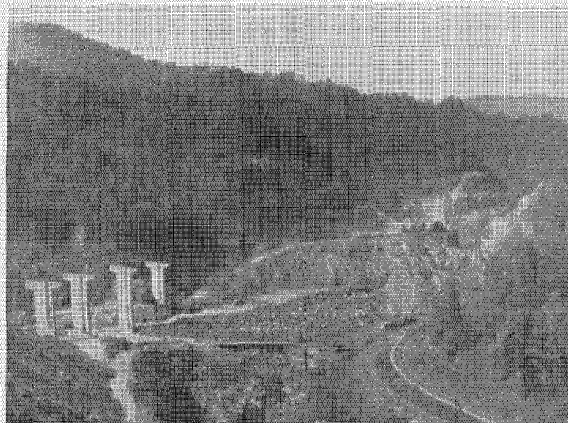
a valuable assistant. It builds up enough voltage to set off as many as 1,200 holes, and is completely portable.

"That CD blasting machine is one of the biggest advances in shooting in many years," he says.

A few months ago most of the heavy grading equipment up and down the turnpike was being loaded aboard flat cars for shipment to other construction projects. Hardrock and many of his colleagues on the Groves contract have already moved on—the veteran blaster himself to a highway building job in New Jersey.

Soon the rumble of heavy construction will give way to a new sound: the drone of traffic as the West Virginia Turnpike begins its useful life in this American Switzerland.

Construction views along the turnpike route through the Appalachians. New toll road, opening this fall, will offer both convenience and rare scenic beauty.





How far have we gone in

# Dyeing man-made fibers

By PAUL L. MEUNIER with MARY ELLEN EVANS

Sometimes the very properties of a new product that give it unusual value for the consumer at the same time create problems for the producer.

Take for example "Orlon" acrylic fiber and "Dacron" polyester fiber. As continuous filament yarns and short staple fibers, they make possible clothes designed for modern, easy living. But the properties that make them quick-drying and wrinkle-resistant work against them as far as dyeing is concerned.

These man-made fibers are highly oriented; that is, they are crystalline in form and so tightly constructed that there are few pores through which dyes can enter. This characteristic is what makes them dry fast, but it also means that they resist conventional dyes as readily as they resist water penetration.

Du Pont scientists realized early in the development of the two fibers that new dyes and new methods



Brilliant colors or soft pastels in basic dyes created especially for "Orlon" make sweaters beautiful as well as practical.



of application had to be developed. The dyes they were after must have outstanding fastness to light and washing to be worthy of the durable fibers themselves.

To illustrate what the research teams accomplished, let us look at the development of new dyes for "Dacron". The scientists knew of the considerable similarity between "Dacron" and acetate. Molecules in both fibers are arranged in a zig-zag chain pattern. In the case of acetate, the chains appear to be flexible enough to allow the dye molecules to enter.

In using a dispersed dye, the dye breaks up in the dye-bath into very small particles, about a ten-thousandth of an inch in diameter. These particles each contain about a billion dye molecules. In the dyeing process, the molecules break off, apparently one at a time, from the particle of dye, and are carried through the water to the fiber. The single dye molecules then appear to enter the acetate fiber.

With "Dacron", the tightly arranged fiber chains refused to let the dye molecules enter. Researchers were sure that if they ever got the dye molecules inside this compact fiber network, they would stay there, assuring a high degree of washing fastness. But how could they induce the "Dacron" fiber to let the dye inside?

Suitings of "Dacron" and wool are dyed after fabric is woven. Pink coat is made of "Orlon".



One idea was to lubricate the interior of the "Dacron" fiber so that the chains and the dye molecules would slip about more readily. Scientists tried using "carriers," compounds usually of the aromatic series, and found they literally slide the dye molecule into the "Dacron" fiber. The carrier is then removed by scouring, and the dye molecules, not remembering how they got into the tiny network, stay there despite washing, dry cleaning, rubbing or exposure to light. Another expedient was to bring in the dye molecules in smaller pieces and assemble them after they were inside the fiber. The dye molecule was then too large to get out.

The research teams also studied the effect of temperature on dyeing man-made fibers. They found that by dyeing at 225°-250°F., the chain molecules of the "Dacron" fiber apparently jump around so vigorously that momentary gaps open up to let the dye molecule through. In other words, at high temperature, "Dacron" behaves as acetate does under normal dyeing conditions.

Pressurized equipment was then developed for high-temperature dyeing. Scientists and engineers at the Jackson Laboratory designed small machines for dyeing stock or short length staples. Similar machines are being used by a number of textile mills. Perhaps the greatest advance was the development of the Barotor pressure dyeing machine, a commercial unit which can handle fabrics in open width. Designed by the Textile Research Laboratory, the Barotor is being used for dyeing fabrics made of "Dacron" polyester staple and filament, blends of "Dacron" with rayon

Cross-dyeing: yellow wool, blue "Orlon" and blend of two fibers came from same dyebath.

and nylon, fabrics of "Orlon" acrylic staple and filament, and blends of these fibers with nylon and rayon.

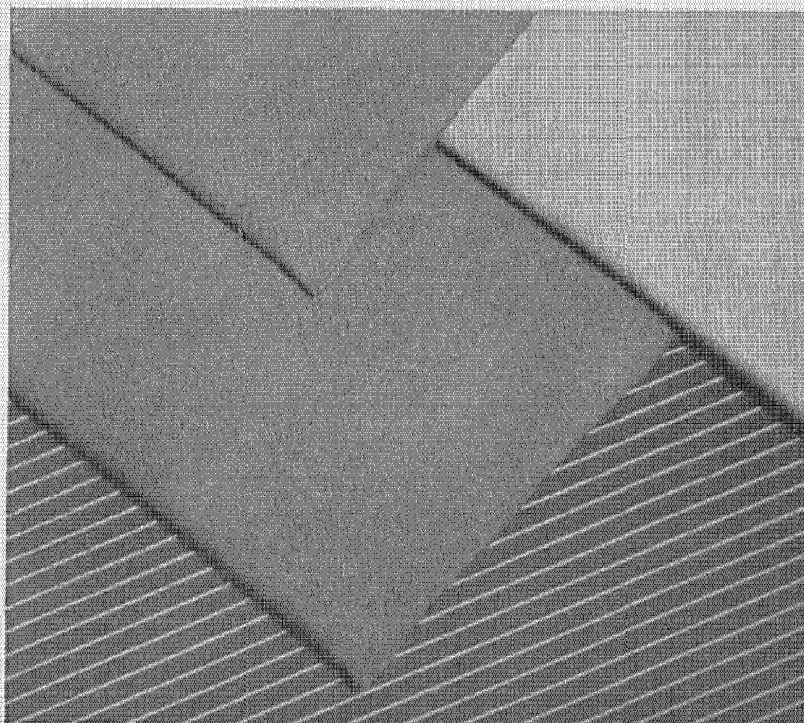
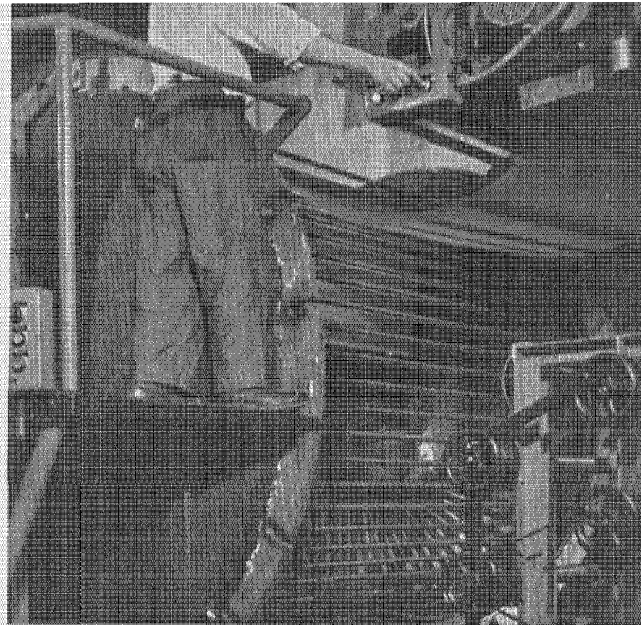
Research likewise turned up a whole new range of dyes for "Dacron" polyester fiber. These "Latyl" dyes are now widely used on all forms of "Dacron"—blends of the fiber with wool for suitings and dress goods, and 100 per cent "Dacron" for wash 'n wear apparel. The colors have excellent light and wash fastness.

The research team also developed new basic dyes with exceptional brilliance and fastness to washing and light. In the past, basic dyes were seldom used on clothing fabrics because of their lack of fastness.

The new dyes are effective on blends of "Orlon" and wool because they dye the "Orlon" without staining the wool. This same ability to select the "Orlon" for dyeing fits the basic dyes for use on blends of the acrylic fiber with rayon and cotton. Textile manufacturers thus may get tone-on-tone and heather effects as well as solid shades when dyeing blends.

We have come a long way in solving the problems of dyeing "Orlon" and "Dacron". But Company scientists are presently working on better carriers, basic dyes with still better light fastness for men's wear, and better union dyeing for the manufacturer who wishes to combine several fibers in one fabric. Du Pont continues to work with the textile manufacturer in arriving at the best dye and the best method of application for the fibers he wants to use.

Stock pressure dyeing machines, developed at the Jackson Laboratory, help test new dyeing methods.



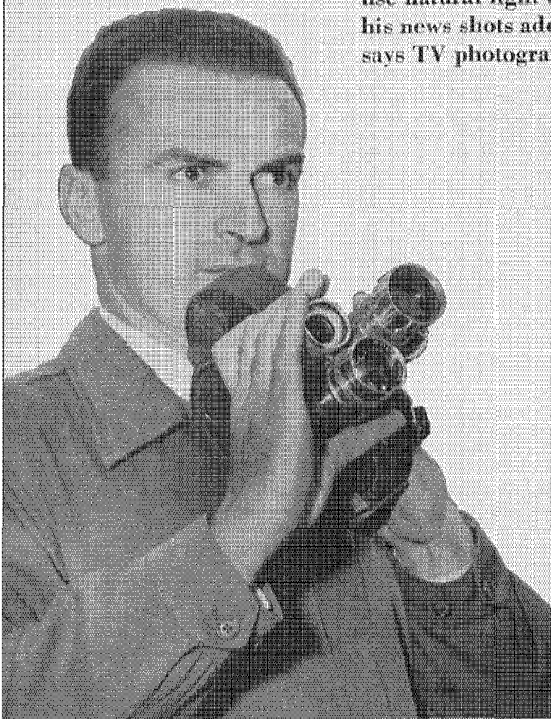


# He makes news live

*TV film reporter Bob Gray has worked out a way to give the viewer a seat at exciting news events*

By JIM F. PALMER

Du Pont's fast film lets him use natural light to give his news shots added impact, says TV photographer Gray.



Have you ever been fascinated by the plight of a perspiring, blinking city councilman on a TV film news show? It's probably not his constituents that upset him. It's that bustling TV cameraman with his battery of glaring lights and maze of wires.

Or take that gambling raid you expected to see on television. The only footage the TV newsman managed to bring back showed one last diceplayer being hustled into the police van. By the time the cameraman could set up and plug in his lights, the raid was over.

Most television news is brought to you via the motion picture camera, and until recently the need for extensive artificial light frequently made news shots stilted and un-

natural. Many were impossible, because the time required to set up bulky equipment allowed vital scenes to escape.

Now fast and complete news is being photographed daily by Bob Gray, chief film reporter for KPRC-TV in Houston, Texas. When news develops, Gray just aims his 16mm camera and shoots. Often he uses no artificial lights at all.

Gray's secret is a very fast motion picture film, Du Pont High Speed Rapid Reversal Pan (Type 931). It's so sensitive that almost any amount of light—from an open window or an ordinary light bulb—will do the trick. The photographer then overdevelops the film to reinforce the image. The result is casual, natural photography that makes for effective reporting.

More important, the new technique also lets KPRC-TV cover stories it was never allowed to touch before.

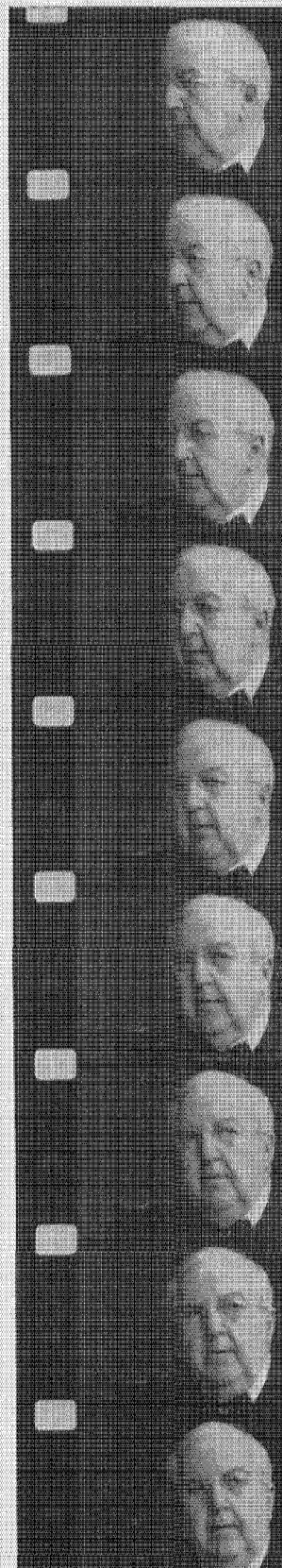
The Houston City Council, for instance, was leery when radio and TV newsmen first began taping and filming council sessions. The councilmen were afraid the meetings might take on a sideshow aspect. But when Gray began filming council sessions without elaborate preparation, using only existing window and overhead ceiling lights, the council soon accepted the camera as a reporting tool right along with a reporter's pencil. On occasions since, artificial light has been used in council sessions, but sparingly.

## COURTS OPEN DOOR TO TV

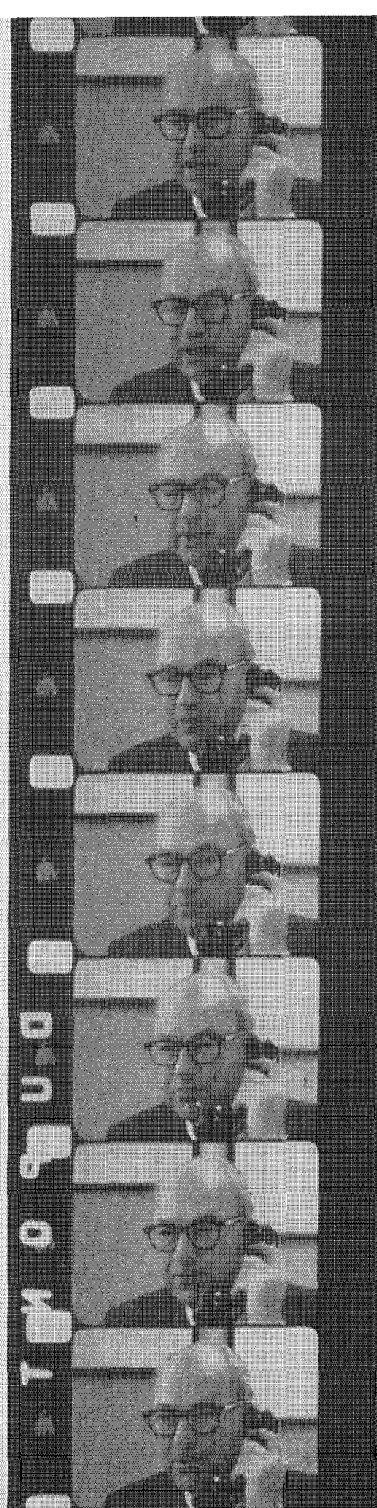
Until recently, TV film coverage of certain Houston courtrooms also was banned. Officials thought it marred the dignity of the court and disrupted the air of concentration necessary to legal proceedings. Now, working unobtrusively with existing light, Gray operates in the criminal courts of all three local district judges, with their blessing.

Gray hasn't abandoned artificial light entirely, of course. His basic idea is to use natural lighting whenever it helps him get

Gray used light from an unshaded window in this filmed interview with Bob Tucker, Democratic Party chairman.







Republican Chairman J. R. Brown makes a quick phone call in this candid TV film sequence. Gray is advocate of casual, unposed look.

action he couldn't capture otherwise. Often he's willing to sacrifice detail for the over-all impression.

"It's the news we're after," he says. "In this business, that comes ahead of technical perfection."

Gray cites the coverage of a beauty contest as an example. All eyes are on the winner as she walks across the platform to receive the prize. All eyes except the photographer's. He sees the adoration on the face of a young girl spectator as she gazes up at the new queen. He swings his camera around almost automatically, switches focus in an instant, and captures the kind of human interest shot that can't be posed. He does, that is, if his camera is loaded with a film that can penetrate the shadows.

#### DAYLIGHT DOES JOB INDOORS

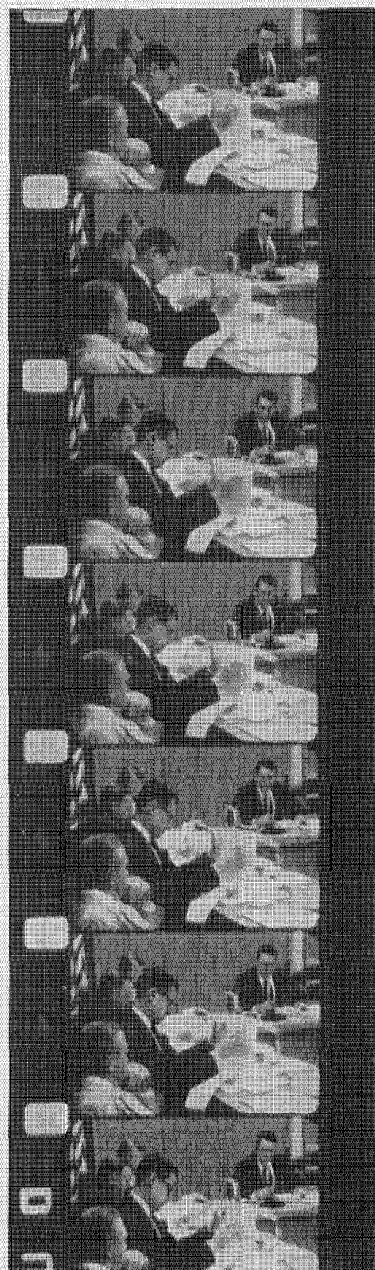
For inside work, Gray prefers daylight from a window. He uses Type 931 film with a large stop opening, careful focusing and controlled long development. In the absence of a window, fluorescent lighting is the next best source. On occasion, ordinary light bulbs must be used.

The Texas photographer has obtained excellent close-ups with a 75-watt bulb as much as five feet away from the subject. He has taken what he considers acceptable shots with only a 60-watt bulb six feet overhead. And he takes long shots as well as close-ups in a crowded courtroom where there are only a dozen 100-watt bulbs 12 feet overhead.

Even with overdevelopment, however, Gray's footage sometimes lacks density. In this case, the television engineers turn up an electronic contrast control to make the image appear clearer on home sets.

The natural lighting technique is not new. It has been used in still photography from the earliest days. But there time exposures made it possible. Now, thanks to the speed of films like Du Pont Type 931, the technique can also be applied to motion pictures.

Through proper use of fast film and a willingness to tread fresh paths in news photography, Bob Gray and KPRC-TV are doing their part to create a better informed community.



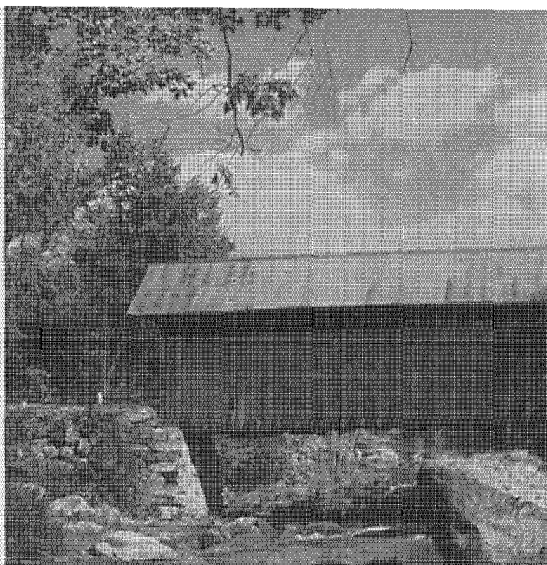
Ordinary room lights allowed Gray to film school board hearing.

Gray used existing light in covering this courtroom scene for TV.





Wood treated with Du Pont CZC resists rot and termites whether it is used in building houses, plants, or in rebuilding a covered bridge.



# The CZC story

By JAY H. MACKEY

Our Grasselli Chemicals Dept. informant positively glowed while describing the use of lumber treated with chromated zinc chloride on offshore oil drilling platforms in the Gulf of Mexico.

"Textile mills in the Carolinas," he added, "can give you another side of the story—the almost unbelievable number of years CZC treatment has added to the life of lumber."

To follow up these leads, we first visited Houston's oilmen to learn about offshore drilling in general and the value of Du Pont Chromated Zinc Chloride in particular. Here we found the same enthusiasm, only it was more vocal. At Continental Oil's headquarters, we talked to James C. Craig, superintendent of marine development. Offshore drilling platforms, like the one pictured here, are being built by Continental and other oil companies in many areas of the Gulf. Each is worth a small fortune, costing up to \$400,000.

"Lumber for the rig decking, or platform floor," Craig said, "is in danger of being set afire by welding sparks, so our decision to use fire-retardant wood was a natural one. We asked the advice of the engineering firm of Brown & Root, who recommended CZC. That, too, seemed a natural, for we like other features of CZC-treated lumber—rot resistance and freedom both from vapors and a slippery surface during hot Gulf of Mexico summers."

From F. R. Hauber, designing engineer of Brown & Root Marine Operators, Inc., we learned more on the subject. "From the competitive point of view, wood is the best structural material for oil platform decking. This is despite the fact that the Gulf dampness rots wood, and drilling muds attack it.

"By treating with CZC," Hauber said, "we can stop rotting and make wood much better able to resist fire without reducing its strength or other good features. We built a platform off Galveston in 1948, and its CZC-treated decking is still in good shape. Since first specifying the use of Du Pont Chromated Zinc Chloride in '47, we've

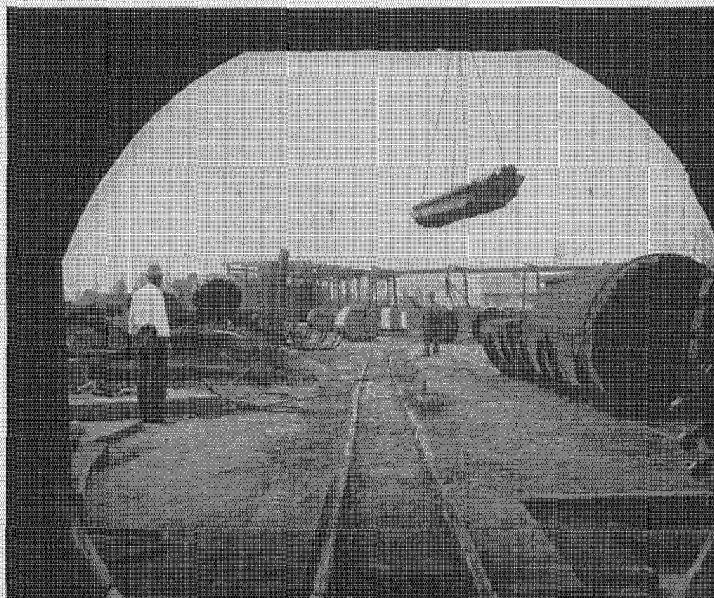
used enough wood treated with CZC for 500 frame houses."

A final stop in Houston took us to the treating plant where a solution of CZC had been forced under heat and high pressure into wood for the decking. In addition to doing such work for industry, this company, like a majority of wood preservers, carries on hand a stock of impregnated lumber for home and commercial construction.

"Preserving wood in this Gulf region has always made good sense," they explained. "The heat and humidity here are ideal for termites and rot. In recent years, treating has become even more necessary because virtually all lumber in the country is sapwood from second- or third-growth trees. It lacks the durability of virgin growth, and needs to be treated to make up the difference. In our opinion, treating with CZC doubles or even triples the life of wood in general use."

En route home, we stopped in New Orleans for some

Camera inside treating cylinder peers out at boom load of lumber. Wood, treated with CZC, is used on offshore oil platform





of its wonderful cooking and to visit the Crippled Children's Hospital. Touching on our interest in CZC was the requirement that all structural lumber in the building was to be flame-resistant in accordance with the rigid stipulations of the Underwriters' Laboratories, Inc. We talked with James Blitch of Ricciuti, Stoffle and Associates, architects for the project, who described his task as one of combining safety and comfort for the patients with economy and workability in construction. "We specified that the wood be flame-retardant. Nonstaining qualities, and even more important termite and rot resistance of CZC-treated wood are plus values," he said.

The treater of the lumber for the children's hospital foresaw an increase in the demand for flame-retardant wood treatment. "For flame retardancy," he said, "we use regular CZC, but our choice is copperized CZC for other uses. It has that extra punch to take care of New Orleans' serious termite and decay problems."

Back home in Wilmington, we checked trade reports and talked to some local wood preserving experts about uses for treated wood. We learned that Fruit Growers Express, which has 15,000 refrigerated freight cars in service, specified CZC-treated lumber for car lining and subfloors. United Fruit Co. also specified it for the cargo spaces of their ships because fungus spores that are rampant in the humid, banana-filled holds find CZC-treated wood strictly off limits.

We found in a lengthy report by a committee of the American Mining Congress that the average life of untreated railway ties in underground mines varied from two to five years. CZC-treated ties had been used on mine tracks for up to 17 years. There was still no evidence of decay, and during this time there had been no chance that in a fire the wood might fill the mine with choking smoke. Miners likewise prefer the clean, non-oily and odorless feature of CZC, since ties and props are frequently moved by hand from place to place.

A wood-treating firm in the East called our attention to lumber treated with the Du Pont preservative which, because it is safest to use near food, is going into wood-lined commercial refrigerators. Another major use for treated wood is in subflooring for school gymnasiums and auditoriums, and its freedom from oil and its paintability are assets for stadium seats. Franklin Field, at the University of Pennsylvania, is a typical CZC job.

"Stress the fact that CZC makes a wood surface more paintable," an official of this company suggested. "An instance where that advantage has chalked up a sale is on guardrail posts along the New Jersey Turnpike. My company also points out that CZC-treated lumber, such as that we supply for the Atlantic City boardwalk, has up to 15 per cent greater abrasion resistance than untreated wood."

To wind up our story, we asked a treater in the textile mill area of the Southeast for the story of CZC in the textile mills. The treater did some figuring, and said he reckoned they'd treated more than 60 million board feet for that industry.

#### CZC UPGRADES SAP PINE

"I can remember," he said, "when longleaf heart pine was standard specification for textile mills. Today, you just can't find it, and you settle for sap pine. Treat it with CZC, however, and it should last as long as heart pine, in addition to being less flammable. For example, a large dye, bleach and print plant put up a CZC-treated roof in 1938. Since then, the steel support beams have rusted out and been replaced, but that old roof is still in good condition. All that time, heat and high humidity in the plant have been ideal for fostering fungus and rot. Steam released from the textile finishing operations actually condenses on the inside of the painted roof and drips back down on the floor. Untreated wood? It wouldn't have lasted four years."

Switching from textile mills to the problem of termite and rot control in homes, the treater explained that if a prospective builder specifies CZC-treated wood for sills, joists and subflooring, it will cost him less than just one termite treatment of the completed dwelling, yet the CZC protects for the usual life of the building.

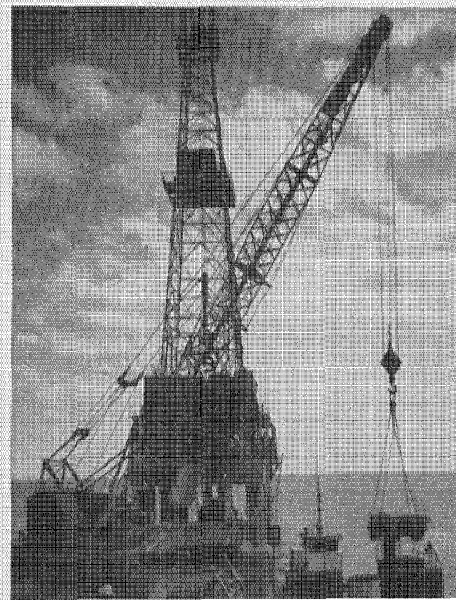
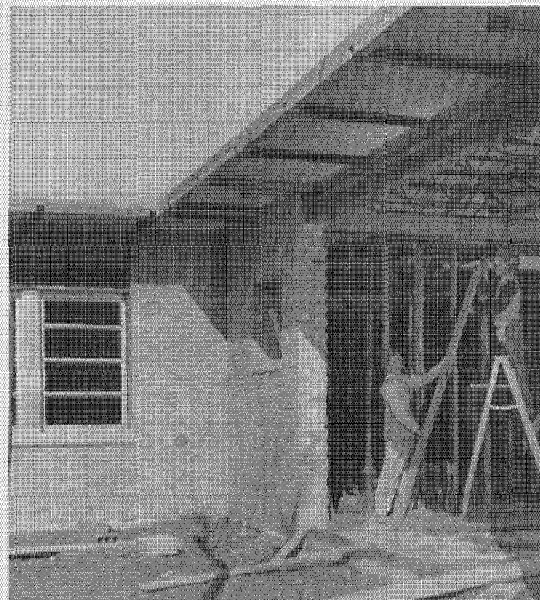
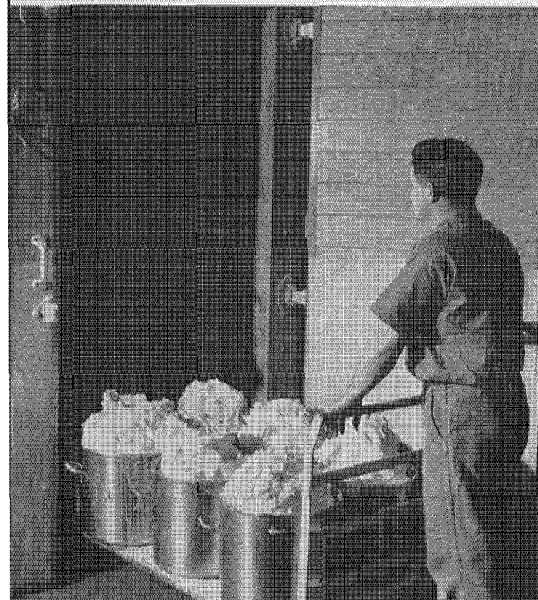
"Commercial work is our main business now, but I wish homeowners would wake up to the inexpensive and lasting benefits of using treated lumber," he said. "For two or three per cent more on building costs, you add many times that in insurance against decay, fire and termites. As time goes on, I believe this end of the business will grow more important."

This enthusiasm for CZC was expected by now, so we told him we hoped to come back in a few years to see how his forecast comes out, and report it to you.

Wood in this bakery refrigerator is CZC-treated to reduce mold, prevent rotting.

Children's hospital in New Orleans uses wood with fire-resistant treatment of Du Pont CZC.

A typical offshore drilling platform. CZC treatment was specified for wooden deck







Aerosol packaging embraces 60 product types, many brands. Sales in '53: 140 million cans.



# Work made easier

*... if you let a push-button aerosol do part of the job*

By FRANK ZUMBRO

From adhesive tape remover to textile yarn dressing, convenience-loving Americans are depending on self-spraying aerosol products to the tune of some 225 million containers this year to do home and factory jobs faster and more efficiently.

More than 60 different types of products have been adapted to the hand-sized packages that spray a fine mist, foam, or even dry powder at the press of a button. Now a \$250 million business, the aerosol industry in eight short years has established a new type of packaging, created new businesses, and feels it has barely scratched the surface of potential applications of the push-button container.

Optimistic outlooks for the aerosol industry hinge on the fact that its growth has been consistent since the first insecticide spray packages appeared on the consumer market in 1946. Between five and six million aerosol packages found their way into retail channels that year. By 1953, the total was an impressive 140 million.

Newest uses for aerosols are in the personal toiletry field, where hair net sprays, hand lotions, shampoos, perfumes and colognes already have made their appearance as the forerunners of an expected host of products in this field. Ultra-low pressure glass aerosol containers introduced this year provide the key to opening up a whole new range of pressurized products, many industry leaders think.

Anti-perspirants, for example, have not been marketed in aerosol containers because of packaging difficulties. Should glass bottles be satisfactory, market analysts think that within two years aerosol anti-perspirants alone might account for 50 million units a year.

Plastic containers also have been developed and, although they have not yet appeared on the consumer market, may be an important factor in the industry's growth.

Many cosmetic experts look on the aerosol package as the most important perfume-cologne advance in the last century. Atomization, they explain, is generally accepted as the best way of applying perfumes and colognes for maximum effect, and the aerosol container gives better atomization than the finest squeeze-bulb atomizers. But perhaps of even more importance is the fragrance protection the aerosol package

gives. Air is the eternal enemy of fragrance, say perfumers. Every time perfumes are exposed to it, their fragrance changes as evaporation and oxidation take place. The delicate and distinctive fragrance of expensive perfume deteriorates each time the vial or bottle is opened.

The aerosol container, being gastight and loaded only with the perfume ingredients and an inert propellant like Du Pont "Freon" fluorinated hydrocarbon, would eliminate air contamination and evaporation. The result, cosmeticians say, would be retention of the original fragrance right down to the last drop of perfume in the container.

Other personal toiletry items that might be adapted to the aerosol package are a closely guarded industry secret. Some work is being done, however, on depilatories, dentifrices, hair dressings, antiseptics for other than mouth application, and powder for the body. One manufacturer is reported to have developed a workable mask to assure spraying fingernail polish only on the nails, while another has perfected a spray that dries nail polish almost instantaneously.

While women are dominant in the toiletry field, the male hasn't been overlooked. Push-button shave creams, now going into their fourth year, have cornered a third of the shaving soap market. This year's sales may well exceed 50 million cans.

Even pharmaceutical manufacturers are eyeing the pressurized package for its ability to protect the contents from contamination and to allow product application to

the skin without daubing or rubbing. The "Freon" propellant is nonflammable, odorless and virtually nontoxic.

Already available is an adhesive balm which, when sprayed on the skin before adhesive tape is applied, reduces the irritation sometimes caused by the tape. Another aerosol product is designed to facilitate the removal of adhesive tape. Topical anesthetics, athlete's foot preparations, bactericides and burn preparations have been adapted to application from an aerosol container, and one of the newest of the medical aids is a spray-on bandage developed for the U. S. Air Force and now available to

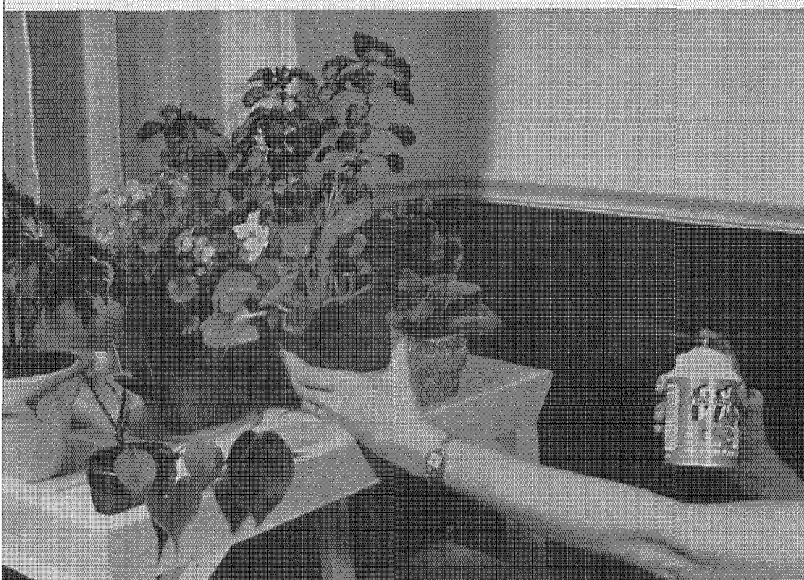


Plastic-coated glass container, one of newest packages in aerosol field.





Aerosol packaging of toiletries is fast-growing segment of business. New plastic containers may spur it even more.



Pioneer aerosol product and still a leader are insecticides. Industry expects to sell 60 million cans in 1954.



physicians for professional use. The canned bandage not only provides protection from contamination and helps seal in body fluids but lets the doctor see the progress of healing. It can be peeled off easily to treat a wound.

Pioneer and probably still the best-known household aerosol product is the insecticide. Pyrethrum was the major ingredient of the first aerosol insecticides, but science has turned to many other killers—DDT, allethrin, chlordane, methoxychlor. With each new development, aerosol marketers have revised their formulations so that today there's a wide variety of insecticides for specialized use against flies, mosquitoes, moths, roaches, and vegetable and floral pests. In 1954, the output of aerosol insecticides for both flying and crawling insects is expected to reach nearly 60 million cans.

Room deodorants, designed to mask the disagreeable odors of cooking or smoking, are another volume leader in the aerosol package. And pressure-packed paints, enamels, and clear plastic sprays have caught the fancy of both household and industrial users sufficiently to chalk up nearly an 11 million unit production last year, with a 33 per cent increase forecast for 1954. That's a healthy growth, too, when you figure that aerosol paints and enamels aren't a general purpose painting tool but are confined largely to touch-up jobs in industry and use on irregular surfaces, such as wicker furniture or radiators in the home.

### THWART STATIC SHOCKS

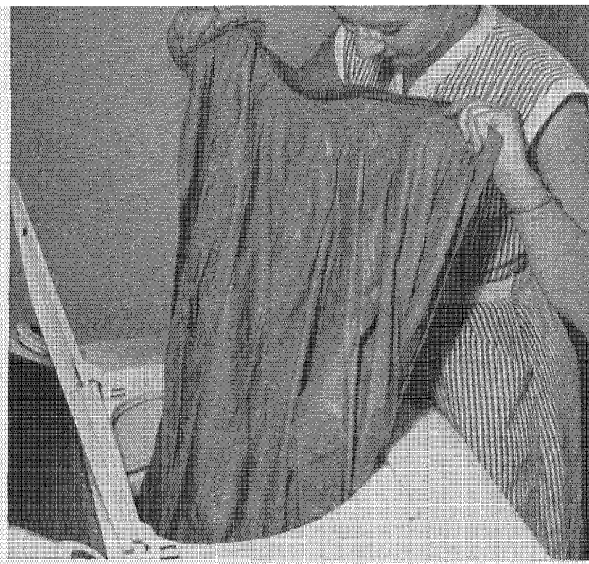
Other housekeeping aids available in the self-spraying containers include antistatic solutions that are claimed to eliminate shocks such as occur sometimes when you slide over seat covers; rug and upholstery cleaners and spot removers; dust mop sprays that increase the "pick-up power" of the mop; fabric refinishers and rejuvenators; foam furniture polish and hand cleaners; hosiery sprays to cut down runs; lubricants and rust preventives; shoe polish; suede refinishers; water repellents, weed killers and window cleaners.

While household and toiletry items account for the king's share of aerosol production, industrial products also are finding their way into the push-button cans. In addition to protective coating products like paints, there are sprays to control foaming in chemical reactions, industrial belt dressings that cut down slippage and lengthen belt life, design layout and stencil inks, dye penetrants and developers for uncovering hard-to-find cracks and defects in metal castings, lubricants and penetrating oils, rust cutters, mold release agents for use in the plastic industry, sanitary lubricants for use on food processing machinery, and water displacing sprays for drying out flooded electrical equipment.

Fast-acting fire extinguishers, textile dressings, and even a fire alarm that lets out a banshee wail when excessive heat causes a valve to open, permitting the "Freon" propellant in the device to expand and blow a whistle . . . all these have been developed around the aerosol package principle. Tomorrow, or even later today, this list of aerosol products will be outdated as new ways of using the pressurized package are perfected.

Pharmaceutical products like this are appearing in push-button cans. One of newest: spray-on bandage.

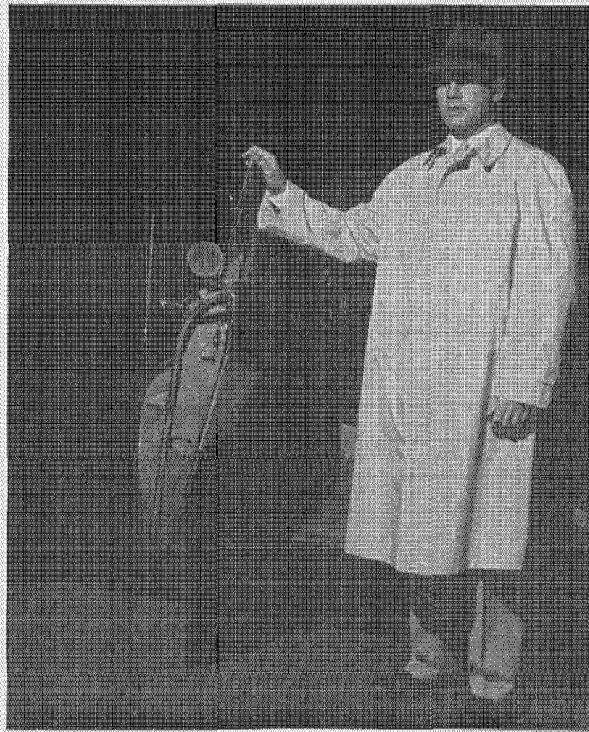




Coat of "Dacron" and cotton, treated with Du Pont "Zelan" water repellent, now takes to the tub as easily as your shirts.

## You can wash this raincoat

Come the next rain, you can don the coat with confidence that the water repellency is still at work to keep you dry.



**R**ainwear has always taken to water—showers, snow, hail or sleet, that is. But until recently most of it has avoided the washing machine. The types of fabrics used, the linings and findings were not chosen for washability.

With the growth in popularity of wash and wear suits, men are beginning to expect the same practical and functional values in all their apparel. Manufacturers of rainwear, in line with this trend, have turned to washable fabrics and a water repellent that will remain durable through many tubbings.

Londontown Mfg. Co. of Baltimore, for example, now tailors a washable, wrinkle-resistant coat called London Fog. The fabric is Reeves Brothers' 50 per cent "Dacron"

polyester fiber and 50 per cent combed cotton. It is treated with Du Pont "Zelan" durable water and spot repellent, a product that doesn't wash out. Raincoats with this finish can be washed, drip-dried, and worn the next rainy day with confidence that they will still repel water.

The London Fog coat, made of this strong, lightweight poplin-type material, is available in single-breasted, fly-front, raglan shoulder models and in double-breasted trench coat styles. Other manufacturers are offering raincoats of staple pima poplin, also treated with "Zelan".

Now that rainwear takes to the tub, your raincoat will be as easy to keep clean and neat as your shirt. And, as any good raincoat should, it will continue to shed water.





Roanoke's Auto Spring & Bearing Co. is a "department store of automotive merchandise."

# One man's secret of selling

By MARIAN ELIOT

The year was 1919. The nation was convalescing from World War I, and talk had started for a return to "normalcy." Forgetting the war and getting on with the business of living was the theme of the times.

One young lieutenant returned to his home in Roanoke, Va. with a gnawing drive to get started. He was a graduate of Virginia Polytechnic Institute, class of 1917, with a degree in electrical engineering. His three brothers were entering law and medicine, but Gordon Johnson went to work for an automobile agency. It looked like cars were here to stay.

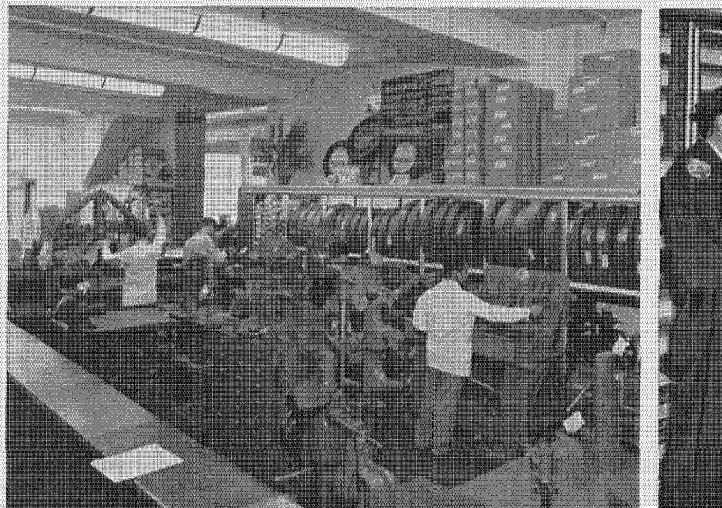
After two years of working for the other fellow, he got the urge to go in business for himself. In 1921 Johnson rented a 10 by 12-foot upstairs room on Kirk (now Luck) Avenue, borrowed enough money to buy a stock of auto springs, and hung out a sign that launched him in the automotive supply business.

Today Johnson and a staff of 55 operate a \$1½-million business offering more than 17,500 items to service stations, repair garages and car dealers. Auto Spring & Bearing Co. occupies a modern building that stretches 140 feet along the aptly named Luck Avenue. Like a

department store, the company displays its merchandise attractively on counters and in special exhibits. Its salesmen cover a web of towns for 200 miles in all directions.

What is behind the growth of this small business? First of several factors is Gordon Johnson himself. Camouflaged by the quiet voice of a Virginia gentleman is a

**Mechanical department operates a modern shop for repairs to automotive and industrial equipment.**





mind that turns out a stream of ideas and merchandising methods. Perhaps his best sales idea has been an illustrated, 68-page catalog of major products. Published first in 1924, it has been mailed to customers and prospects bi-monthly ever since.

"This catalog is responsible for about half of our sales," says C. G. Strickler, general manager. "It lists both wholesale and retail prices, and is used extensively by our salesmen."

The company operates a well-equipped repair shop for customers who need repairs on automotive and industrial equipment. Not far away is a coffee bar for self-service of free coffee to customers and employees.

Courtesy is stressed throughout the organization. Johnson believes a counter salesman, for example, should greet the visitor promptly. If an ungreeted customer somehow gets past and rings a gong near the back of the store, he gets a package of cigarettes—to the chagrin of all salesmen. This idea has never boomeranged except during the cigarette shortage of World War II, when some old friends slipped along below counter level and banged the gong. Johnson still paid off.

The outside salesmen, under the leadership of Jack Dymond, take advantage of special weeks or seasons in merchandising products. During Du Pont Antifreeze Week in October, bumper banners urging motorists to get "Zerone" or "Zerex" are displayed on all salesmen's cars and on company trucks. A large antifreeze exhibit is set up in the store. Salesmen start taking orders for "Zerone" and "Zerex" antifreeze as early as January for delivery the following September and October. By the end of March, well over half their accounts are booked. "We've handled Du Pont antifreeze since 1941," says Dymond. "The men like to sell 'Zerone' and 'Zerex' primarily because they are quality products."

One incentive for booking early orders is a salesman's contest. Based on his territorial "Zerex" sales for the previous year, he tries to get all orders in by April 30. When the salesman reaches his quota, he has \$20 added to his paycheck.

A similar contest adds zest to the work of salesmen every month. Known as the "personal sales contest," it awards small cash prizes to the salesmen who show the greatest dollar-percentage of increase during the month, compared with the same month a year ago.

Training of salesmen isn't left to chance. Every Saturday, the outside salesmen get together for a meeting and a continuing course in executive salesmanship. Once a month the entire organization meets to discuss everything from complaints to Dale Carnegie courses.

Johnson invites Du Pont salesmen or representatives, antifreeze and No. "7" specialties to attend certain monthly meetings throughout the year to keep Auto Spring & Bearing salesmen up to date on new products, improved uses and new sales ideas. Occasionally, Du Pont representatives spend time in the field doing sales training work with the outside salesmen.

So that his sales group will know the entire area, each man travels with another salesman one day a month. Johnson himself covers at least half the company's territory once a year. The credit and general managers make 11 trips annually through the area, meeting customers. In this way the officers keep in close touch with the people they serve.

"Of course, we couldn't have made much progress without the fine men and women who work with us," says Johnson. And the employees say, "It's a mighty fine place to work." Back of this attitude are employee benefits seldom found in the small company. Management picks up the tab for benefits ranging from sickness and accident insurance to retirement pay. Vacation policy is liberal: after a year, two weeks; five to ten years, three weeks; after ten years, a month. Old-timers receive a gold watch on their 10-year anniversary, and every summer thereafter have an annual week-end outing with their wives. On the 20-year anniversary, it is the wives who are honored with diamond-studded watches.

Employees may purchase preferred stock of the company with a sure-thing dividend of seven per cent. If they terminate their employment, they sell the stock back to the company.

Advancement in the company is based on merit. What with contest bulletin boards, sales record boards, and even demerit boards, everyone has a pretty good idea of how he stands at all times. Proof of the success of Johnson's personnel relations is the fact that employees rarely leave Auto Spring & Bearing.

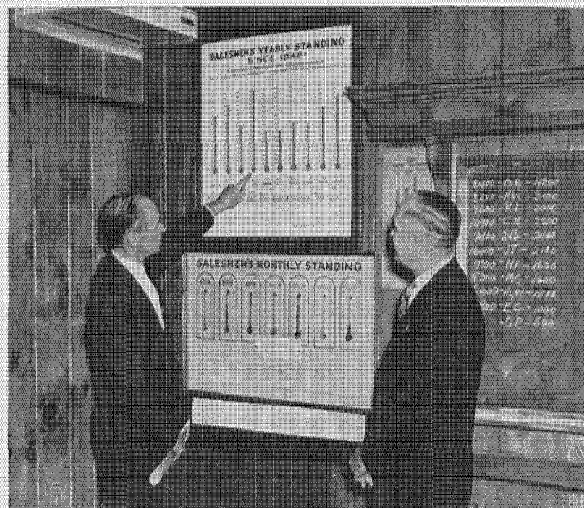
"We've had only three men leave us in recent years," Johnson says. "And they went into competition with us." Besides numerous incentives to encourage permanence, the company has an atmosphere of business ethics that makes employees feel it is good to be there.

Johnson is alert to every possibility of improving his business—from modern lighting to alphabetical arrangement of stock in the warehouse. His alertness and business sense have added up to an A plus A1 Dun & Bradstreet rating, and a noticeable pride around Roanoke in Gordon Johnson, who rented a small room in 1921 with the faith that sound merchandising methods, quality products and fine employees would add up to success.

Customers help themselves to free coffee at any hour of day.



Charts on sales standings, many contests, and weekly meetings keep salesmen informed.



Gordon Johnson, right, checks display of Du Pont antifreeze with salesman prior to Antifreeze Week





# "Orlon" in uniform

*An oil company and a railroad find this Du Pont fiber in blends helps make uniforms look good and wear well*

For years, armed forces everywhere have known the morale value of neat, well-kept uniforms. They identify the man and woman and give them a feeling of pride in the group. In more recent years, many companies have taken notice of the advantages of good-looking uniforms for the people who serve the public.

But uniforms, although identifying the wearer, haven't always been completely comfortable and serviceable. With the creation of man-made fibers, companies are now evaluating fabrics that retain their good appearance yet are comfortable to wear and easy to keep clean and neat.

Recently, more than 2,000 service station managers, salesmen and dealers of The Standard Oil Co. of Ohio put on new blue uniforms of Du Pont "Orlon" acrylic fiber and rayon. Sohio selected the fabric and style after months of wear tests by station personnel. Requirements were high: the company wanted a uniform that was distinctive, one that would quickly identify their men. The fabric had to have good initial appearance and ability to retain its

neat, fresh look. Salesmen preferred a year-round material that would eliminate buying summer and winter outfits. It

Manager Kenneth Raupach of Cleveland Sohio station removes grease spot from uniform. Men like easy care of new outfit.

should resist damage by battery acids, greases and oils. And for the sake of the salesman's pocketbook, it should be washable and require little upkeep.

## "ORLON" WINS IN TEST

Wear tests on trousers of various fabrics began early in 1952. Among the fabrics was one of 90 per cent Du Pont "Orlon" and 10 per cent rayon. Trousers of this material, worn from July '52 to February '53, met the rigid requirements set by Sohio. With proof of performance established, the company decided on a uniform, made from 11-ounce fabric, featuring an Eisenhower jacket.

After the first shipment of the new uniforms for the Cleveland and Akron areas, word spread fast. In answer to salesmen's requests, Sohio speeded up distribution so that all would be in the new uniform by April 1954.



"This jacket of 'Orlon' and rayon is plenty warm, even for Cleveland winters," says Kenneth Raupach, manager of the modern Sohio station at 46th and Carnegie. "We can't wear a coat that is too heavy or binding because of the kind of work we do around a station. I remember once we tried a heavy iceman's shirt. We couldn't move. With this new outfit, if winter gets too severe, I'll just put on a sweat shirt underneath."

Dick Banks, another Sohioan in Cleveland, says, "My wife likes the new uniform as much as I do because she can wash it, hang it up wet, and it needs no ironing. The material doesn't wrinkle, yet it holds a crease. And everyone likes its snappy look."

## B & O EVALUATES EIGHT FABRICS

Like Sohio, many companies have uniformed personnel who are meeting the public, selling their company's products and services. And probably no other group finds a good-looking, comfortable uniform more important than do railroad conductors and trainmen.

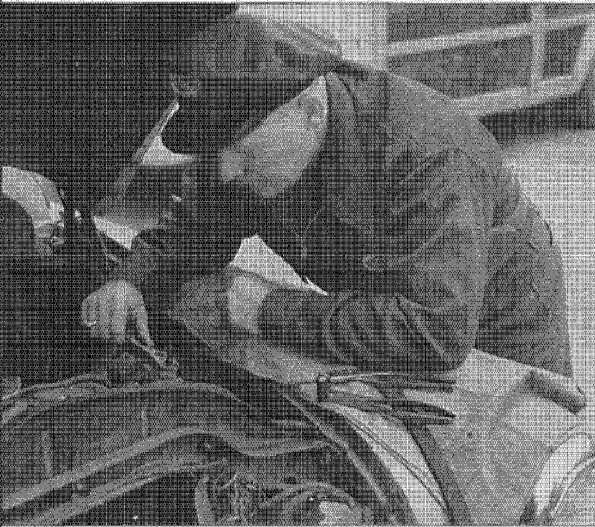
Three years ago, Baltimore & Ohio started a search for a new, improved kind of uniform. Their research department did a thorough job. They put 17 uniforms on wear test. These uniforms were made of different fabrics, most of them blends of man-made and natural fibers. One test uniform after another failed to meet B & O's standards. But one uniform topped others in all-around wearing qualities. It was a blend of 50 per cent "Orlon" and 50 per cent wool.

Like Sohio, B & O found the lighter weight fabric best. A 12-ounce fabric in navy blue twill, matching the





Quality service plus neat appearance help to bring the customer back again.



**"Orlon"** in uniform resists the oils, grease, acids of everyday work around automobiles.

present uniforms in weave and color, was worn by Conductor E. M. Marcum for 16 weeks. Marcum says, "It's the best uniform I have ever worn. I like its good appearance and its serviceability. The trousers hold their creases and show no signs of bagginess even after being wet with rain."

Walter Hughes, conductor on the night round trip between Philadelphia and Baltimore—12 hours of service a day—wore his uniform of the lightweight fabric six weeks before having it cleaned. Even then it didn't need pressing, Hughes says. He likes the light weight and warmth of the blended "Orlon" and wool.

B & O officials, as a result of these tests and comments, recently offered trainmen the new fabric as an optional material for uniforms. Researchers at the B & O lab believe they have found what they were looking for—a better product at lower initial and maintenance costs.

Fabric manufacturers, uniform makers and the Textile Fibers Dept. of Du Pont are cooperating with many companies who have requested aid in evaluation of man-made fibers for uniforms that must take hard wear in any kind of weather—and still look good and be easy to care for. Companies thinking of improving their uniforms are learning this is the best way to find the best fibers for the job and the employee.



▲  
B & O researcher checks uniform of "Orlon" and wool during wear tests on 17 fiber blends.



Pell Kangas of B & O Research Dept. and Robert Dahl of Du Pont Textile Fibers run abrasion test on blend of "Orlon" and wool. Fabric was approved for uniforms.





New dental unit fills water cup automatically, hides instruments when not in use, lets patient see x-ray films.

## The latest in dental units

*Ritter's Model G, finished with "Dulux", hands instruments to the dentist at the press of a button*

As an ancient Egyptian complaining of a toothache, you would have been advised to catch a mouse, split it down the middle, and hold half of it against your cheek until the pain stopped. As a Roman, a few hundred years later, you might have been directed to find a frog, spit in its mouth, and ask it to please take your toothache away.

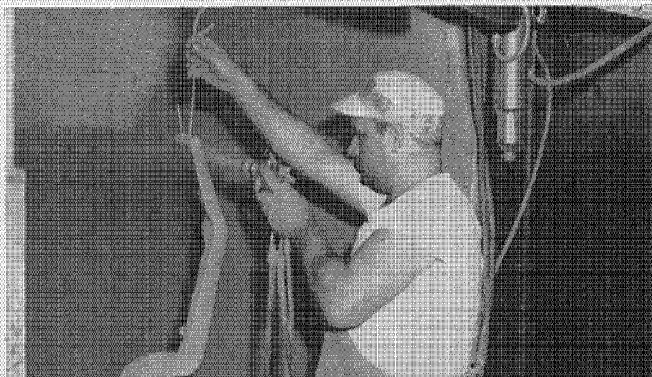
These are only two of the hundreds of superstitions mankind has swallowed since his teeth began giving him trouble. Some, such as the European belief that toothaches can be avoided by getting out of bed left foot foremost, have persisted almost to the present.

The dental tools and equipment used until comparatively recent times were as primitive as some of these ideas. Complete cleaning of a cavity, for instance, was almost impossible with only a hand-turned drill. Yet the foot-operated drill was not developed until George Washington's

time. Washington's dentist, a man named Greenwood, made one with parts from a discarded spinning wheel. It was only about 100 years ago that the first dental chair capable of being raised and lowered appeared on the market. Later chairs were upholstered in crimson and green plush, and the bottom was hung with a curtain to hide the operating machinery.

Today a dentist's office equipment is as up to date and efficient as the man who uses it. American dental techniques are generally acknowledged to be the best in the world, and the same can be said of American-made dental equipment.

Baked "Dulux" enamel finish protects Ritter's dental and medical equipment.





Ritter-equipped dental office in not-so-gay '90s. Sombre colors were typical.



Let's take a look at the new Model G unit made by the Ritter Company, Inc. of Rochester, N. Y., the world's largest manufacturer of dental equipment:

As the patient leans back in the dental chair no instruments are in sight to disturb his peace of mind. When the dentist touches a switch under the instrument tray, a panel silently recedes into the unit, and the instrument assembly advances to his fingertips. At the same time, a film illuminator appears on which dentist and patient may study x-rays together.

One of the instruments in the unit is a warm-water syringe, in which the water temperature is thermostatically controlled. Another is a mouth spray which draws solution from a hidden reservoir. A new mouth lamp has a voltage control to regulate brightness. And when a patient returns the cup to its holder after rinsing his mouth, the cup is automatically refilled with water.

Dozens of suggestions made over a period of years by practicing dentists are incorporated in this new model. The unit is so popular that within two months after its introduction Ritter had received orders it took the factory a year and a half to fill.

As the operation of dental equipment has been modernized, so has its appearance. In place of black with hand-painted gold scrollwork or the once standard simulated mahogany, the streamlined Model G blossoms in a variety of cheerful colors. It is offered in cream white, ivory tan, coral, blue or any one of three shades of green. Also available in these colors are Ritter chairs, sterilizers, and dental x-ray machines.

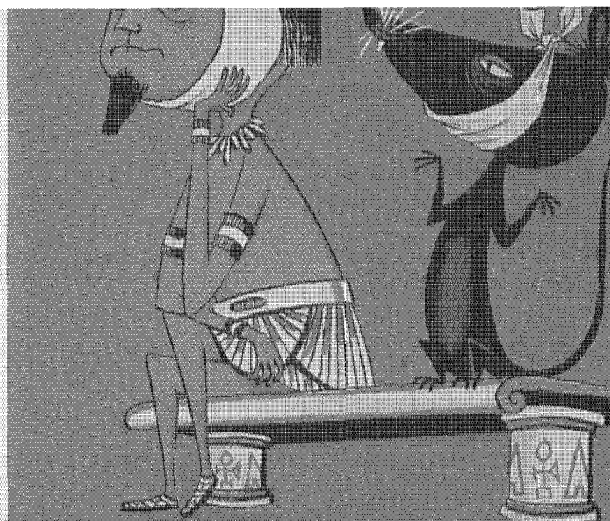
After 30 years of using "Duco" lacquer on its equipment, Ritter last year switched to "Dulux" enamel. According to Ward L. Hamilton, laboratory manager, the enamel gives improved chip and stain resistance. There's a one-third saving in paint, too, due to better coverage, and baked enamel requires no buffing.

Frank Ritter, the Bavarian-born cabinetmaker who founded the company, gave it a durable slogan: Always build up to a standard—not down to a price. One evidence of this is the care taken to see that a product's finish is blemish-free before it leaves the Ritter Park plant. Inspectors and touch-up men are key figures in this quality check.

The company for many years has been identified with a campaign to increase the dentist's earning power. By employing hygienists and assistants for cleaning and x-raying, Ritter has pointed out, a dentist can use his special skills more economically to serve more patients. Almost half the dentists in the country now have two-chair offices, and the trend is increasingly in that direction. Ritter supplies dentists with a list of graduating hygienists available for hire, and also offers an office-planning service for new dentists or those who want to enlarge or remodel existing offices.

Today a third of Ritter's dental equipment sales are for office enlargement, another third for replacement of outmoded equipment, and the rest for new offices. With 67 years of experience and tradition behind them, the Ritter people are valuable allies of the modern dental profession.

Slicing mouse in two, spitting in frog's mouth (this one spit first), and alighting from bed on the left foot were early toothache remedies, more colorful than effective.







As part of research program, skirt made of blended fabric is given to housewife for wear-testing.

# Compatible competitors

*Natural and man-made fibers have a lot to offer each other*

Timber and steel compete in the construction field. Yet in building railroads, it is the combination of these two basic materials—timber in crossties and steel in rails—that results in a sturdy roadbed and a safe, comfortable ride.

The simile also applies to textile fibers. While the natural fibers on one hand and man-made fibers on the other might be termed fierce competitors, they have much to offer as allies in blends. Since no such thing exists as an all-purpose fiber—just as there is no all-purpose metal—the blending of fibers, like the blending of metals in alloys, becomes the key to performance.

There's nothing new in all this. Du Pont fibers have been used in blends for years. But today, detailed information on just how the older and newer textile fibers complement each other is being amassed by a group of researchers in Du Pont's Textile Fibers Dept. They are accumulating data on what sort of fabric performance you can expect when you mix a given percentage of this fiber with a given proportion of that. This detailed fact-gathering is aimed at providing a more extensive backlog of scientific information for fabric designers.

"We say this to the textile industry," one researcher told us. "Here are some data which show the least that you can expect of a certain blend. If you do much worse

than this, something's wrong with your fabric construction or finishing. If you do better, we won't be surprised, because we haven't been able to include all the variables.' "

The first phase of this Du Pont program dealt with suiting fabrics. Nylon, "Dacron" polyester fiber and "Orlon" acrylic fiber were each blended in various proportions with wool, acetate and rayon. The resulting fabrics were put through a series of tests to determine their durability, how easy they were to keep pressed and so on.

In general, the three fibers in the first group contributed to blended fabrics such qualities as these: resistance to abrasion, shrinking and wrinkling, and an ability to retain a press. There were individual differences, of course; nylon, for example, was highest on abrasion resistance, while "Orlon" and "Dacron" excelled in press retention and wrinkle resistance.

The water-absorbent fibers—wool, acetate and rayon—contributed their own special qualities to the blends: resistance to the build-up of static electricity, to melting by sparks and to the formation of tiny "pills" of fuzz on the fabric surface, for example.

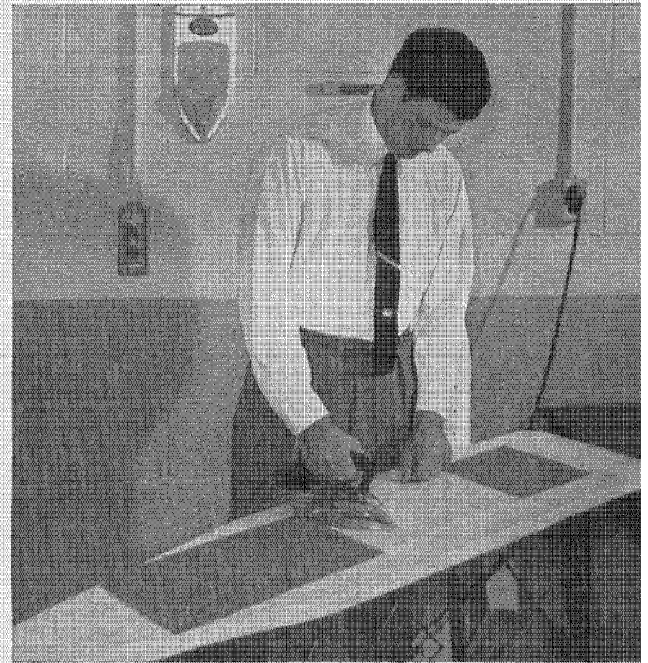
Two-component blends are not the whole story. The Department's Fabric Development section has carried the investigation further by investigating blends of three



Blend of "Orlon" and wool is scoured in beek dyeing machine at Textile Fibers laboratory.



Wife at home has nothing on this laboratory worker, shown ironing test fabric.



fibers. Confining its studies to man-made fibers, the Fabric Development group has shown, for example, the excellent compatibility of rayon with the newer synthetics.

In a current phase of the blends research program the experimenters are introducing nylon, "Orlon" and "Dacron" into such cotton-rayon type fabrics as broadcloth, percale, duck, denim and knitwear. Again, increasing percentages of the first three fibers are blended with cotton and with rayon in the various fabric constructions.

In addition to laboratory tests, small-scale wear tests are being conducted, as they were in the suiting program. The denim, for instance, has been made into children's play pants for comparative wear tests, the duck into basketball sneakers and the broadcloth into shirts.

The blending of various percentages of nylon with cotton to increase the wear-life of work clothes is already an accepted commercial practice. The current Du Pont study indicates that about 20 per cent nylon in broadcloth may double the life of a man's cotton shirt, now estimated at 35 launderings. Still higher percentages of "Orlon" and "Dacron" in shirting are required to add such factors as quick drying and wrinkle resistance, the results show.

Another phase of fiber blends research is concerned with the esthetic as well as physical properties of fabrics. Laborers in this vineyard are given free rein to weave new fabrics they believe are worth investigating. One man, for example, has spent eight months developing a single blended material.

"If we have to string yarn across the ceiling to weave the kind of fabric we want, we're free to do it," one of the laboratory men told us. "First we see if it can be made, and then we worry about how to make it commercially."

With its research on blends, the results of which are available to the textile industry, Du Pont is helping fabric designers capitalize on the best properties of all the fibers they now have at their command.

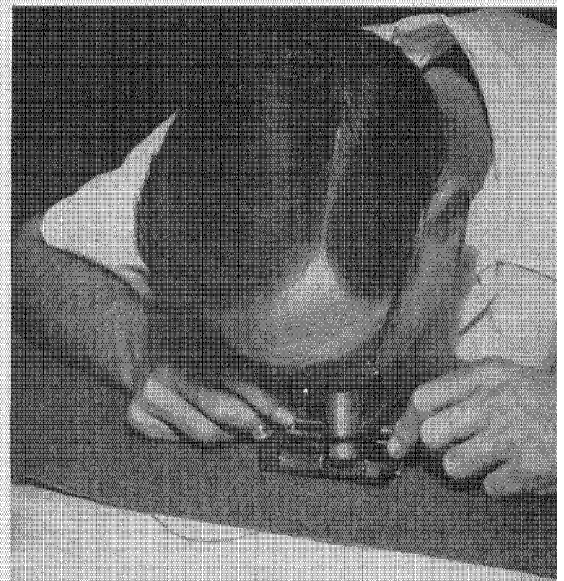


Barber clippers are used to shear fuzz from cloth in small-scale duplication of mill procedure.



A lab technician counts number of yarns in given area of fabric. Tightness of weave influences "hand" of material.

Dungarees of blended fabric get thorough wear test here.





The Homestead in Hot Springs, Va. is 20 miles from a town;  
so its engineering and maintenance staff must create

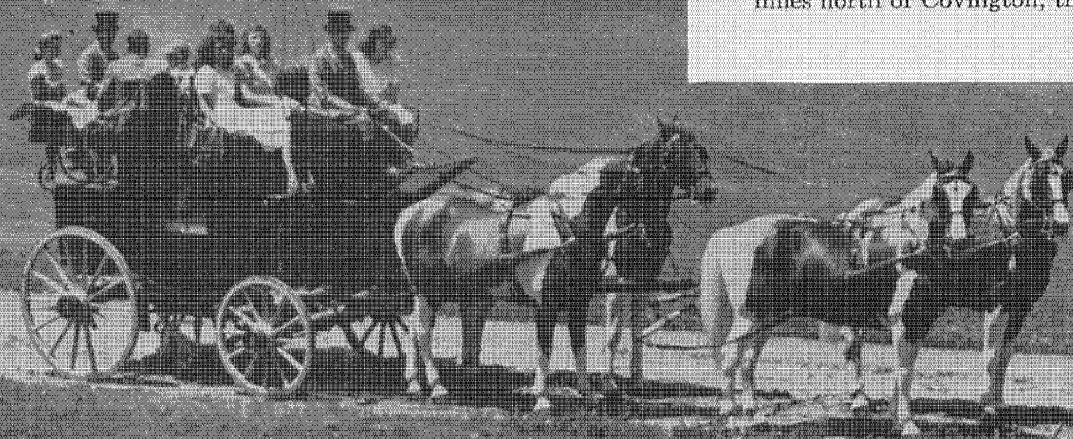
## A world of its own

In 1761, the "propitious opening of the gentlemen's pool as a centre of health and pleasure" near Hot Springs, Va. was announced to the gentry of the day. By the late 1700s the first families of Virginia, including such notables as Thomas Jefferson, made "going to the springs" as fashionable as a trip to the spas of Europe.

The hot mineral springs, located between mountain ridges at 2,300 feet altitude, were famous first for their medicinal values. But they soon became centers of social activity, where a gentleman might find others given to philosophical polemics, and an anxious mother might find a match for her post-debutante daughter.

Some of the bathhouses of those early days have been preserved for a touch of 18th century atmosphere, and an emphasis on comfort for the individual guest has been maintained with zealous care. But the appearance and facilities of the spa have changed. The simple country inn gave way in 1846 to a "new and modern" structure called The Homestead. During the past century The Homestead has been enlarged until today its Great Hall, 600 bedrooms, dining room, ballroom, theater, casino, bathhouses and Cascades Inn cover a vast area in Warm Springs Valley.

Although now accessible by automobile, train and plane, The Homestead is relatively remote from the rush of modern life. It is located in a 17,000-acre estate, some 20 miles north of Covington, the nearest town. This remote-







All waiters carry trays on heads. To show skill they dance and race in annual waiters contest.

ness creates a small world of its own. For example, The Homestead must have a construction staff to build and maintain the roads, bridges, buildings, pools and golf courses. Other staffs operate a private telephone system, power supply and water and sewerage systems. The Homestead has its own farms, greenhouses, a dairy, stables and shops to repair everything from furniture to saddles.

A city hotel manager might consider it a nightmare that operations and services aren't on an assembly-line basis at The Homestead. But Manager Thomas J. Lennon and his staff of nearly 1,000 take pride in individual attention to details so that each service is not just a repetition of the one before. It doesn't bother them that no two rooms at The Homestead are exactly alike, or that rooms numbered in the 100s are above the 900s in one wing. This lack of standardization doesn't mean The Homestead isn't harmonious, they say; it has simply adapted itself to its environment.

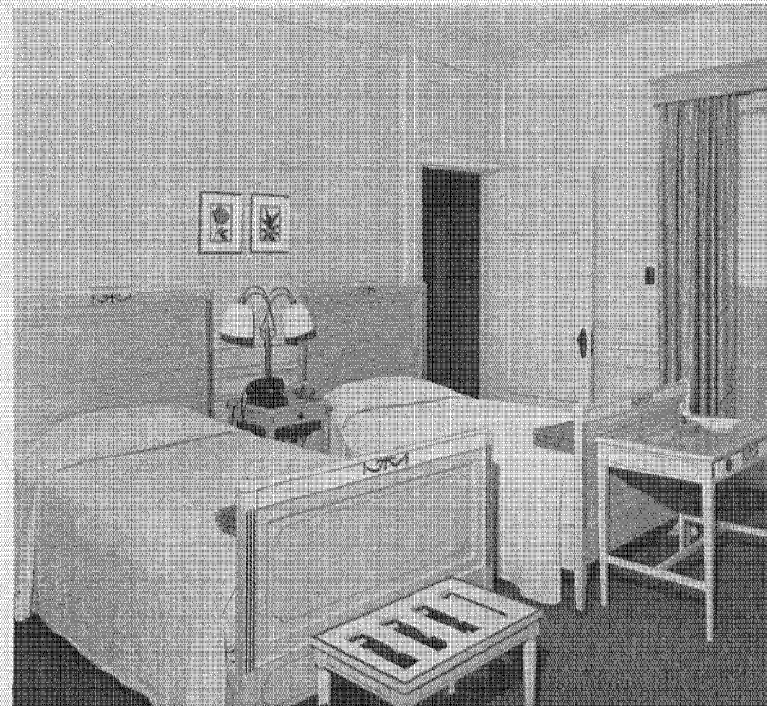
#### APPEARANCE COUNTS HERE

The objective is to keep guests comfortable and happy. To help reach this goal, the engineering and maintenance staff uses all available 20th century aids to make a stay at The Homestead a never-to-be-forgotten experience.

Keeping the furniture in good repair is a full-time job for one of The Homestead shops. Here three or four

men repair and paint five to six thousand pieces every year. Recently the men modernized the furniture in 450 bedrooms by cutting down the headboards on the beds and removing the mirrors from the dressers and hanging them on the walls. On the 5,400 pieces of furniture involved they used "Dulux" enamel in Homestead Gray, specially prepared by Du Pont.

"We must have a good-looking, durable, fast-drying finish for furniture," Elmer Martin, general foreman, says. "Since The Homestead is open year round, we can't keep furniture out of the rooms long. Du Pont finishes have been our stand-by for more than 20 years."



Furniture in 450 bedrooms was recently modernized and refinished with "Dulux" enamel in special Homestead Gray.

Bedroom furniture in the tower section of The Homestead is refinished with red mahogany stain and "Duco" clear finish. All porch and lawn furniture gleams in a coat of "Duco" white gloss enamel.

During the major part of the year, a large refrigerated truck makes three trips a week to Washington, D. C. for special foods such as live lobster to enhance the well-known cuisine of the resort. Other trucks and cars of The Homestead fleet serve the immediate area, and all are refinished in "Dulux" enamel in Forester Green.

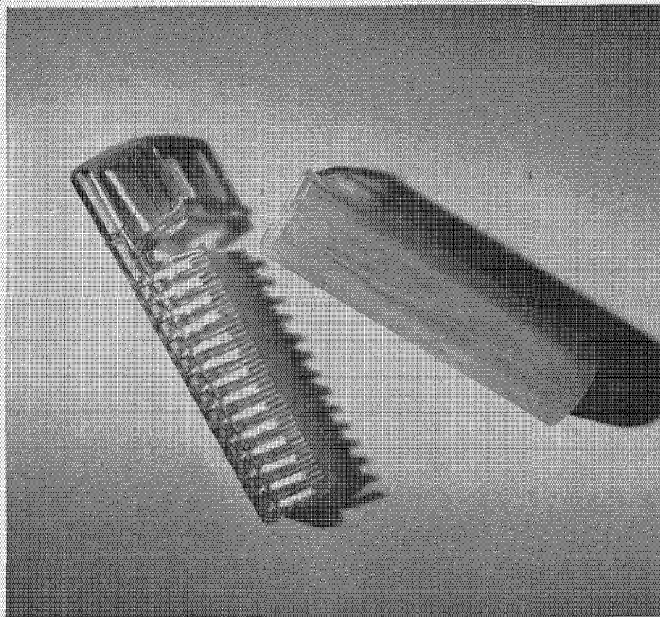
Altogether, the Du Pont finishes at work at The Homestead add up to 16, and range from Black Jack Enamel for boilers to "Dulux" Super-white flat enamel for the beams of the Great Hall. To the guests, good appearance, immaculate cleanliness and comfort are to be expected at The Homestead. And the engineering and maintenance group knows how to serve up all these qualities, quietly and efficiently.



The Homestead nestles in a high valley of Virginia, surrounded by hot mineral springs, 17,000 acres of mountains and an atmosphere created by long history.



# What's New



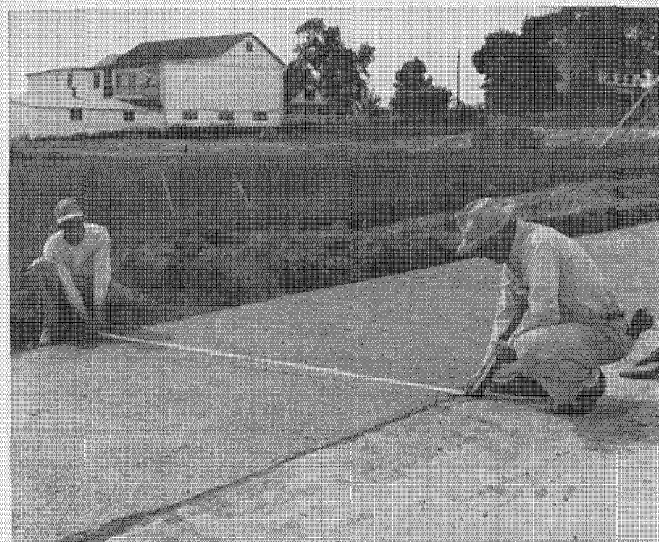
- **BRUSH-COMB COMBINATION**, bristled with "Tynex" nylon monofilament, comes in a protective case ready to drop into the purse. Made by the Du Pont Plastics Products Division, this brush-comb is available in chain variety, drug and department stores.

- **A NEW FIELD METHOD** for curing concrete test cylinders is based on the use of Du Pont cellulose sponge for the curing can liner. In summer, the sponge is saturated to assure adequate humidity for proper curing. In winter, the dry sponge helps protect the wet concrete against low temperatures. Acme Curing Cans are available from E. W. Zimmerman, 228 N. LaSalle St., Chicago, Ill.

- **"TEFLON" TETRAFLUOROETHYLENE FIBER**, so resistant to heat and chemicals that laboratory workers call it "dragon fur," has been announced officially by the Company. Produced in experimental quantities only, the new fiber is being evaluated as a tool for industry. It has unparalleled resistance to chemical attack; it is inert to all solvents and reactive chemicals except fused alkali metals and hot fluorine gas under pressure. "Teflon" is nonflammable, its moisture absorption is zero, its tensile strength is 42,700 pounds per square inch.

- **CLEANABLE PLASTIC FLUOROSCOPIC screen**, developed by Du Pont for use by armed forces medical units in tropical areas, is now available for civilian medical and industrial use. Called the "Patterson" CB-2, the screen is not affected by moisture, oil, dirt or fungi.

- **TWO NEW SEED DISINFECTANTS** for use on small grains come in liquid form for easier application. Based on a combination of phenyl mercury acetate and ethyl mercury acetate, both disinfectants prevent seed decay and seedling blight. Du Pont Liquid 364 is a concentrate to be diluted with water for use in slurry treaters. Du Pont 244 is used undiluted in ready-mix machines.



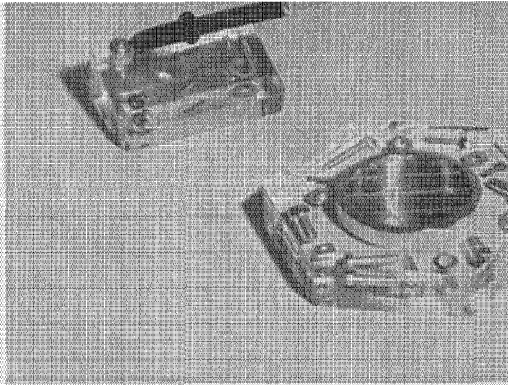
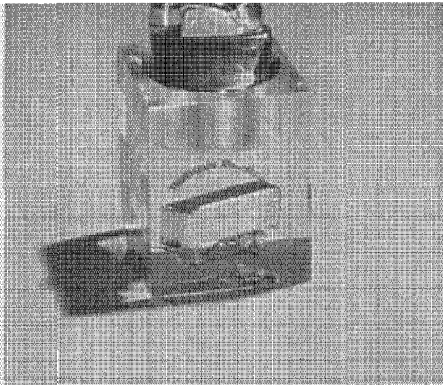
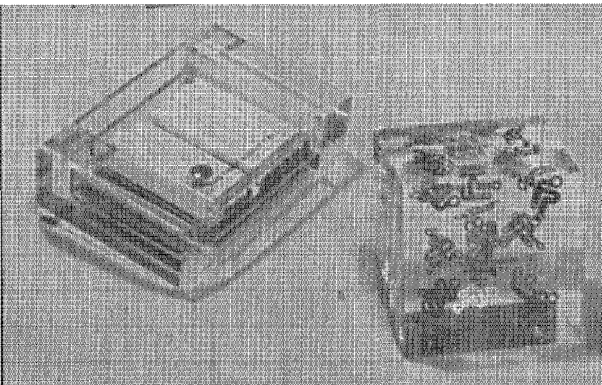
- **FLEXIBLE MEASURING TAPE** of nylon and "Dacron" polyester fiber, coated with plastic, can take the abrasion, moisture, and general hard usage in highway, utilities and construction work. Made by The Lufkin Rule Co., Saginaw, Mich.

- **NEW DU PONT ROTOFILM** promises to simplify gravure printing, allow reproduction of high quality and reduce color-printing costs. Since Rotofilm comes already sensitized, gravure printing plants do not need to sensitize their own material. Other advantages: any number of copies may be made and mailed inexpensively in paperboard tubes; the processed film can be stored for future use.

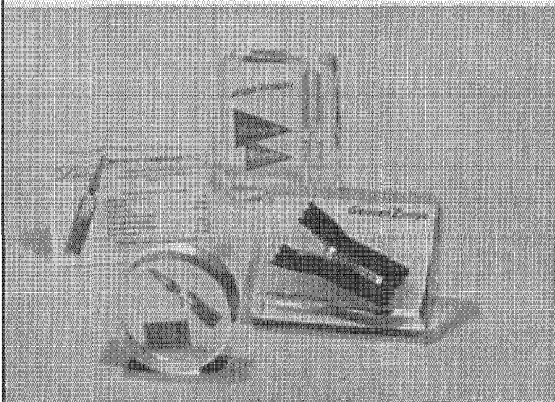
**PHOTO CREDITS:** Page 3, bottom: Courtesy *Electronics Magazine*; Page 4 and Page 5, left center: Courtesy *Roads and Streets*; Pages 8 and 9: Courtesy KPRC-TV; Page 10, top: Courtesy The Rumford Press; Page 11, bottom right: Courtesy Continental Oil Co.; Page 14, top: Courtesy Helena Rubinstein; Page 19, last two photos: Courtesy B & O Rail-

road; Page 20, bottom and Page 21, top: Courtesy Ritter Co., Inc.; Page 24 and Page 25, top: Courtesy The Homestead; Page 30, top: Courtesy Thompson Products Co.; Page 32, left and Page 33, bottom: Courtesy North American Aviation, Inc.; Page 32, right: Courtesy U.S. Air Force; Page 33, top: Courtesy Shell Oil Co.; Pages 34 & 35: Courtesy Nye-Wait Co., Inc.





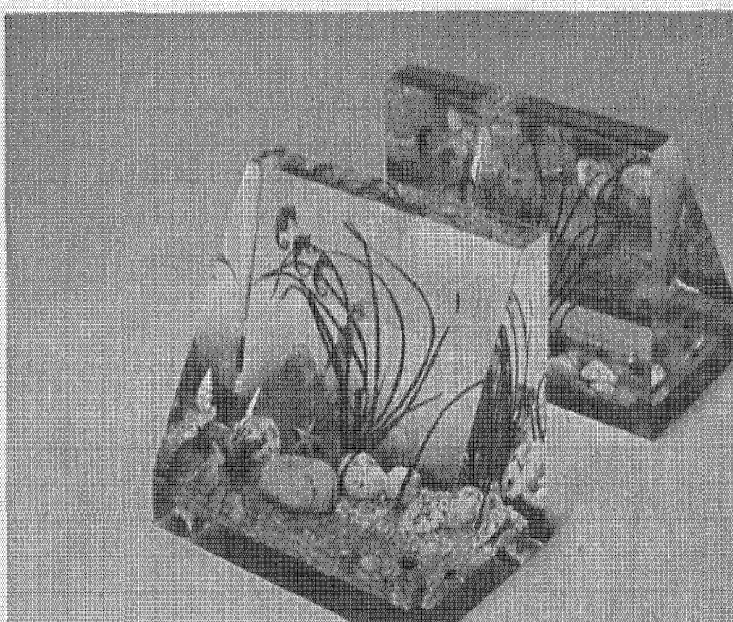
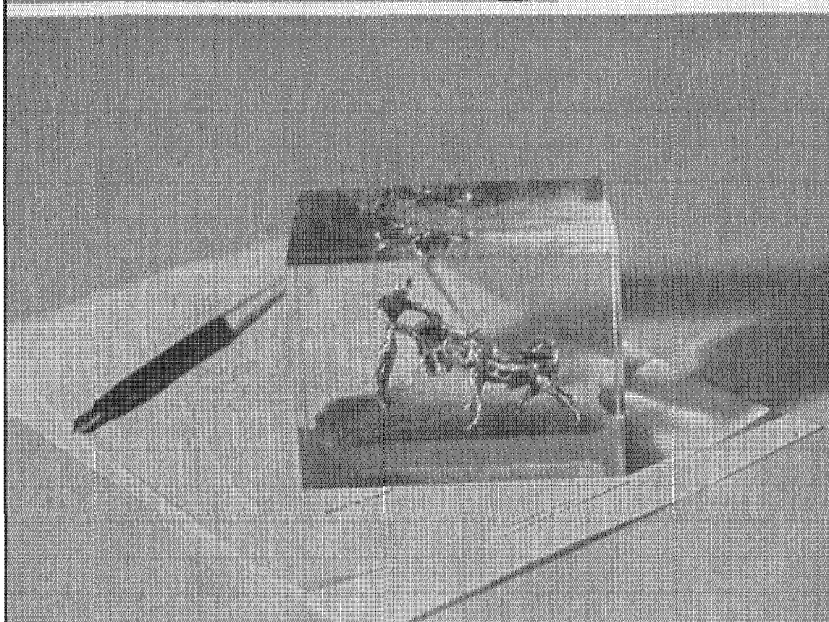
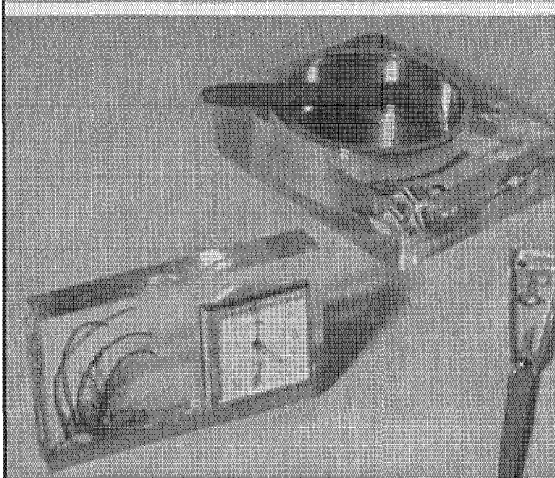
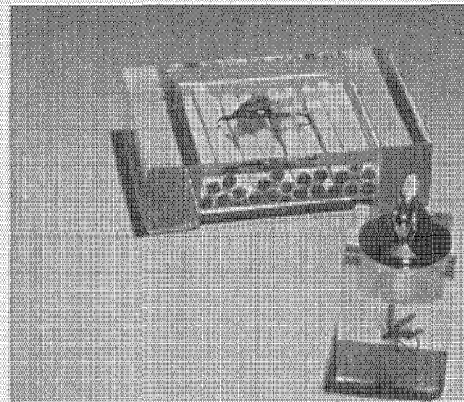
## Miniature showcases



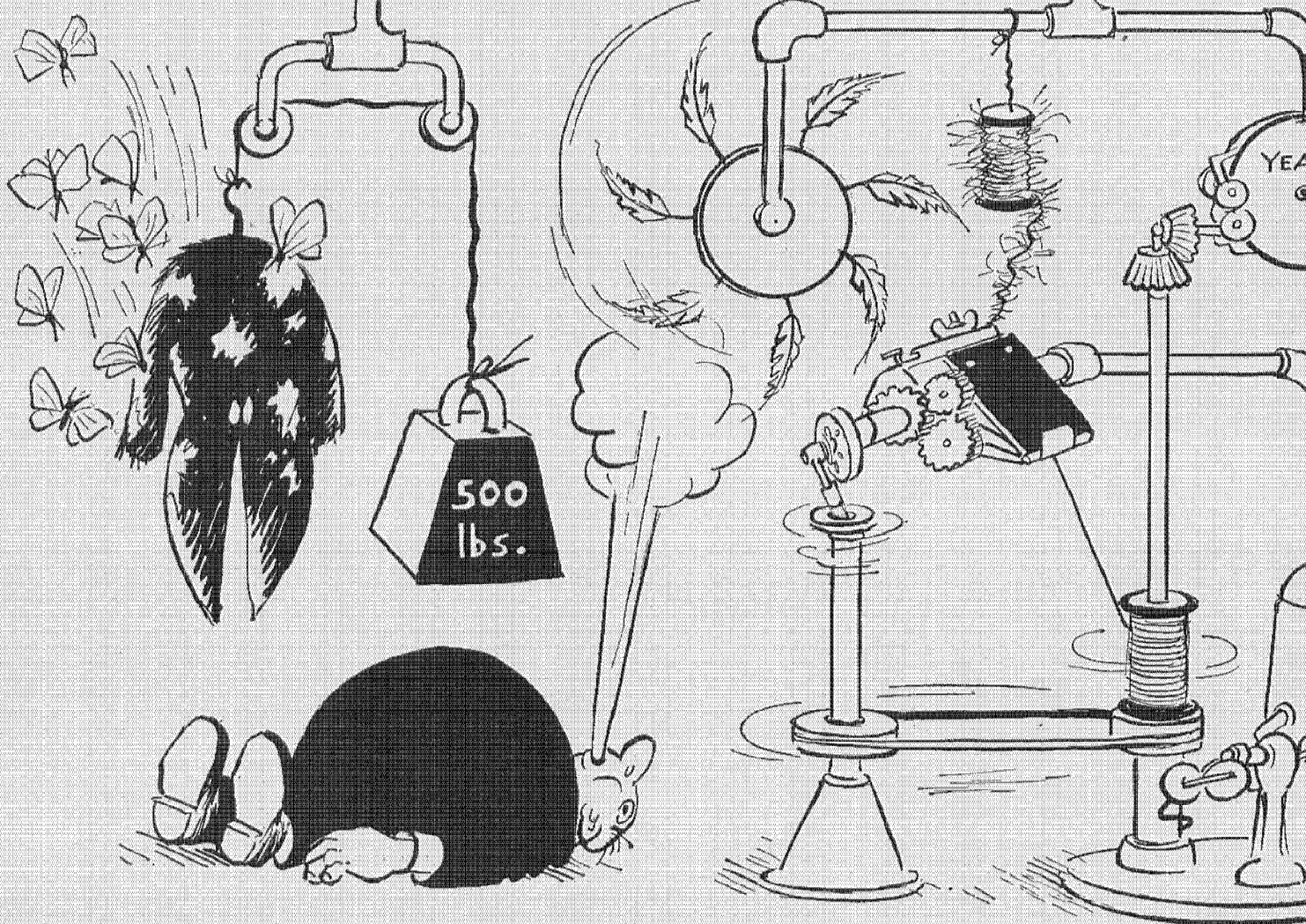
"Lucite" acrylic resin and Plastic Developments, Inc. of Attleboro, Mass. have teamed up to create products that are both beautiful and useful. To the partnership Du Pont "Lucite" brings its crystal-clear beauty and durability, while Plastic Developments has contributed new techniques for mass producing cast embeddings.

The result is of particular interest to businessmen who want a new and effective display medium for their products. Small items such as electrical components or bottle caps, as well as miniatures of larger products, can be embedded either singly or in patterns in the "Lucite". Advertising copy, even individual letters, can be made to appear suspended. These miniature sales showcases can be handled indefinitely without growing grimy and losing their promotional and advertising value.

Embedments in "Lucite" are also created for the home and office. The pictures on this page tell better than words the appeal and beauty of these new decorative objects.







## A new look in textile machinery

*That's what "Zytel" nylon resin is bringing to the textile industry*

By RICHARD W. LOUNSBURY

A man with an oilcan is almost a fixture in a textile mill. This is good, for he helps prevent wear of metal parts on machinery. But in another way it's bad. For years, the textile industry has been plagued by yarn stained with oil and grease. This dirty yarn must be scrapped, for it can't be dyed or processed properly.

Textile machinery manufacturers are now offering ways around this costly problem with parts made of "Zytel" nylon resin. "Zytel" is Du Pont's newly adopted trade-mark for its nylon molding powder. It is a unique Du Pont engineering material which almost automatically eliminates yarn soiling because it requires little or no lubrication. And it's bringing other benefits as well. Let's take a look at a few examples.

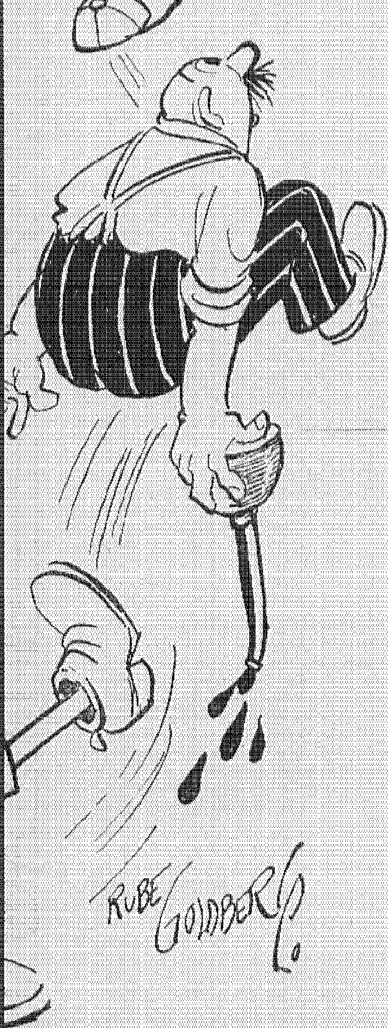
Rough yarn is given strength and uniformity during processing operations on a long draft spinning frame. This belt-drive unit controls and guides the separate fibers as they are processed. Metal parts near the fibers require lubrication, and this means trouble. Macdonald and Sons, Inc. of Providence, R. I. looked into the matter,

and came up with this answer: a new, long draft unit in which all moving parts except the belts are made of "Zytel". Waste due to yarn contamination is eliminated, and that's as good as money in the bank.

Several of these Macdonald units were operated continuously up to 16,000 hours (equal to eight years of 40-hour weeks) without failure or even noticeable wear. Thanks to "Zytel", production from long draft spinning units has been increased, waste decreased, and the quality of yarn improved.

A now-standard application of "Zytel" in the textile industry is in flyer blocks. These are wire assemblies on a speedily revolving center bearing which twist yarn under tension onto a bobbin. The M. J. McHale Co. of Scranton, Pa. had been making the blocks from conventional material but was not satisfied with them. They were complex and easily broken at high operating speeds. In addition, lubricating oil often spattered on the yarn passing through the wire assemblies. McHale tested several new materials. Du Pont "Zytel" nylon resin met all the specifications,





*MOTHS EAT COAT, CAUSING IRON WEIGHT TO  
DROP ON STOMACH OF FAT MAN, CAUSING HIM TO  
PUFF AND BLOW FEATHERED WHEEL-THIS OPERATES  
LONG DRAFT UNIT FOR EIGHT YEARS, AT THE SAME  
TIME KICKING LUBRICATOR OUT OF PICTURE.*

and was put into use. The flyer block became a compact, one-piece molded bearing of "Zytel". It was cheaper to manufacture, and yarn spoilage was practically ended. Due to its toughness, the new flyer block also outwore its metal predecessors.

A development by Industrial Plastics, Inc. adopted by Whittin Machine Works is another example of how advanced engineering is saving manufacturers money. Whittin spinning frames now have top rolls with bearing surfaces made of "Zytel". The top rolls operate with a maximum

20-pound load at speeds up to 30 rpm. Lubrication has been eliminated, and it's now necessary to clean lint and fly from the rolls only once every 30 shifts instead of once each eight-hour shift.

The manufacturers of Hunt looms were plagued by the same problems as the rest of the industry. Recently they developed a new loom with 19 different parts made of "Zytel", which can be fabricated with great dimensional accuracy into the intricate shapes required. In the new loom, gears of nylon are alternated with those of metal. The manufacturer reports that by ending metal-to-metal contact, it is no longer necessary to lubricate the teeth of the gears in the train. It is also interesting to note that considerably fewer parts are used in the new loom than in the older model.

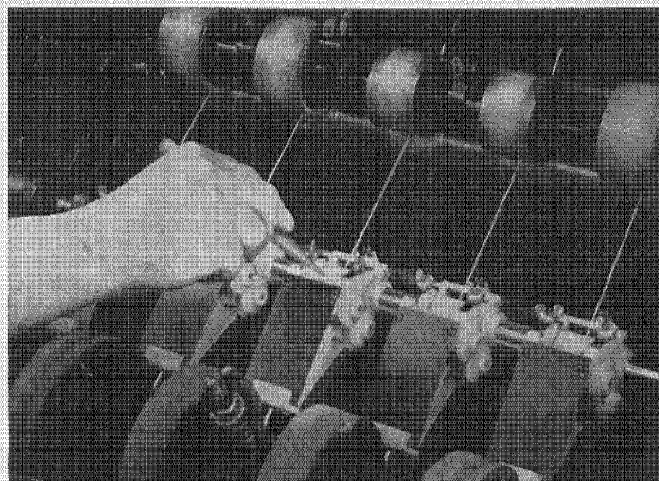
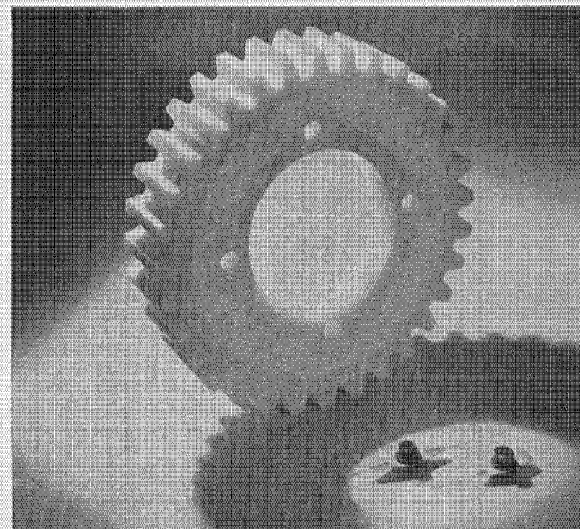
Coats and Clark, Inc. of Newark, N. J. make travelers precision-molded of "Zytel". They are used for twisting crochet articles and domestic and industrial threads in the company's mills, and also are sold to outside customers. These travelers perform better at lower cost, say the mills. Here, the light weight of "Zytel", which means low inertia in high-speed operation, pays off. With the conversion to

this DuPont molding powder, the need for lubrication is reduced, too, improving cleanliness. As the product is tough and resilient, these new travelers greatly outlive their metal counterparts. In fact, with "Zytel" the travelers last so long that they are removed periodically for cleaning. Formerly, travelers required no cleaning because they wore out before it was necessary.

These are representative of the many successful applications of "Zytel" nylon resin in the textile industry. More and more manufacturers are turning to this Du Pont engineering material to meet the demand for improved quality and faster, more economical production.

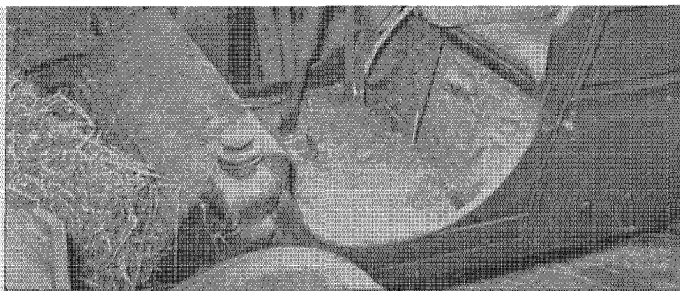
*Here info. C. W.*

Large, like this drive gear by Hunt, or small, like ~~Mellor's~~ flyer blocks, parts of "Zytel" are solving engineering problems for textile machine designers.



Long draft unit, subject of Goldberg cartoon, also employs "Zytel" for production of better yarn with much less danger of soiling

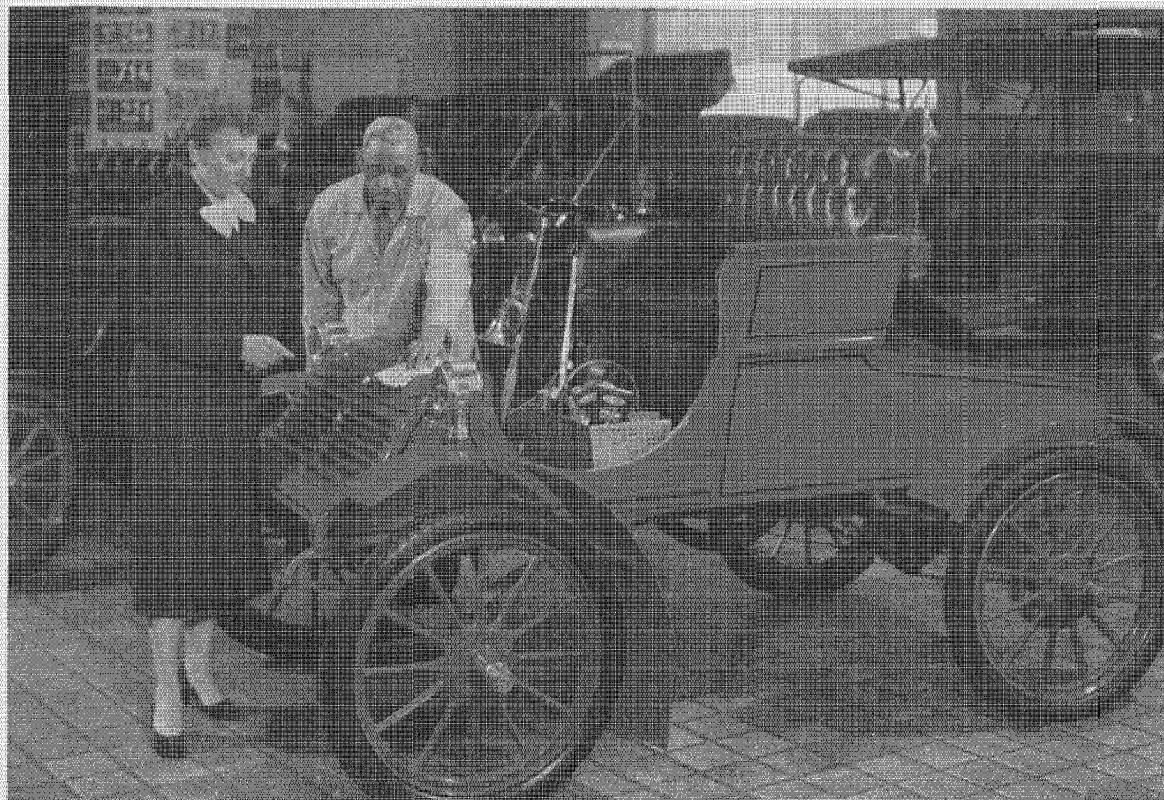




This 1902 American sat in an Ohio barn for years, kept by a farmer who remembered it with affection.

## HORSELESS CARRIAGES ARE BACK

The same car, standing in splendid restoration at Thompson Products museum, is one of curator Ruth Franklin's favorites. The finish is "Duco" lacquer.



By MARY ELLEN EVANS

If you want to get into one of the most zestful, entertaining and educational hobbies in the world today, do two things. Talk your Uncle Hiram out of the automobile that's been sitting in his barn for 35 years. Then talk with a dedicated collector of antique cars.

In no time at all, you'll probably be restoring the old model. After that, if you're like several thousand Americans who are addicted to collecting antique automobiles, don't expect a cure. The object of your labors will no longer be impersonal, but a mistress, sometimes a heartless hussy, who demands and gets your time, affection and cash.

Rusted hulks from New York to California are being restored to their original natty appearance and running condition. With the restorations, young Americans get a glimpse at the colorful history of automotive transportation. The not-so-young look at the antiques and relive the era of dusters and touring that tested the driver as well as the vehicle.

This hobby has few restrictions. It is followed by men, women, teen-agers, manufacturers, singers and school teachers. No one seems to mind the work, research or "Sunday best" upkeep of an antique. Take for example the 1902 American pictured on this page. For years it sat in an Ohio barn, hay piled in the seat, feed strewn over the floor boards, and chickens roosting on its brass headlights. The owner, who had refused to sell at any price, one day in 1951 walked into the Thompson Products Auto Album and Aviation Museum in Cleveland and gave it to the curator, Ruth Franklin.

"I know you'll treat her right," he said. "My father loved her; she once saved the life of my mother. So I want her to live on."

In the museum restoration shop, three men, who like to get their hands on the bony ribs of a Model T or the elegant curves of a Lancia, went to work on the American. They stripped it down to the frame, restored the wooden body, cleaned the chassis, and lubricated the one-cylinder



engine. Then Mrs. Franklin sent the body to George Longstreet, a Cleveland refinisher. Even he got into the spirit.

"Finishing antiques gives you a real sense of satisfaction," says Longstreet. "We spent more than a hundred hours on this little American, but it was worth all the painstaking work."

The reincarnated American now occupies a prominent spot in the Thompson Products museum, which includes 150 antiques (more than 35 years old) and a few classics (made during the so-called Golden Age of the Automobile, 1925-42). The museum got its start in 1937 when Frederick C. Crawford, then president and now board chairman of the company that makes automotive parts, bought a 1905 high-wheeled Duryea. As he bought more and restored them, the idea of a museum, open free to the public, was born. In August 1943, the company opened its doors to a collection of 40 automobiles.

### FROM BARNs TO BEAUTIES

Adding antiques to a collection is an adventure, according to Mrs. Franklin. Some cars are bought, others are traded, and a few are given to the museum. Some are in fair condition, even to upholstery; others are badly dismembered. An antique may be restored in three months; it may take years. The aim is not speed, but authenticity and perfection of restoration.

This fall, as in the past, Thompson Products will have an entry in the Glidden Tour of cars made before 1914. The Tour, a revival of the 1905-13 annual competition for endurance of automobiles and sportsmanship of drivers, will be held in New England this year.

At the Long Island Automotive Museum, Henry Austin Clark, Jr., displays the 1907 Thomas Flyer that won the strangest of the many strange races sponsored in the early days. Backed by the *New York Times* and the *Paris Matin*, six cars entered a race from New York to Paris. The Thomas was the only American entrant. After a wintry trip across the "impassable" roads of the U. S., a boat trip to Asia, weeks of slogging through Manchuria and Siberia, the Thomas made it to Paris first and received the title of "world champion." This car, unlike the other 80-odd Clark has on display, is in its original condition, a monument to drivers and maker.

"Graveyard" of antique vehicles that await resurrection in Thompson Products restoration shop downstairs.

Many collectors specialize in a few of the more than 2,000 makes of cars manufactured at one time or another in this country. Clark's museum highlights Fords and Pierce-Arrows and has a special section for old fire engines. T. Clarence Marshall of Yorklyn, Del. has an impressive collection of 25 Stanley Steamers.

Whether the collectors have one antique or 100, they usually belong to one or more of the three national groups—the Antique Automobile Club of America, the Veteran Motor Car Club of America or the Horseless Carriage Club. Besides the 8,000 members of these clubs, other collectors belong to unaffiliated local groups or go it alone. Half the fun, they say, is in talking about their prize antiques with people of similar mind.

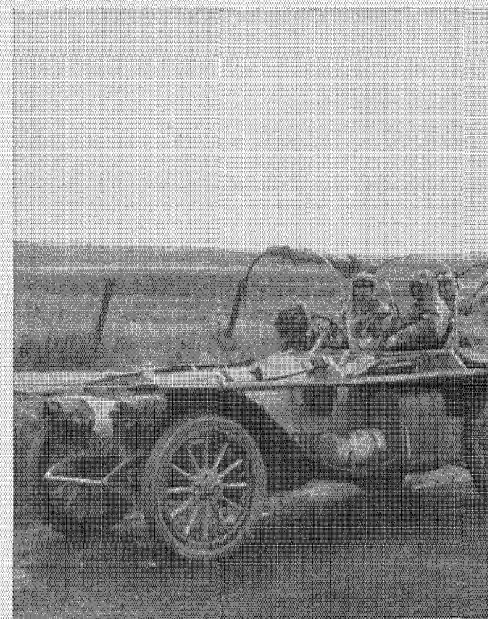
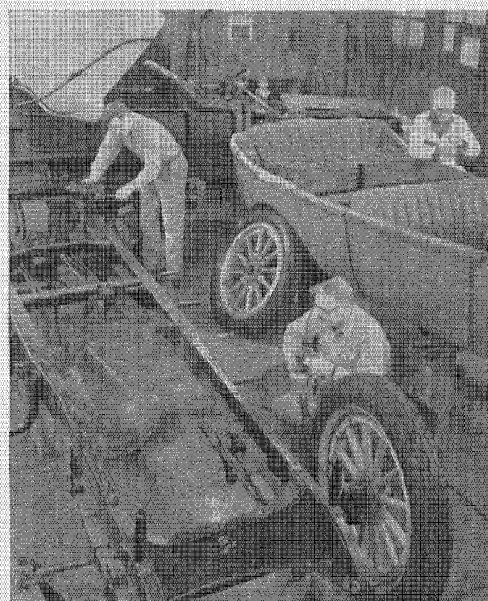
Paralleling the growth of automotive transportation in America has been the continuing advance in auto-

In the shop, three experts tear down 1917 Winston for careful restoration.

motive products, research and services by Du Pont. Sole producer of tetraethyl lead from 1923 to 1945, Du Pont now not only makes this antiknock compound for gasolines, but also operates a Petroleum Laboratory for research on additives and lubricants. The Petroleum Chemicals Division's recently announced silica grease is one of the new products from this research. Test cars and instruments such as a specially designed engine spectrometer and the lab's new chassis dynamometer assist the scientists in their search for better products for today's automobiles.

Du Pont products in the automotive field include the Company's neoprene, antifreezes, plastics, finishes, polishes, cooling system products, fabrics for upholstery and behind-the-scenes chemicals such as those used in treating metal. Such an array of products alone illustrates the long way we have come from the horseless carriage. And they help make not only the new car but the restored antique a thing of beauty and a joy to own.

This 1907 Thomas Flyer, now in the Long Island Automotive Museum, won New York to Paris race in 1908.





# The box that sees and hears

*It goes where human engineers cannot, keeps a photographic record of its experience,  
and writes the whole complex story on a single paper strip*

By MERRITT HULBURD

You remember those movies back in the late '30s—the hero is diving straight down at a frightening 325 miles an hour in the most modern and deadly plane aeronautical genius could perfect. No matter who the actor, our hero is always “a wild, daring youth with ice water in his veins—a test pilot!”

Today there are still daring young men who rush headlong at the ground to test modern flight designs. But in 1954, even though speeds exceed 1,000 miles an hour, the pilot is safer because his aircraft has been thoroughly tested before leaving the ground. Much of this testing is done with the help of recorders that substitute for human eyes and ears.

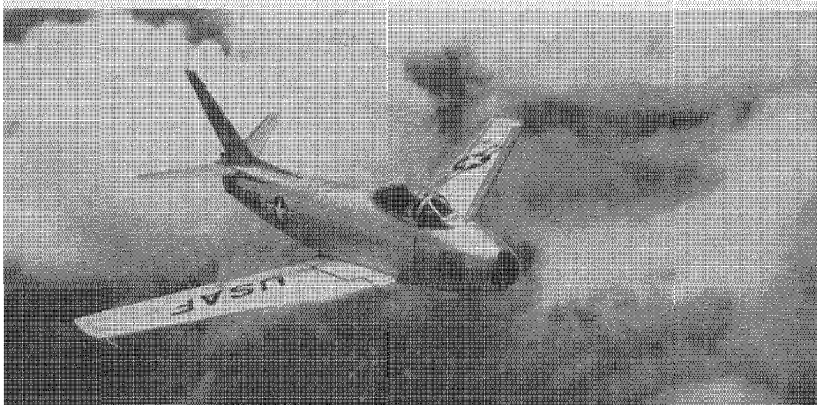
North American Aviation, for example, used dynamic data recorders in the wind tunnel testing of the now famous F-86 Sabre Jet and the new F-100. The technique is this: Minute gauges, or “pick-ups,” are placed at strategic stress and vibration points inside and outside the aircraft. “Pick-ups” might be attached, for example, to braces in the wing and tail assemblies. Then the wind tunnel is started up and the aircraft put through its paces.

All of the data received from the various “pick-ups” are recorded on strips of sensitized recording paper. After the tests, an expert interprets the recorded lines on the paper to gain accurate operating information. Similar

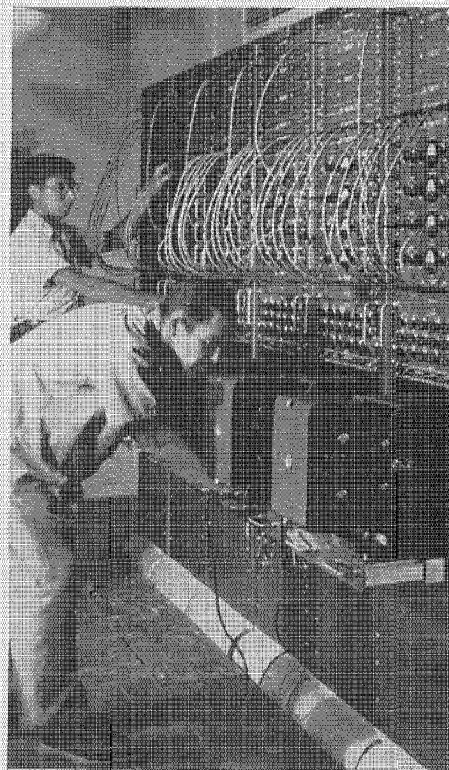
recordings are taken during the plane's actual flight testing, when all of the pilot's cockpit instruments can be connected to the recording devices.

Other industries also use these multi-channel dynamic data recording devices to record tests on innovations in railway passenger and freight car construction, new ideas in oil pump construction, and new automobile designs.

The recording devices are based on the fact that a physical quantity can be translated into electrical energy. Thus operating reactions on the test mechanism are translated into electric impulses by the pick-up gauges. Inside the recorder is a small galvanometer which reacts to these impulses. When a pulse of electrical energy passes through the galvanometer it swings in proportion to the strength of the impulse. Attached to the front surface of the galvanom-



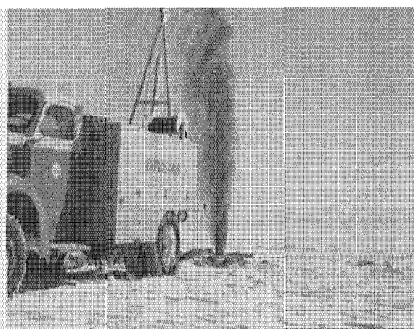
Dynamic data recorders kept watch on performance of the F-86 Sabre Jet during 1,000 wind tunnel tests, nine months of flight testing.



Data from guided missile in flight is radioed back to these recording oscillographs in Air Force



Seismo-Writ recording paper stands up to climatic extremes of oil prospecting.



eter is a tiny mirror. A small, shielded bulb furnishes light. Whenever the galvanometer moves, its motion is traced on a moving, time-calibrated strip of sensitized paper by the pin-point of light reflected from the galvanometer mirror. Later the sensitized paper is developed, much like an ordinary photograph, and the resulting wavy line is a graphic record of the function being tested.

The evolution of the dynamic data recording device was given impetus by the needs of first the oil and later the aircraft industries. In the world-wide search for oil resources, specialists began with seismic devices imported from Europe in 1924. From these were developed the sensitive electrical instruments now being used.

Seismic prospecting for oil depends upon the fact that the earth is made up of layers of varying densities. Shock waves, touched off by an explosion, radiate down from the surface and send back fluctuating echoes as they strike each different subterranean layer.

Oil-seeking seismographic crews first set off a series of regulated charges. Du Pont "Nitramon" S blasting agent is a particular favorite for this work. Sensitive microphones called geophones, embedded in the earth at carefully selected points surrounding the explosions, pick up the returning echoes, turn them into electrical impulses, and transmit them to the recording devices. The telltale traces on the sensitized paper show whether rock formations indicate possible oil deposits.

Du Pont makes a rugged and dependable photo-sensitive recording paper called Seismo-Writ for the oil

industry. The amateur photographer would probably be amazed at the flexibility of Seismo-Writ. It can be exposed and developed in the frozen Arctic or the steaming tropics with little or no effect on quality. This toughness was built into Seismo-Writ because oil men survey under widely varying climatic conditions. The adaptability of Seismo-Writ extends to the darkroom, too. For instance, where clean, clear water is scarce and must be saved for human consumption, swamp water is sometimes pressed into service for processing.

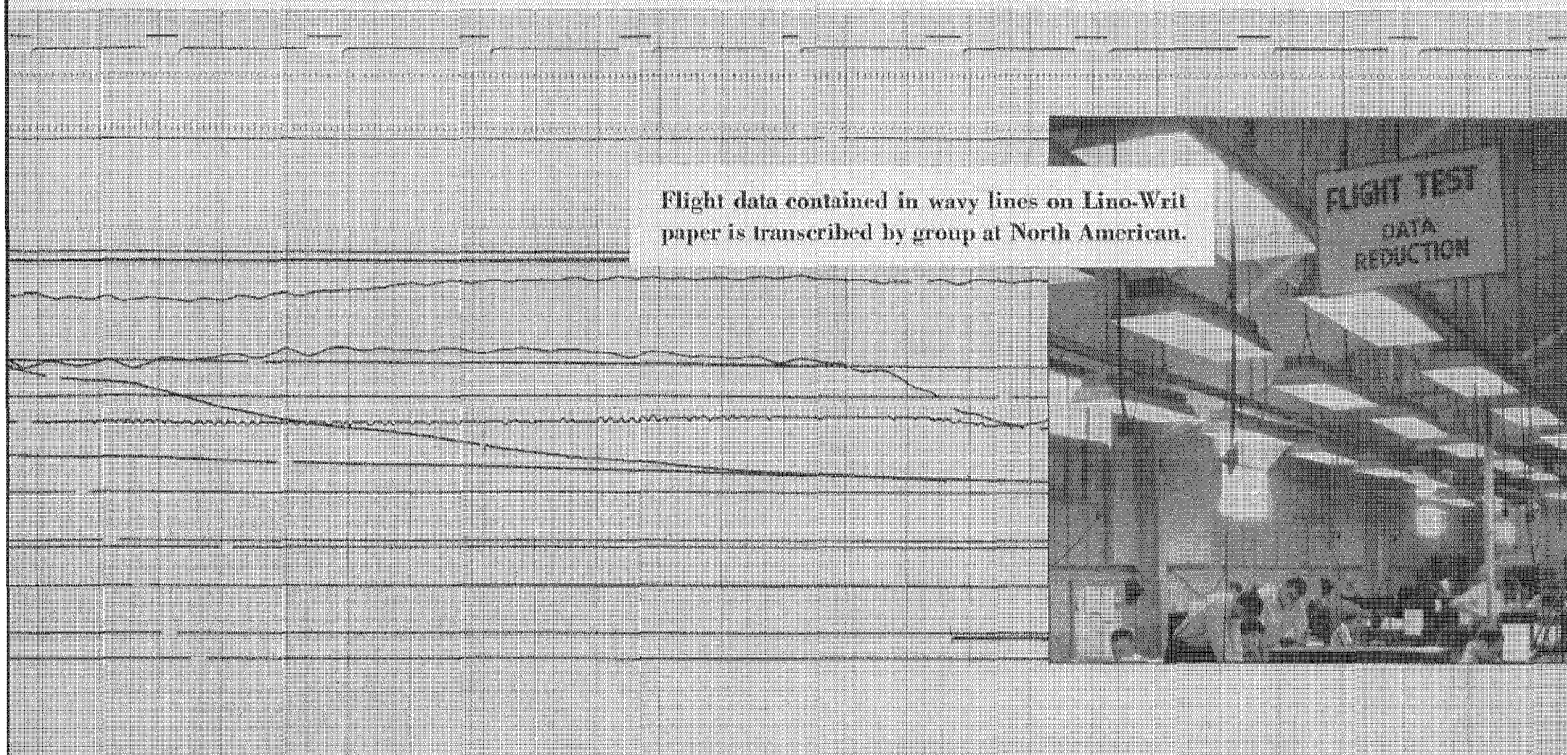
For use in other recording devices, Du Pont sells a sensitized paper known as Lino-Writ. This is the type called for in testing planes on the ground and in the air. Here the ruggedness of the photo-sensitive paper is just as important, for a recorder may be sent into the sub-zero stratosphere inside a rocket-propelled missile. After the recorder has gathered the information it was sent aloft to get, it may be dropped unceremoniously by parachute on a patch of blistering hot sand.

#### THINNER PAPER, MORE DATA

The most recent product advance in recording papers is a new surface W for both Lino-Writ and Seismo-Writ. Made of 100 per cent rag stock ledger paper, it is stronger, wet or dry, and yet is 60 per cent thinner than regular papers. This thinness means that much more information can be recorded during important and often unrepeatable tests. Lino-Writ W is easier to carry and less expensive to ship because it weighs less than comparable sizes of regular paper. This new lightness can mean a great deal when ounces of extra weight may contribute to performance failures in high-speed missiles. Lino-Writ W also has the added advantage of being translucent. When duplicate tracings are needed, you simply print through it, much like making a contact print in photography.

Today's expanding technology has created machines which move, rotate or vibrate faster and faster. The stresses, accelerations, velocities, amplitudes, pressures, and other variables involved demand a constant expansion of industry's ability to perform accurate "preflight" tests of these new elements.

Our hero of the '30s, plummeting toward the earth, is a symbol of what is now being conquered more safely and accurately by the science of dynamic data recording.







# NYLON:

By LOUISE J. GRUBER

If the *Arabian Nights* were being written in 1954, that fabulous magic carpet might have been made of nylon. Granted nylon carpet won't carry you over rooftops, but its performance is as wondrous in a more practical way.

The story of nylon carpeting is that of the iron fist in a velvet glove. The beauty and luxury of these floor

Nylon does yeoman duty on Delta Lines' SS *Del Sud*. Carpet was chosen for easy care, durability, resistance to mildew weakening.



Executive office at Stamford Rolling Mills Co. is carpeted in nylon for long wear, outstanding beauty and ease of care in an industrial area.



# practical luxury underfoot for business

coverings belie the very practicality and economy that businessmen like.

For example, take the case of the Sea View Hotel in Miami Beach, Fla. Nylon carpeting was laid in a lounge next to the beach. There it was subjected to constant tracking of sand, plus the inevitable spilling of drinks, foods and cigarette ashes. A hurricane added its havoc by completely submerging it, but after a normal shampooing the nylon carpet was almost like new. Other parts of the hotel have since been furnished with nylon carpeting, and even today the seven-year-old section compares favorably with the brand new ones.

Nylon carpet fiber does not attract moths, carpet beetles or other insects. Resistance to weakening from mildew is also inherent in nylon, increasing its value at the seashore or on shipboard.

## SPIKES PROVE LITTLE HAZARD

A carpeting problem at the Owasco Country Club in Auburn, N. Y. was to find a luxurious but durable floor covering for the main club entrance which serves the locker room and barroom. Rough treatment from golf spikes presented an extra hazard; every golfer made at least two trips over the area each time he played. Nylon carpeting was chosen. Five years and an estimated 1,800,000 spikes later the carpet was taken up for shampooing. The adjacent oak floor and doorsill were so chewed up by spikes that they had to be replaced, but thorough inspection of the carpeting revealed practically no signs of wear or tear. As a matter of fact, the club had planned to turn the carpet to equalize wear, but after cleaning it was impossible to tell which end had been at the entrance!

Ease of care is another important feature appreciated by the business and professional people who have adopted nylon carpeting. Vacuuming quickly removes dirt, which does not cling readily to nylon's smooth fibers, and spot cleaning takes care of most stains. A dentist in one town is so enthusiastic about the nylon carpet in his heavily trafficked waiting room that he is known as the "nylon dentist." His patients and friends have all heard its virtues extolled to a fare-thee-well.

The oil-filled atmosphere which penetrates all plant areas of a brass and copper rolling mill makes maintenance a constant problem. Six years ago, Stamford Rolling Mills Co. in Springdale, Conn. purchased nylon carpeting for the office of James O. McCue, president. Appearance, naturally, was important, but so was durability. Regular conferences are held in the office with men from the production lines, and so much grease, sand and dirt is tracked across the carpet that it is cleaned and vacuumed every day. Despite this, no paths have been worn into the surface and the beauty of the color remains unchanged.

The Stamford Rolling Mills president summed up his satisfaction in a letter to the manufacturer: "The service we have gotten from our nylon carpet convinces me it is a smart and economical buy for any office."

These are just a few instances of nylon carpeting's standing in its field. Churches, restaurants, banks, and stores, as well as home decorators, also are specifying nylon for floor coverings.

As for serviceability, results of a wear test made by



After dunking in salt water during hurricane and seven years' wear, nylon carpet at Sea View Hotel looks new.

an independent testing company show that an all-nylon carpet exhibited only slight traces of wear after a period ten times the wear limit of a conventional carpet.

Du Pont nylon in carpeting has frosty but subdued luster. Also, because the fibers are snow white, dyeing brings a new depth of color. Various methods of weaving nylon fiber produce a variety of textures and designs in carpets, all combining beauty and resiliency underfoot.

Today several companies—and we'll be glad to send you their names—make nylon carpeting of luxury, distinctiveness and beauty. They offer a practical investment, too, because the added years of service and lower maintenance costs of nylon carpeting are a winning combination for any business.



# Du Pont Notes

On a new "indoor highway," Du Pont engineers now travel thousands of miles by automobile without leaving the Petroleum Chemicals Laboratory at Deepwater, N. J. This armchair approach is made possible by the lab's new chassis dynamometer, on which a car's reactions can be studied under manufactured road conditions. With a few adjustments, engineers can have the test car climbing a simulated hill or threading its way through imaginary city traffic. They can even blow a 90-mile-an-hour stream of air at the radiator to add to the functional realism of high speed driving.

The dynamometer is operated from a control panel where engineers record data on car performance as affected by fuels, lubricants and other factors. It's all part of a research program on additives to improve fuels and lubricants for tomorrow's cars.

The understanding of the people is one of industry's greatest needs, declared William H. Ward, a Du Pont Co. vice president, in a recent address before a business audience in New Orleans.

"The American people must recognize the true source of their economic security and the part that industry plays in it," he said. "Unless they guide their efforts so that this security can be cultivated and protected, they are in peril of defeating their own ends."

Until recently, he continued, industry has not tried hard enough to state its case. He called on the industrial community to "stop trying to influence the nation, and concentrate upon our own immediate communities and publics.... These are people who know us. They may be more inclined to listen to us and believe us."

Snow in a can is most popular with people who don't have much snow on the ground, results of a Du Pont consumer survey indicate. Sales of artificial snow in push-button aerosol cans were higher percentage-wise in the South and West than in the snowy Northeast and North Central states, the survey disclosed.

Almost one-third of the 2,468 families interviewed had bought the artificial snow at one time or another. Most used it for Christmas tree decoration. Other uses, in order of popularity: for decorating windows, packages, evergreen boughs, and table decorations. Du Pont makes the "Freon" fluorinated hydrocarbon propellant used in the aerosols.

New colors for paints, lacquers, ink, paper, plastics and other products are the research aim of a laboratory being built by Du Pont at its Newark, N. J. pigments plant. The new facilities will be among the most modern in the country.

Hard work and responsibility do not by themselves cause such stress diseases as ulcers, high blood pressure and coronary trouble, the health records of Du Pont executives indicate.

A medical division study shows that the incidence of these ailments is no higher among top and lower level executives than among nonexecutive, salaried Du Pont employees. In fact, top executives have fewer of these illnesses than those one step below, although older sales executives exhibit a slightly higher rate than other groups.

It's not the number or complexity of problems that cause stress, the medical division feels, but the individual's emotional reaction to them. Pointing to the relation between obesity and some stress diseases, the division recommended keeping weight within reasonable limits.

Five Du Pont scientists have used the big electronic "brain" at the Massachusetts Institute of Technology to operate, on paper, a chemical reactor in a Company plant hundreds of miles away.

So well did the machine do its work in establishing a set of operating conditions that the reactor's production rate was increased 25 per cent.

So far as is known, the robot operation was the first large-scale use of MIT's famed Whirlwind computer in solving a chemical industry production problem.





# A coal with personality

**P**edestrians hurrying past the Blum Store in Philadelphia last fall may have been startled to see piles of red-spotted coal in the store windows along with the fall's feminine fashion display.

Copy cards informed them that the coal was Famous Reading Anthracite, and that anthracite black with a touch of red was a style note of the autumn season.

Promotion of coal in store windows may seem unusual, but it's only a sample of the vigorous merchandising adopted by The Philadelphia and Reading Coal and Iron Co. Like the rest of the anthracite industry, Reading's sales efforts are aimed at capturing new markets for hard coal and winning back markets lost to competing fuels.

The little red spots on the coal loom large in the company's merchandising program. They are an easily identifiable trade-mark, established in the public mind by 15 years of promotion. The company feels that the trade-mark and the slogan, "When it's red, it's Reading," have

become symbols of anthracite quality to consumers.

Reading registered its red trade-mark in 1928, but technical difficulties slowed its adoption. Colored wood pulp, one of the early materials sprayed on the coal, turned purple on exposure to weather. Other trials were little more successful. Finally, in 1939, Philadelphia and Reading took its problem to the Du Pont Finishes people, who developed a special red paint for the job.

The identifying "red for Reading" paint has to meet several specifications: It must be inexpensive to use, must stick to the wet surface of freshly washed coal, and must dry quickly so that the red spots don't become red smears. The spray nozzles that apply the paint at the breaker have to be specially adjusted, too. They must splutter rather than spray to achieve a spotting effect.

"The high quality of our product and the signifying red trade-mark are our biggest assets," a Philadelphia and Reading spokesman told us.

Coal is loaded aboard cars immediately after trade-marking. Paint has to dry fast enough to prevent smearing, retain the spotted effect that identifies Reading coal.



Here's how the red trade-mark is applied to Famous Reading Anthracite. A special Du Pont paint is sprayed on the freshly washed coal as it streams from the breaker.





BEDROOM SET—drapes and bedspread  
feature new Fiber E-cotton combination.



FIBER E RUG—it's practical,  
and the crimp stays through  
repeated washings.



## FIBER E: rayon with a "wave"

Fiber E Rayon is another Du Pont contribution to luxurious and practical modern living. Its "wave," or unusual curl, actually *improves with washing* and gives it long-lasting beauty.

Shown here are some of the modern, *practical* products being made from Fiber E by textile manufacturers. We say *practical*, because Fiber E launders easily and doesn't lint or lose its luster.

Colorful decorator rugs (from 2' x 3' to 9' x 12')—matching bedspreads and drapes—upholstery material and slipcovers—stuffed toys and baby clothes; these are a few examples of where this development of Du Pont research is being used to bring you better products at reasonable cost. Look for them at your local stores.

*Look on the label for **FIBER E** rayon*

UPHOLSTERY—luster of  
crimped Fiber E Rayon is  
outstanding.



JACKET LINING is made with Fiber E Rayon.

DU PONT FIBER E RAYON



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

FIBER E adds texture to toy dog, baby suit.

