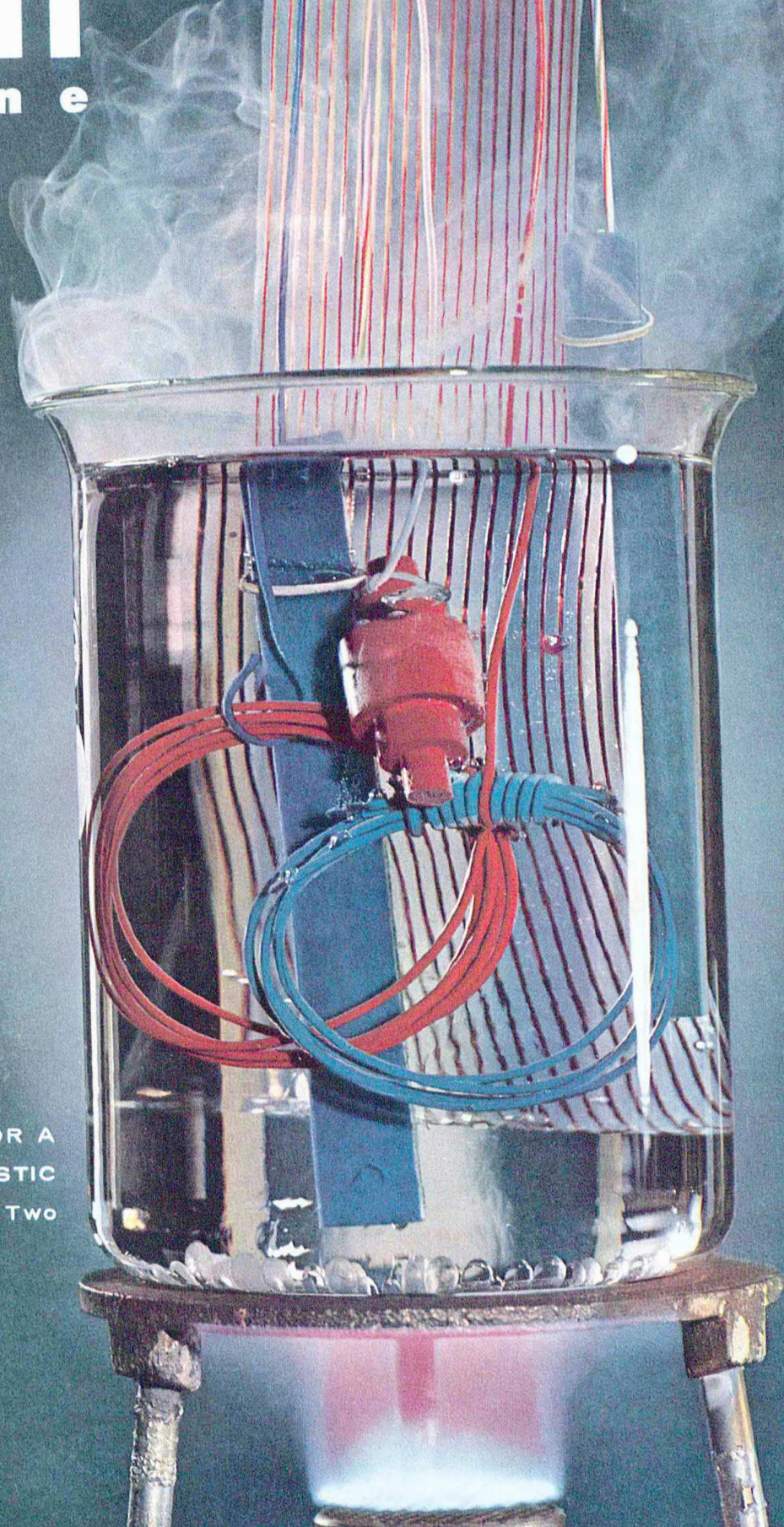
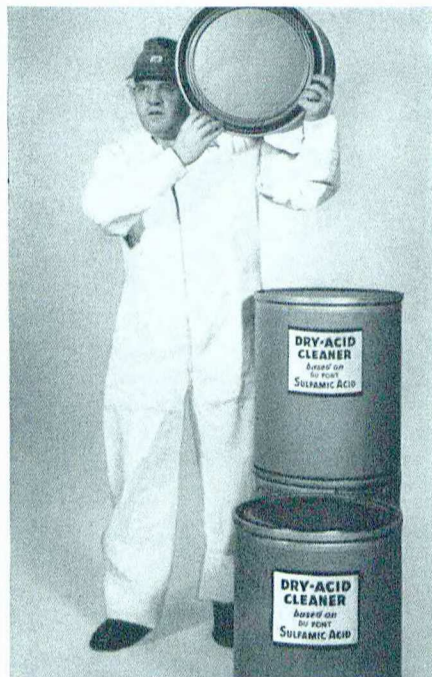


ACID BATH FOR A
TOUGH NEW PLASTIC
...Page Two



WHY **Dry Acid Cleaners**

are gaining favor for cleaning equipment



✓ Safer, easy to handle

NEW sulfamic acid-based cleaners are supplied in light, disposable cartons. They're stored and handled dry... no spillage or breakage worries.



✓ No hazardous fumes

NEW dry acid compounds are measured, mixed with water for use. These cleaners are nonfuming, produce no corrosive gases... dry or in solution.



✓ Low storage costs

NEW dry acid cleaners are concentrated, require less storage space. One 100-lb. drum occupies only 1.9 cu. ft.—more than equivalent to a 192-lb. carboy of 18° Be' HCl, which occupies 5.6 cu. ft.

DRY ACID CLEANERS BASED ON DU PONT SULFAMIC ACID offer important features that recommend them for industrial equipment cleaning:

- ✓ Safer to handle
- ✓ Easy to use
- ✓ No hazardous fumes
- ✓ Powerful descaling action
- ✓ Less corrosive
- ✓ Lower handling and shipping costs
- ✓ Economical storage.

Sulfamic-based cleaners are ideal for removing hard-water scale and other mineral deposits from such equipment as

- ✓ Steam boilers
- ✓ Condensers

- ✓ Heat exchangers
- ✓ Piping
- ✓ Air-conditioning cooling towers
- ✓ Ice-making machines
- ✓ Bottle-washing machines
- ✓ Sea-water distillation units
- ✓ Butterworth heaters
- ✓ Food-processing vessels
- ✓ Gelatin evaporators
- ✓ Milk evaporators and pasteurizers.

We'll gladly send you additional information about sulfamic-based cleaners, including names of companies who offer these products and provide technical service for users. Just mail us the coupon.

SULFAMIC ACID

E. I. du Pont de Nemours & Co. (Inc.) Grasselli Chemicals Dept.,
Rm. N-2543DP, Wilmington 98, Delaware



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

Please send me:

☐ Free booklet about dry acid cleaners based on Du Pont Sulfamic Acid

☐ Names of formulators who offer these cleaning compounds

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DU PONT magazine

A POLITICAL ROLE FOR BUSINESSMEN

Speaking to the North Carolina Citizens Association recently, Du Pont President Crawford H. Greenewalt said in part:

"John Adams envisioned a balance of power as the most effective way in which the dissimilar interests of a democracy could be compromised... If a balance is to be preserved, the views of all parties should be heard and considered. Yet business, in an era featured by shrill cries, has all too often pleaded its case in whispers..."

"Business has not been active enough in its own behalf. Had the privilege of a hearing been removed by law, the injustice would have been decried as an outrage. Yet, as Mark Twain said about reading, there is little difference between those who don't and those who can't."

"In our country, all decisions are made in accordance with popular will... I believe that, by and large, the public's verdict will be sound and just. But here, of course, there is one essential proviso—that the issue be clearly defined and that the voters be fully informed of the facts. It is here that business has the obligation to make sure that evidence is not withheld..."

"It is the particular, not the general, which is the corporation's proper (political) sphere. It can perform effectively only in defense of its stockholders or employees as such. On many of the larger and more general political questions, there can be no valid corporate position at all. It is unrealistic to presume that even a 'business viewpoint' would be representative... It would be as difficult to achieve unanimity among businessmen as it would be to reach a single conclusion among an equally large group of legislators or clergymen or housewives..."

"Any corporate program, or program of participation by businessmen, will fail if it conceives its proper purpose to be the seeking of favors or of anything relieving business of its proper obligations. It can succeed only when its objectives are in accord with the highest ethical standards..."

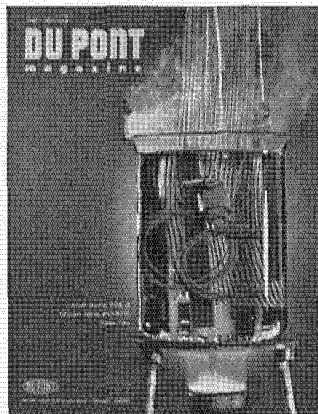
"Businessmen are already beginning, I think, to see that government, like parenthood, requires personal attention. They will come to see, too, that there can be no delegation at any time of the responsibility to be responsible."

OUR COVER

The clear liquid giving off those evil fumes is hot concentrated sulfuric acid. The colorful molded pieces, printed wiring and insulated wire bathing unmolestedly therein are made with a new Du Pont plastic, "Teflon" FEP-fluorocarbon resin.

Indifference to acids is only one of FEP's desirable qualities. It's a standout electrical insulator, too, although we couldn't think of a way to show that in the same picture. Anyway, you'll find all of FEP's virtues pretty well extolled in the article that begins on the next page.

Photographer Ted Adams had the devil's own time getting this cover picture, by the way—four long shooting sessions and 20 sheets of Ektachrome. We earnestly recommend that no one try it who isn't thoroughly experienced in safe laboratory procedure.



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STAFF

James H. McCormick, *Editorial Supervisor*

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CHANGE OF ADDRESS

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"TOUGH GUY" PLASTIC GETS

A new fluorocarbon plastic that one Du Pont sales manager predicts will "set industry on its ear" will begin flowing from a Du Pont plant in Parkersburg, W. Va., late in 1959. The product is "Teflon" FEP-fluorocarbon resin (the initials stand for fluorinated ethylene propylene), and it promises to spread the unique benefits of the fluorocarbon plastics to a broader spectrum of industry than ever before.

Because FEP has good melt-flow properties, it can be molded and extruded like nylon, polyethylene and other resins familiar to industry. In appearance the product resembles high-density polyethylene; it has excellent transparency in thin sections and is a translucent white in greater thicknesses.

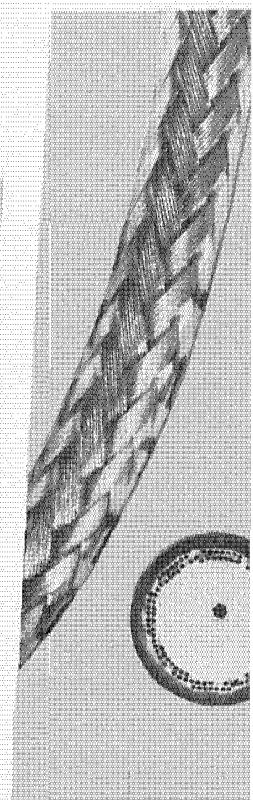
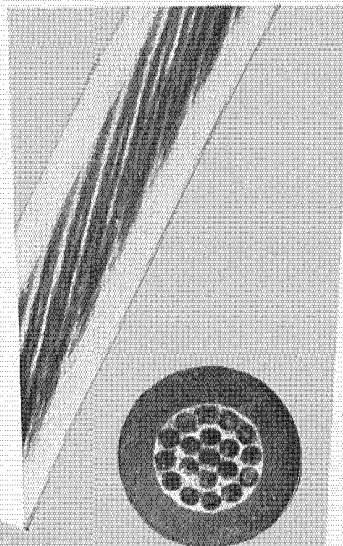
The Du Pont Polychemicals Dept. will sell it as a granular powder at an initial commercial price of about \$12 a pound, and the Film Dept. will market it as a film and thin-walled tubing. The latter department also has tentative plans to supply lami-



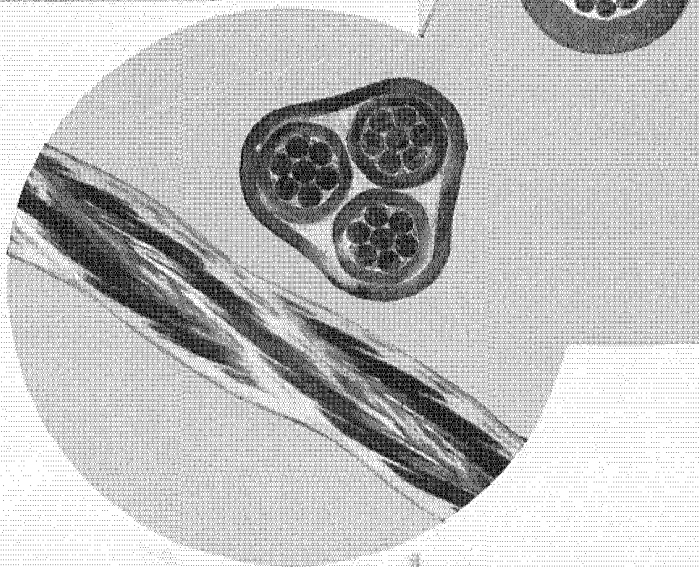
Man of distinction is John Cheshire, Du Pont Film Dept. Heat-sealed envelope of FEP film holds water, but the plastic could just as well hold corrosive rocket fuels. Other samples: flat cable insulated with FEP film, capacitor, printed circuit and film-coated asbestos gasket.

Three-wire twisted cable has a primary insulation and jacket of FEP. It's economical to make because FEP is easily extruded.

Here the new plastic is primary insulation on stranded silver-coated hookup wire.



Coaxial cable has primary insulation of FEP resin, a jacket of FEP over braid to ward chemicals and moist



PARTNER

Here's a new "Teflon" fluorocarbon resin, and this one's a true thermoplastic that can be melted, molded and extruded. Du Pont begins quantity production late this year.

nations of FEP to selected substrates, and the Fabrics and Finishes Dept. is studying market applications for FEP-coated fabrics.

FEP is a direct descendant of DuPont's first fluorine-derived plastics, "Teflon" TFE- (tetrafluoroethylene) fluorocarbon resins. The original TFE resin was born 21 years ago when a chemist opened a cylinder of tetrafluoroethylene gas—a relative of the "Freon" refrigerants—and found that over a period of months the gas particles had joined under pressure into a whitish, waxy solid never seen before.

Du Pont began manufacturing the first TFE resin in 1943, and since then the whitish solids have come to occupy an exclusive niche in the plastics field. Wherever conditions are too hot or corrosive for other materials, wherever you want a surface that almost nothing will stick to, TFE resins are a likely answer. They insulate hookup wire in planes and missiles, serve as packing and gaskets in acid pumps and coat bakery tins. In fiber form,

they make self-lubricating bearings and high performance filters.

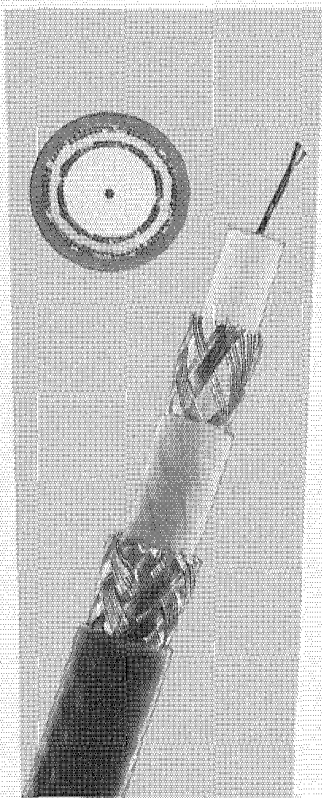
TFE resins don't behave like ordinary thermoplastics, however. Instead of becoming fluid at temperatures above 621°F., their crystalline "melting point," they hold their shape. As a result, the special techniques required to fabricate them are more like those employed with powdered metals than with plastics.

The exciting thing about FEP is that it has just about all of the properties that have made TFE famous, with one exception: TFE can be exposed continuously at 500°F., while FEP is limited to about 400°F. Du Pont doesn't foresee any appreciable displacement of TFE by FEP, however. The prediction is that there will always be jobs one or the other can do better, but that a middle ground will develop in which either material can be used.

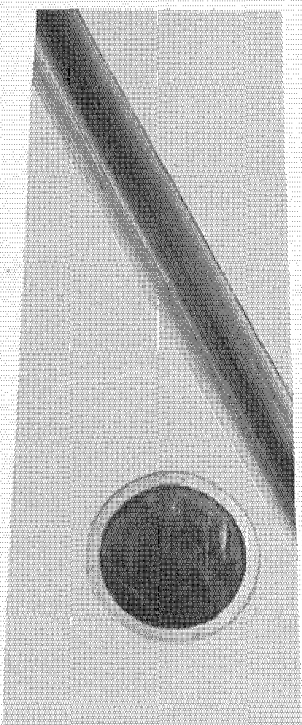
Here are the qualities the two classes of resins share:

They are excellent electrical insulators, retaining their insulating ability over a wide range of temperatures and frequencies.

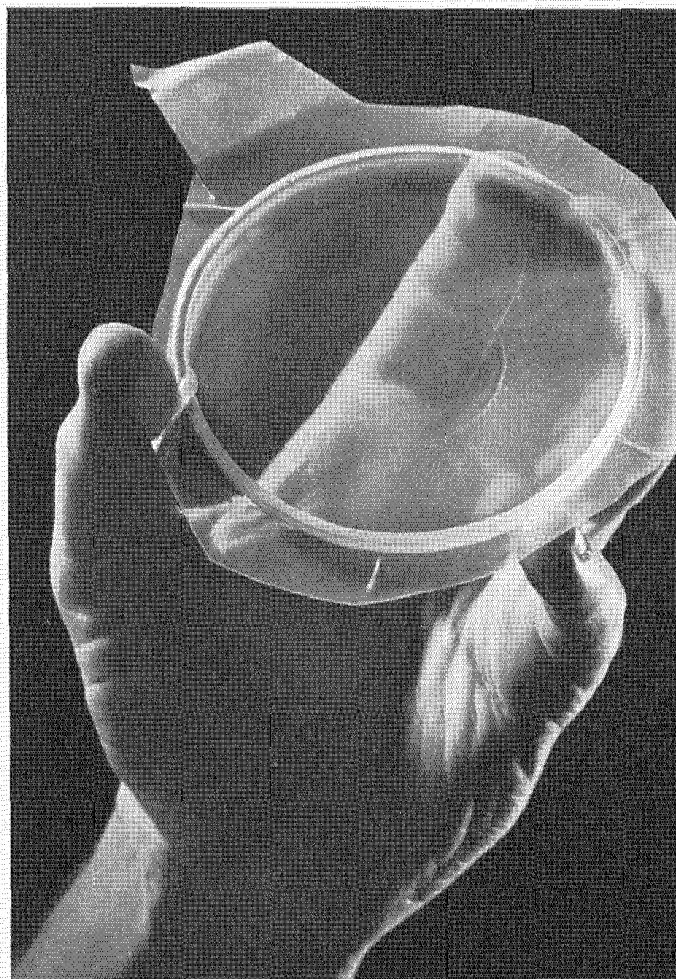
Complex triaxial cable has two wire braids and two pigmented jackets of FEP.



Solid copper wire has 4-mil coating of FEP. Extrusion temperature doesn't degrade electrical conductor.



Pigmented FEP insulates tinned copper wire. Plastic takes colors well.



Vacuum-formed dish—this is a laboratory sample—illustrates another potential application for new "Teflon" FEP film. Possibilities: molds with excellent release properties; chemical-resistant laboratory sinks.

The latter is extremely important in high frequency applications. Because they do insulate so well, a little "Teflon" goes a long way. This saves space and weight, critical factors in aircraft and missiles.

They have no known solvents and are unaffected by most chemicals. Exceptions: alkali metals and certain halogenated compounds at elevated temperatures.

Practically nothing sticks to them. A sheet of FEP film, for example, placed under the ice cube tray in a refrigerator, will prevent the tray from sticking. TFE has this same property.

We asked Bob Stabler, Polychem product technologist, where FEP would be used to begin with.

"Three-quarters of the market is expected to be in wire and wire products," he said. "The remainder will go into injection-molded parts, tubing, hose and a variety of other end uses.

"As the market grows, the price probably will come down. TFE prices, for example, have dropped from \$18 a pound for the granular powder in 1944 to the present \$4.10. Price reduction will broaden the market for FEP still more."

What does FEP offer the wire user that he doesn't have?

"A wire and cable coating resin that is easily pigmented and that gives a high quality, chemical-resistant jacket in long, continuous lengths, free of flaws and capable of continuous service at 400°F.," said Stabler, running out of breath. "FEP also shows no evidence of turning brittle after prolonged heat aging. These qualities add up to outstanding reliability."

As a primary insulation, FEP can be extruded successfully over tin-plated, aluminum-plated, silver-plated or bare copper conductors, said Stabler. The conductors don't degrade since they are held such a short time at processing temperatures. As a jacketing material, it can be applied over shielded and unshielded primaries as well as multiconductor and coaxial cables.

"Ice doesn't stick to FEP," Stabler reminded us. "This raises interesting possibilities. Could FEP be used, for example, on airplane leading edges and propeller blades to prevent ice buildup? We're looking into it."

MEANWHILE, AT THE FILM LAB...

The next day we talked to Dave Ormond of Film's Sales Development and Technical Service Laboratory about the future of FEP film as his department sees it.

"We're selling film ranging from a half mil to 30 mils thickness, maximum roll width 16 inches," he said. "The electrical field is one of immediate interest. Because it is thermoplastic, the film can be heat-sealed to itself in a wrapping operation for extremely thin primary insulation, can be combined with TFE and other materials or used as cable overwrap. To eliminate conventional wiring, you can make a high performance flexible printed cable with film."

In printed wiring boards, a film of FEP serves as the filling in a sandwich of copper foil and TFE or TFE-coated glass fabric. It adheres well to both surfaces, and the resulting construction—"Teflon" throughout—yields a superior electrical grade laminate. Capacitor dielectrics are another promising application.

A variety of candy and plastic molds might be vacuum- or heat-formed from FEP film to give excellent and permanent release properties, Ormond went on. Many shapes might lend themselves to this technique—chemical sinks, ice trays, roll coverings, exhaust hoods and so on.

Flexible bladders and fuel cells for aircraft and missiles might be fabricated of the film by heat-sealing or heat-forming techniques. The chemically resistant film shows excellent impermeability to a variety of corrosive fuels, such as hydrazine and fuming nitric acid.

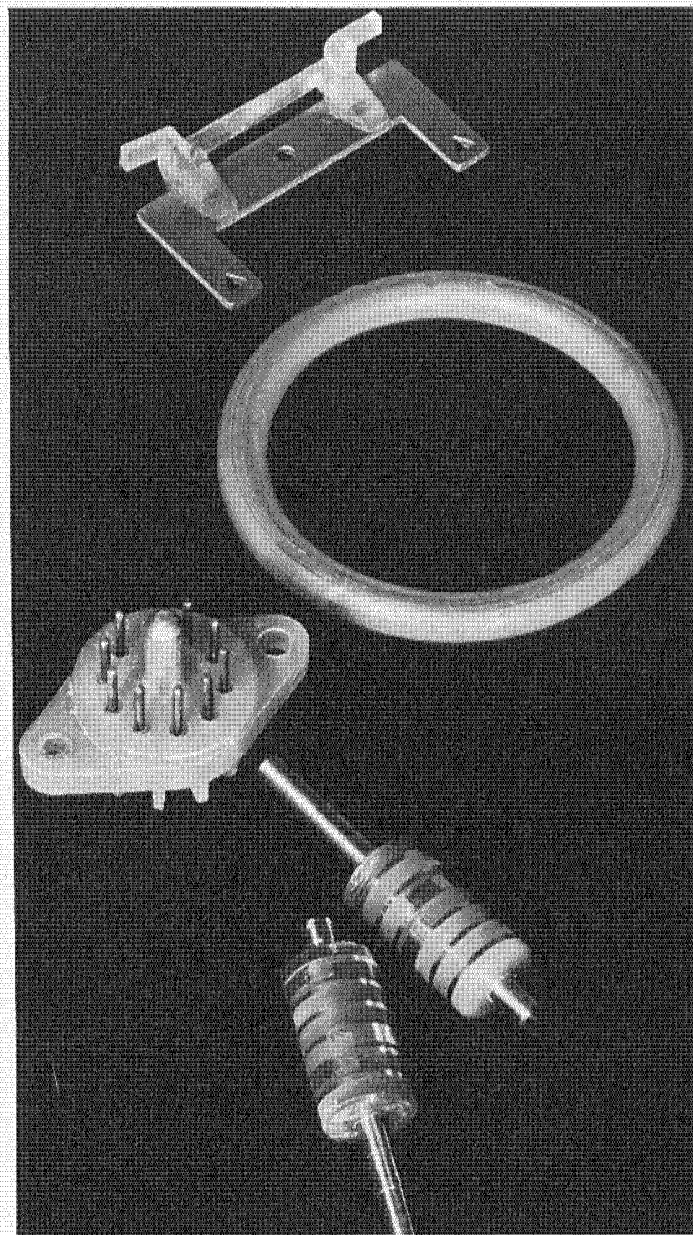
FEP film also will be used in gaskets, seals, diaphragms and bearings, Ormond predicted. The key properties here: antistick,

corrosion resistance, heat sealability, heat bondability and freedom from pinholes. Asbestos cloth is being laminated with FEP film now for use in tadpole gasketing for aircraft. Since it prevents wicking of fuel by the asbestos, the thin film makes the gasket an effective barrier against the spread of flame.

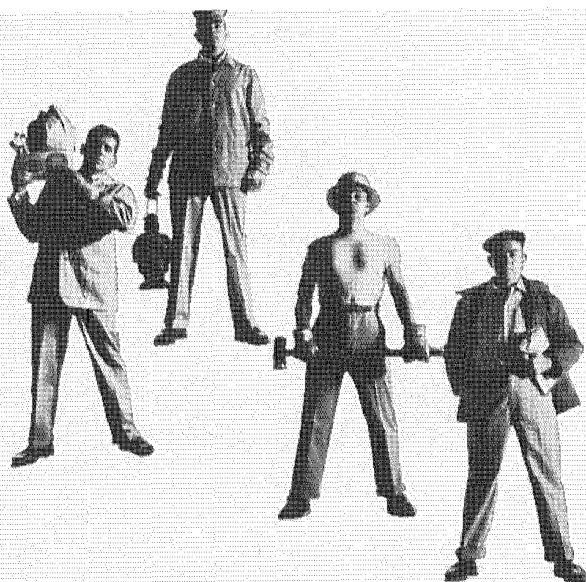
The film's chemical resistance also holds out the intriguing possibility that it might be used as a corrosion-protective lining for tanks and piping, said Ormond. Practical techniques for this application are being studied. Such linings would have obvious importance for the chemical, food and transportation industries.

Ormond also sees an outdoor future for FEP. The film appears to be transparent to ultraviolet radiation, the villain that shortens the outdoor life of most clear films. There is no known limit on FEP's outdoor life.

What Stabler and Ormond told us, of course, is only the foreword to the story. The first chapter will be written some months from now when commercial quantities of FEP resin are available to industry. We'll be reporting on these developments later. Meanwhile, write the *Du Pont Magazine* for further details on FEP applications you may have in mind.



Encapsulated molding of electronic parts is possible with FEP, extending benefits of "Teflon" to areas once excluded.



MORE WORK FROM WORK CLOTHES

*Industrial workers, college students and
cowboys of all ages are among the beneficiaries
of utility clothes strengthened with*

Du Pont 420 nylon

If you buy a pair of work pants today, you can expect them to last about 70 per cent longer than they would have two years ago. You can, that is, if you choose garments properly fortified with Du Pont 420 nylon, a type that made its appearance in 1957.

Yarns formed by blending 25 per cent of the special nylon with cotton have a breaking strength significantly

higher than straight cotton and are up to five times more resistant to abrasion. Used in the warp or wearing surface of denims, twills and sateens, they lengthen the wear life of utility clothing appreciably.

Such garments serve a sprawling market that includes sportsmen, do-it-yourselfers, college students and school-boys as well as farm and industrial workers. The nylon-fortified fabrics have zoomed to such popularity that mills currently are turning out about two million yards a month.

Back in 1952 when Du Pont began its search for a nylon that would blend with cotton, the specific goal was to add to the wear life of industrial workers' garments. An early field test involved a group of pipefitters, each of whom received one pair of cotton pants and another of cotton and the new nylon. The all-cotton trousers lasted an average of 134 days, the nylon-fortified ones an average 229 workdays.

Subsequent tests have shown comparable extra wear—averaging 70 per cent—for the nylon-cotton blends. Such added mileage can make a big difference to the company that pays all or part of the cost of work clothing for its employees. A pair of fortified pants may sell for about a dollar more than the all-cotton variety, but the extra cost is more than repaid in wear.

Also interested in the fortified garments are laundries that supply as well as wash industrial workers' clothing. One industrial launderer is currently running a wear test with a steel company customer.

You'll find utility clothing fortified with Du Pont 420 nylon at practically all department and chain stores. Choice is wide, too. For example, J. C. Penney Co., Inc., which stocked garments of the fabric in two styles last year, now offers 12.

WORK CLOTHES GO TO COLLEGE

What style of utility clothing will appeal to what market is a subject that frequently baffles department store buyers. For instance, denim once was worn almost exclusively by truckers, miners and farmers. College students took it up enthusiastically some years ago, then lost much of their interest. Today, however, it's reportedly enjoying a campus revival. Paradoxically, the sateens and twills that the Ivy Leaguers made their uniform have since become favorites for on-the-job wear.

Spurred no doubt by admiration for television cowboys, boys are wearing denim jeans with a flourish and showing a marked interest in the tight or "western" style. The once-popular bib overalls are currently in eclipse.

Mothers are enthusiastic champions of nylon-fortified jeans. In one recent check, more than a thousand women supplied information on garments that their sons had worn 20 to 30 times. Over 75 per cent rated the nylon-cotton blend better than all-cotton for jeans.

Meanwhile, uses for Du Pont 420 nylon are broadening. New this spring is knit underwear of cotton bolstered with 20 per cent of it. Previously some knitters had used small percentages of nylon to reinforce collars and other points of stress, but the current garments are the first in which the blended yarn is used throughout. Here, too, the improved wear-life is significant. Undershirts tested wore about 50 per cent longer than all-cotton ones, for instance.

The particular advantage of Du Pont 420 nylon is that it doesn't stretch as much as other varieties of nylon and hence works better in harness with cotton to keep the warp yarn strong. Precisely because it stretches less in clothing, it's putting extra stretch in the clothing dollar.



Rope tricks for industry

*Sturdy, lightweight cordage made of
Du Pont fibers performs well and saves money
in a variety of demanding roles*

Handling bulky materials, whether they be steel tubing, compressor shafts or beef on the hoof, is likely to call for rope. And rope, one of man's most ancient tools, is better able to serve him these days than ever.

The reason: With nylon and "Dacron" polyester fiber, cordage makers are turning out products that are superior to older ones in many ways. Both synthetics are notable for their strength, uniformity and rot and mildew resistance, qualities that enable them to stand off rope's traditional enemies. In general, nylon ropes are well over twice as strong as Manila ones of comparable size, and ropes of "Dacron" are about twice as strong.

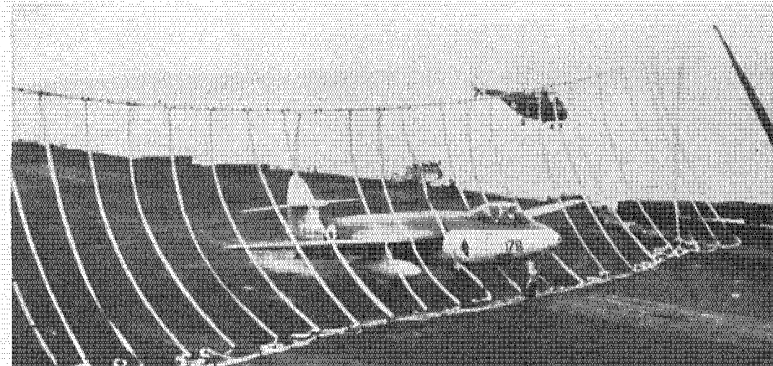
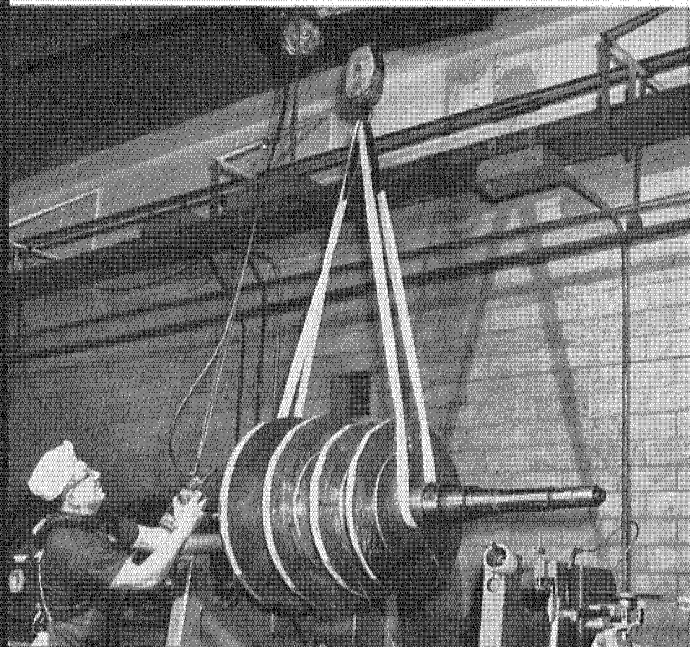
While this may be old stuff to mountain climbers, cowboys and sailors, the performance of synthetic cordage is not so well known in industry, partly because the jobs it can do are so diverse that they're difficult to pinpoint. But here are a few of the things that can happen when industrial users get to know the ropes.

Carrier Corporation, Syracuse, N. Y., finds jobs for a variety of slings—some of cordage, others of webbing—in its machine and assembly shop. A major one is in transporting heavy compressor shafts and wheels along the production line. The coolant used in machining operations once degraded Manila slings so rapidly that they lasted only about 12 days. A number of slings made of nylon and "Dacron" have served for eight months and one

S-t-r-e-t-c-h: Nylon webbing caught and saved this British carrier



Two jobs for synthetic fiber slings at Carrier: top, nylon rope moves an impeller wheel for compressor; bottom, nylon webbing carries a 1,500 pound impeller and shaft assembly.



is still going strong after more than a year.

"Coolant-soaked Manila slings picked up steel filings from the machining operations and scored the highly machined surfaces that are so critical to our operations," explains Robert Sparrow, senior layout engineer. "Even more important than the durability of nylon and 'Dacron' is the fact that their tight construction prevents such chips from being embedded into the slings." The Carrier machinery division's first use of nylon webbing was for moving electronic control units of commercial refrigeration systems. It replaced wire cable, which had to be padded and even then sometimes marred painted surfaces.

Pacific Tube Company, Los Angeles, needed a sling for moving stainless steel tubing—5,000 pounds at a time—through its pickling and cleaning operations. Natural fiber rope disintegrated rapidly in the nitric-hydrofluoric acid pickling solution; metal chains, while durable, tended to mark and dent the surface of the tubing.

Now Patco uses a three-quarter-inch rope of "Dacron" made into endless slings. Not only are the slings durable—they last about six months—but they have reduced the amount of tubing rejected because of handling marks.

Elsewhere in the mill almost all of the tubing is handled on slings of nylon belting impregnated with Du Pont neoprene synthetic rubber. In addition, Patco has outfitted its receiving and shipping departments with slings made of hard-lay nylon, chosen for their stiffness and wear resistance.

The Rice-Powell Elevator, Chicago, sends word that it is well pleased with its first trial of 300-foot shovel lines of "Dacron". Used to unload grain barges, the ropes go down a marine leg through pulleys from drums at the top. One line is connected to the rear of a scoop and another to the front. Two scoops hooked up in this way are then dragged back and forth through the grain, which they pile on elevators that lift it from the barge.

UNLOADING COST CUT ONE-THIRD

Elevator superintendent James A. Crombie reports that after unloading three million bushels of grain the lines of "Dacron" were still going strong. Manila ropes had lasted an average of 475,000 bushels. Even more important to Rice-Powell are savings in time and manpower. Since "Dacron" makes possible the use of bigger scoops, what once was a 6-hour job for 16 men is now a 4-hour job for 10. All in all, the cost of unloading 1,000 bushels of grain has dropped to \$5 from \$7.50, Rice-Powell figures.

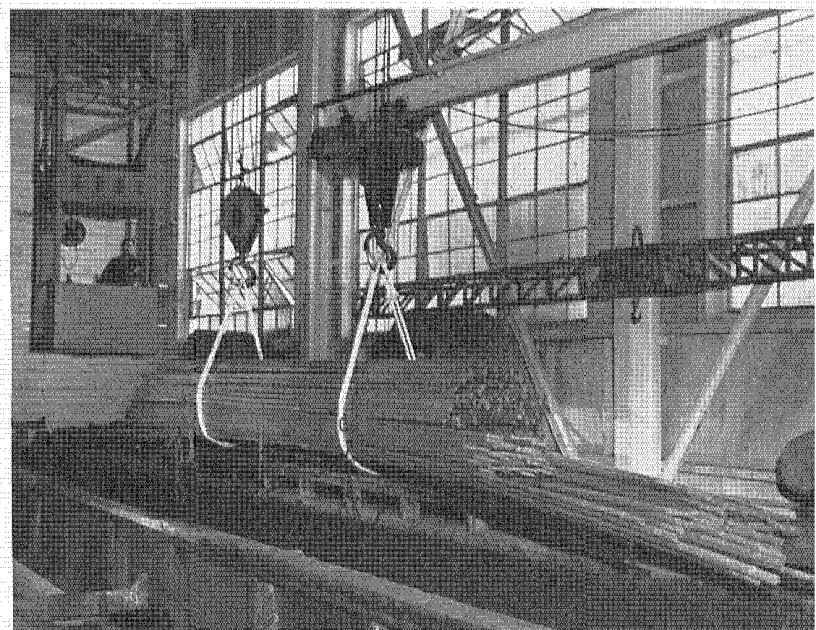
Handling men rather than materials is the job of nylon rope at the American Bridge Division of U. S. Steel, Pittsburgh. After running tests of the tensile and impact

strength of nylon, American Bridge has standardized on it for bridgemen's safety lines.

Some cordage makers are also producing webbing of nylon and "Dacron" for use in heavy-duty slings and nets. In one construction, a core of parallel filament yarns of nylon or "Dacron" is protected by a woven outer covering. Another sturdy variety, known as "slotted nylon webbing," is used for cargo nets by the Navy and Air Force. Reports of their good performance also have come from two civilian shipping firms. At one-third the weight and ten times the life of Manila nets, nylon bears investigating.

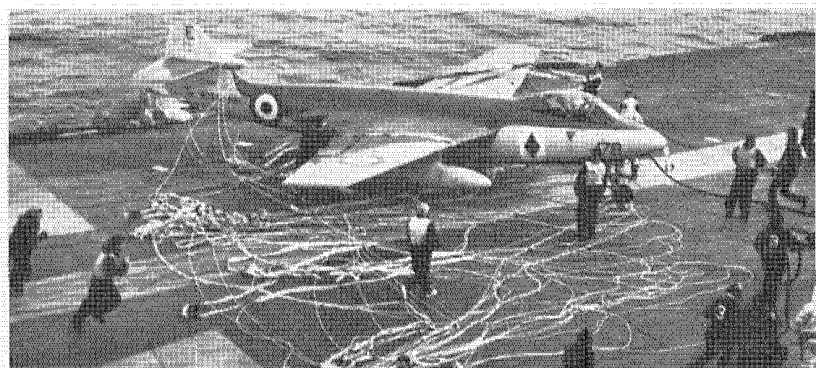
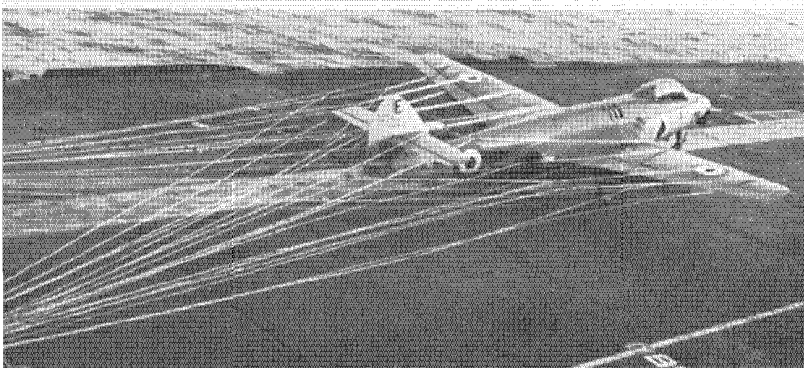
The latest improvement in synthetic cordage is the development by Du Pont of a new nylon, Type 707, that boosts a rope's breaking strength about 16 per cent above that of regular nylon. The dry breaking strength of a 5½-inch circumference rope of Type 707 is 87,000 pounds, compared to 75,000 pounds for regular nylon. In addition, the new yarn has about three times the ability to withstand repeat loading. All of the nylon sold by Du Pont to the cordage industry recently has been of the new type.

More details on the properties and suppliers of synthetic ropes and a list of their uses are available in booklet form. Let us know if you think nylon or "Dacron" can help you turn a hitherto difficult rope trick.



At Pacific Tube Co., 5,000 pounds of stainless steel tubing at once ride through pickling solution in endless slings of "Dacron".

After its landing hook jammed. At Mitchell Air Force Base recently, a similar nylon runway barrier successfully corralled a runaway jet.



The world's biggest little magazine doesn't go to press—it stays there all the time. This is . . .

WHERE THE DIGEST GROWS

By GEORGE REYNOLDS

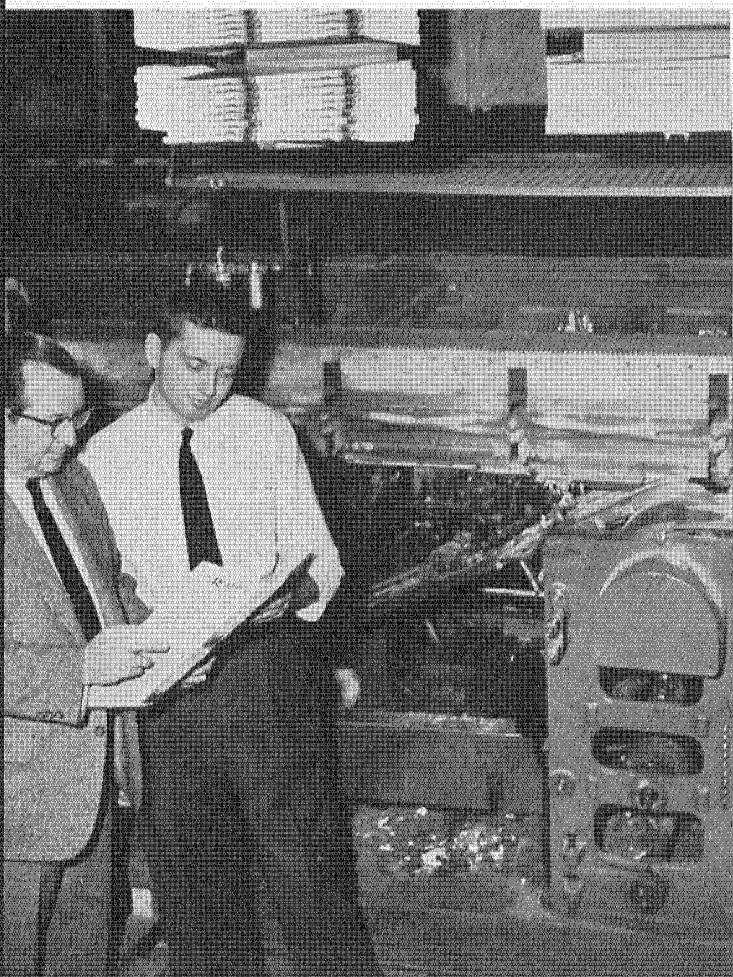
DAYTON, OHIO

Four abreast, more than two stories high, the giant presses roar day and night, week after week, racing a calendar they never catch. Dominating the vast interior of the two-block-long McCall Corp. printing plant here, the big machines have one purpose: print the little magazine that's also the world's biggest, *The Reader's Digest*.

Though they pause only for an occasional gulp of fresh paper or a quick adjustment, it takes them 36 days to turn out the 13.5 million copies of a domestic *Digest* edition—and the *Digest* comes out once a month. You'll still get yours on time, however. Other presses will carry the overload until a fifth and sixth five-color giant take their places in the ranks within a year.

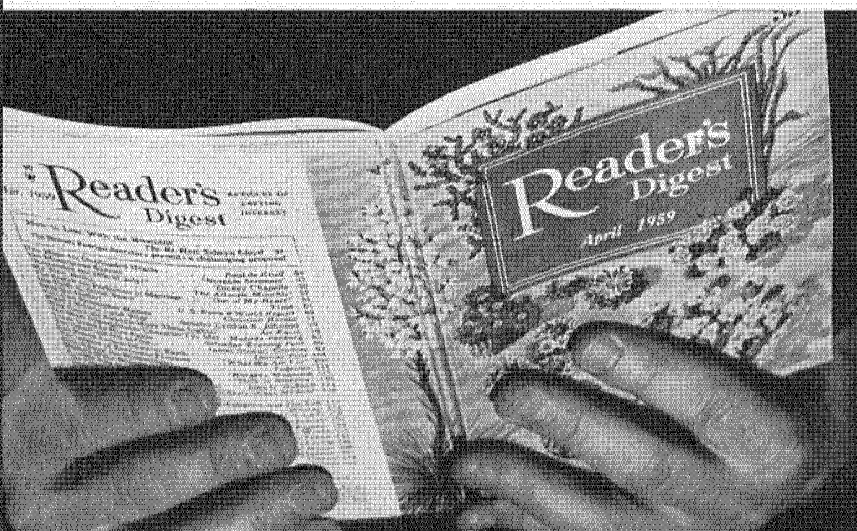
Editorially, the *Digest* is unique in approach, scope and success. Its hundred editors spend 5,000 hours a month weeding out and deftly polishing the best articles in 600 publications. They screen more than 20,000 letters bearing anecdotal candidates for "Life in These United States" alone. Their 16 researchers check 2,000 facts through 450 sources for an average issue.

The conception, establishment and phenomenal growth of the *Digest* is recounted in James Playsted Wood's new book, *Of Lasting Interest—the Story of The Reader's Digest*. Wood relates how Dewitt Wallace, a young Midwesterner, nursed his novel idea to maturity and how he and his wife, Lila Bell Acheson Wallace, issued the first *Reader's Digest* from their Greenwich Village apartment in February 1922. Its quick popularity propelled the young couple to a more spacious garage apartment at Pleasantville, N. Y. Now, on a model 80-acre estate near there, more than 2,500 people help the Wallaces compile the magazine that is read in 13 languages by 70 million men and women the world over.



Du Pont's John O'Donnell, McCall's Pete Mullin examine "double" *Digest* just off binder. Roller at right center applies adhesive.

Try it yourself: next time you're reading the *Digest*, open it to double-page spread, bend it back on itself and lay it down flat. Note good align



in McCall's sprawling Dayton plant, though, you see the other side of the magazine moon. A remarkable operation in its own right, the plant prints some 50 magazines besides the *Digest*.

Surrounded by the pungent aroma of ink and new paper, the brilliant colors of magazines in the making and the constant clatter of machinery, 4,000 McCall employees translate the editor's art into the printer's science. Their handiwork accounts for three-fourths of all of Dayton's mail; they have their own post office and express office. They draw raw materials from hundreds of barrels of ink, tons of metal and a veritable paper forest of 50-foot cylinders covering acres of warehouse floor. Fifty tons of their chief by-product, waste paper, are trucked to waiting freight cars daily.

The star of the stable, of course, is the *Digest*. The monumental task of producing an issue starts with the arrival of finished manuscripts, illustrations and advertising copy from the editorial offices at Pleasantville and the art and advertising departments in New York City. It consumes 3,500 tons of paper, 47 tons of ink, 21 tons of glue and 1,530 miles of wrapping paper. It ends when 90 carloads of *Digests* have been sent out.

As type and engravings take form, page proofs shuttle back and forth to New York on specially arranged train schedules until they're letter-perfect and electroplates can be made. From 144 sets of these printing plates, each of the big presses turns out three folded 48-page sections (called signatures) that are twice the magazine's page depth and must be chopped apart later.

A single *Digest* begins to grow when the first signature starts briskly down a gathering line and others join it at stations along the way until all the inside pages are together. Then they're picked up, pressed flat and whisked off to the binder between the plates of a clamp. En route, the signatures' folded backs are trimmed off flush, ready for a binding operation that makes the *Digest* unique among major magazines in still another way.

While most periodicals are stapled together either from back to center or through the entire thickness near the spine, the *Digest* is "perfect" bound with a hot-melt adhesive developed by Du Pont. The adhesive made such a hit with book publishers when it was introduced some years ago that today more than 95 per cent of paperbacks are assembled with hot melts.

The *Digest's* editors also were intrigued by it. Books bound with it could be opened flat and left that way. All of every page was exposed to the reader, and double-page spreads and advertisements could cross the center line as

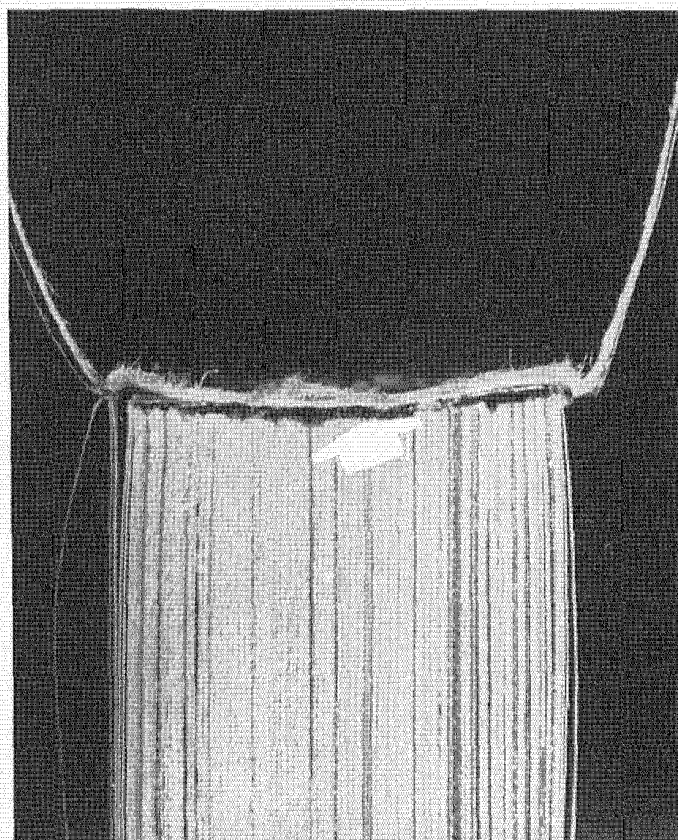
unbroken units. Nor did pages shed as staples tore through them, which sometimes happens with saddle-stitched books. Finally, the end product was better looking.

The new adhesive could be a boon to McCall's production line, too. Melted and applied at high temperatures (325°F.-340°F.), it set to full strength in two or three seconds; glues took up to several hours to dry by evaporation, often bottlenecking the whole process.

McCall and Du Pont men worked together for nearly a year to adapt the system to the *Digest's* large-scale needs. They designed and installed new equipment to melt the adhesive and feed it to applicator rollers.

Today no staples pierce the *Digest*. Instead, the whole length of the edge of each page is gripped tenaciously by a thin film of the strong adhesive, which is rolled onto the freshly trimmed spine of the book as it moves along in the grip of its clamp. Its cover arrives simultaneously on another conveyor and is adhered to the same sticky film. Seconds later, as the new double-length magazine leaves on an overhead conveyor to be chopped in half, trimmed, wrapped, addressed and mailed, the adhesive has already set at full strength simply by cooling.

Since the first completely "hot-melt" issue of December 1957, more than 200 million copies of the *Digest* have rolled off the presses. As always, many readers have added them to their permanent files. For those avid collectors, the *Digest* has more good news: the new adhesive doesn't harden and crack with age as do animal glues, but remains strong and flexible for the lifetime of the magazine. Thus, readers are now getting a more lasting repository for those valued *Digest* "articles of lasting interest."



Magnified photo of end of a *Digest* hanging by its covers shows how film of hot-melt adhesive (arrow) welds pages, cover together.

of gap at center. If phone rings, answer; *Digest* will stay put.





THIS IS THE SECOND of four articles on Texas oil history, sponsored by the Du Pont Petroleum Chemicals Division as a salute to the petroleum industry in its centennial year. Author William A. Owens' series, written especially for the *Du Pont Magazine*, is based largely on his tape-recorded interviews with Texas oil pioneers.

FIRST TEAKETTLE IN TEXAS

Near the lemonade waters of Sour Lake, men found oil. The tiny "teakettle" refinery built on its shores, some 30 miles from the Spindletop oil field, was the granddaddy of today's string of Gulf Coast refineries.

By WILLIAM A. OWENS

Before white men settled in southeast Texas, Indians camped by a small lake to drink the medicinal water and rid themselves of vermin by rolling in the oily mud. Once, legend has it, the lake caught fire while they were camped in the deep thickets around its rim. Convinced that only evil spirits could make water burn, the Indians ran away, never to return.

White men discovered that water from Sour Lake, when sweetened, tasted like lemonade. A shrewd promoter built a large hotel near the lake and began advertising the healing qualities of its water. Though the hotel was nine miles over thicket roads from Nome, the nearest railroad station, crowds of people came. They drank the water, breathed the odor of sulfur and allowed an old Negro practitioner, appropriately called Dr. Mud, to cover them with mud from the oil seeps. Few of them dreamed that Sour Lake was impregnated with oil and gas from a large underground pool.

By 1890 the oil craze that had started in Pennsylvania in 1859, then swept through West Virginia and Ohio, began to be felt in Texas. Men with oil fever showed up at Spindletop and Sour Lake looking for oil. Signs were plentiful, but not easily recognizable because they were different from those in known producing areas.

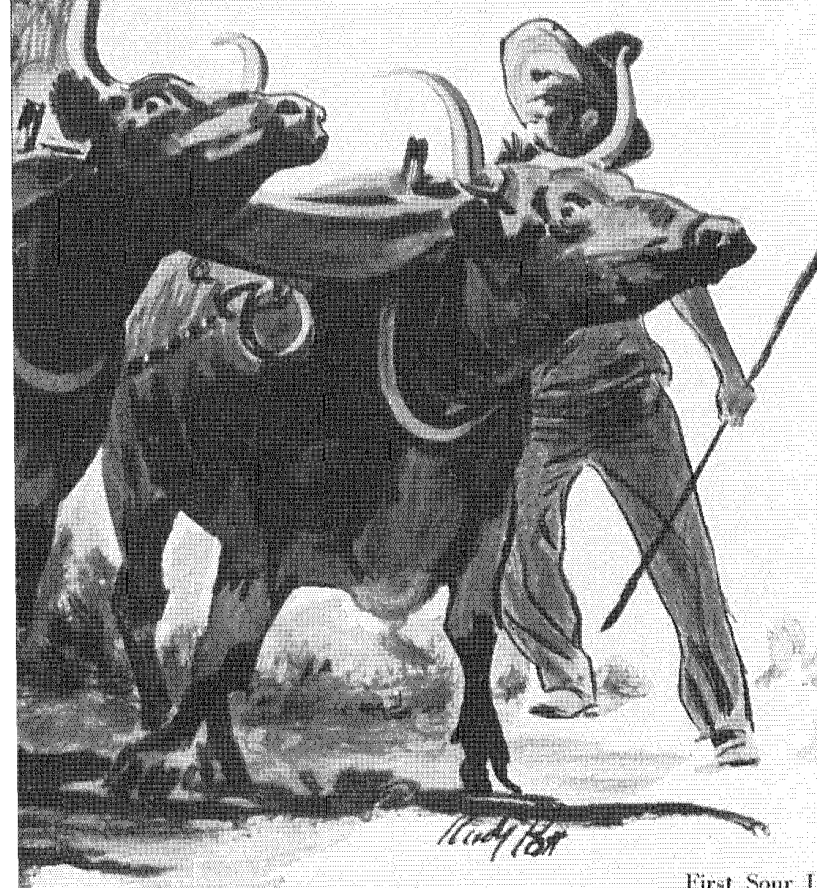
By 1893 there had been some shallow drilling at Sour Lake, and in 1895 the Savage brothers from West Virginia drilled several wells. Three of them had some production—enough to whet the appetite but not enough to prove commercial value in the field.

By 1896 Walter B. Sharp, one of the most enterprising of Texas oil pioneers, began operations at Sour Lake for the Trinity Lubricating Oil Co. of Dallas. He was only 25 years old but already was quite experienced in drilling water wells. He also had tried to drill an oil well at Spindletop, an attempt that ended in failure because his machinery was too light.

At the time he came to Sour Lake an entire drilling rig could be loaded on one flat car. He unloaded his rig at Nome and hauled it to Sour Lake by ox cart. His first well was a failure, but in May 1897, under a drilling contract of \$200, Sharp brought in a second well that produced 20 barrels a day. He immediately arranged for cypress storage tanks and a 100-barrel-a-day separating tank.

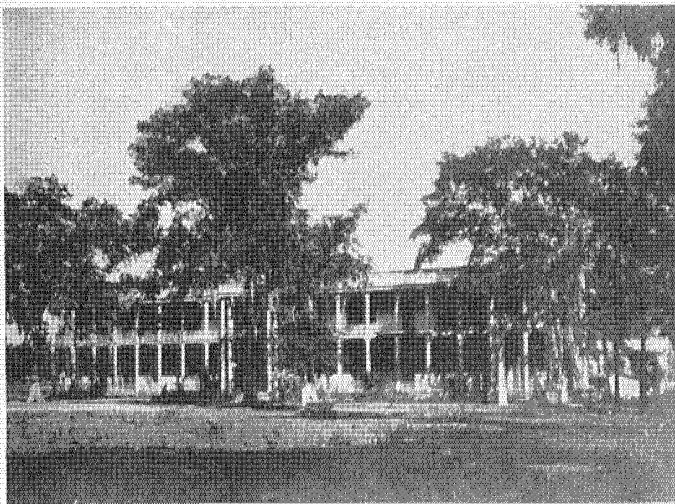
The oil was heavy and black and useless for anything except axle grease until it was refined. The nearest refinery was hundreds of miles away, over the dirt road to Nome

First Sour Lake refinery ran only a month before fire wrecked it in January 1898. Its discouraged builders gave up refinery dream.





Little oil was refined at Sour Lake, but a lot was produced there. During boom, crude thatched huts housed roughnecks.



Sour Lake Springs Hotel served crowds that came to drink healing waters and bathe in mud years before oil was found nearby.

and the remainder of the way by railroad tanker. The transportation cost would eat up all the profits.

Sharp did not give up easily. He decided to refine the oil at Sour Lake, barrel the commercial products, and ship them out to the local markets. In Dallas he bought a 100-barrel-a-day refinery of the "teakettle" type, as they were called, and had it shipped to Nome.

In a feat that seems next to impossible now, they brought the still from Nome by ox cart and set it up south of the lemonade lake. Sharp knew little about operating an oil refinery. The local men working for him knew even less. Facing almost insurmountable odds, they built a brick firebox and mounted the still on it. By December 1897 the refinery was ready to operate. In what must have been a moment of wonder at themselves, they filled the tub with crude and fired up with green pine slabs from a local sawmill.

In their best run they produced eight different grades of oil, including "headlight" oil for locomotive lamps and both light and heavy lubricating oils. Eager to have their results tested, they barreled different grades and shipped them out to market by way of Nome.

For Sharp and his associates business began to look good. The oil field was expanding; refinery operations appeared to be profitable. Barring accident, Sour Lake

would supply oil products to an area dependent on wood for fuel and slobbucket skimmings for axle grease.

But disaster struck in January 1898 when the refinery caught fire and was destroyed. Discouraged, Sharp and the men who had come to Sour Lake with him gave up completely and left, some on foot because they had lost everything. For a second time fire had driven men away from the lemonade lake.

DREAM IS AGAIN FRUSTRATED

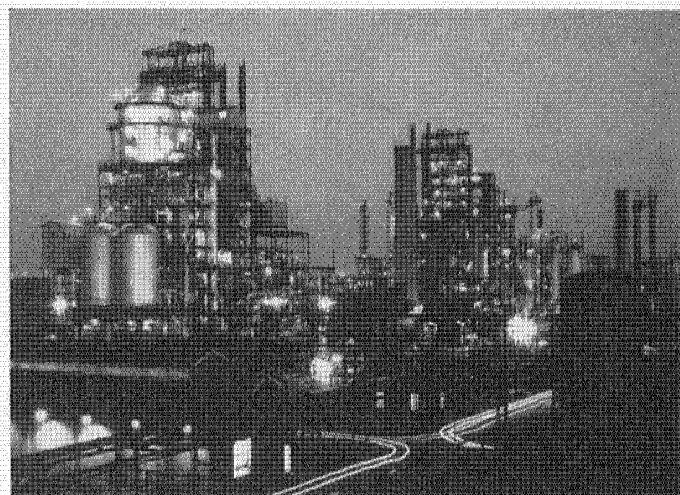
The dream of an oil refinery at Sour Lake passed on to another group of men. The Gulf Coast Refinery Co. of Galveston constructed a refinery of the same 100-barrel-a-day size near the site of the one that had burned. Before it could be put into operation, however, the shallow wells began to sand up. The amount of crude they supplied was not enough to keep the refinery going. The owners gave up, closed the refinery and moved the equipment away.

At the time no one could foresee the prodigious Lucas gusher, which came in at Spindletop in 1901 and opened up the Gulf Coast oil industry. Nor could they guess that within five years Sour Lake itself would be a producing field with gusher after gusher spouting oil high above the derricks. Cannily, Walter B. Sharp held on to some of the land he had acquired at Sour Lake; he returned with the boom and more than made up for the loss he had suffered with the refinery.

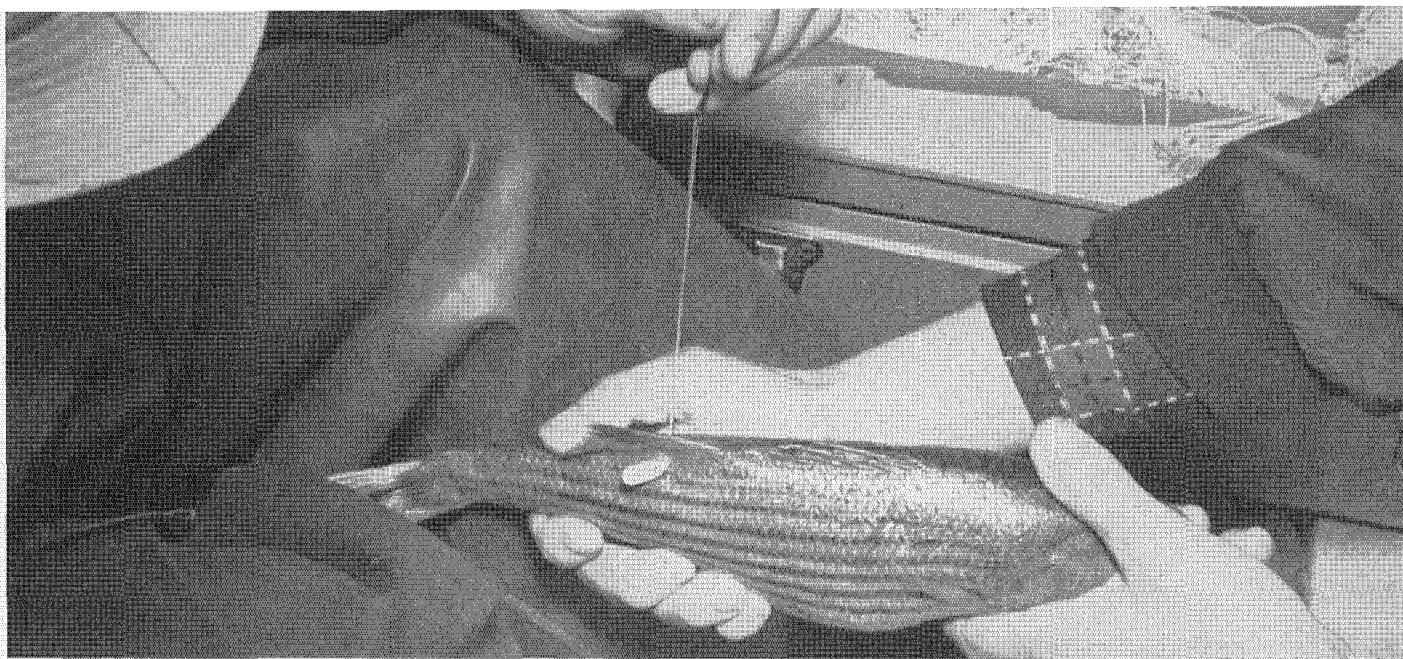
The dream of making Sour Lake a refining town was never realized, however. When the boom did come, refineries were already under construction at Beaumont and Port Arthur, where there was access to deep water. Sour Lake became instead a pumping station on pipelines between Indian Territory fields and Gulf Coast refineries.

Sixty years have passed since Walter Sharp's refinery burned down. The resort hotel was destroyed by fire long ago. The lemonade lake has been drained and filled in. Sour Lake today is a small town surrounded by tank farms and the equipment of the modern oil industry. Back of the lake a few old wells are still pumping away after 50 years. More important for the future: Voids left in the oil sand when millions of barrels of oil were pumped out have now become safe, inexpensive storage spaces for natural gas.

Sour Lake has seen a lot since the first teakettle refinery rolled in on an ox cart.



Some 60 years after first "teakettle" came to the state, Texas refineries have a daily capacity of about 2.5 million barrels.



Marine biologist uses nylon twine to attach plastic tag behind the fin of a striped bass.

Marine biologists choose nylon twine for . . .

Foolproof fish tagging

Men have been tagging fish at least since the days of Izaak Walton, who told in *The Compleat Angler* (1653) how fishermen caught tuna, tied ribbon bows around their tails, and tossed them back into the sea. Walton's friends were only fishing for laughs, but today's marine biologists are in deadly earnest. On their success may depend the nation's \$363-million-a-year commercial fishing industry.

How do you track a fish? How do you predict when last year's crop of fry will be big enough for the nets? Where's the best fishing ground for a given time of year? It's as important for fishermen to know these things as it is for a clothier to know how many of his customers will want wash-and-wear suits this summer.

Probing for such fishy facts, the U. S. Fish and Wildlife Service explores the ocean from a dozen experimental laboratories scattered from coast to coast and in Hawaii and Alaska. Tuna, haddock, salmon, herring, cod, flounder and weakfish are tracked from egghood to adulthood, from spawning ground to fisherman's net.

In the course of this fact-finding, one thing emerged clearly: Scientists had to develop a near-perfect fish tag, one that would stay fastened to the fish for life without marking it as different from its companions. A marked fish has to migrate with the mob, mate and spawn as the others do, and get itself caught in the fisherman's net merely by chance. The tag also has to be big enough to carry a serial number, the name and address of the tagger and the reward offered for its return.

Designing the ideal tag hasn't been easy. Back in 1911, when a man named Sella tagged ten Mediterranean bluefin tuna, he looped a copper chain around the tail of each and turned it back into the fishing grounds. Then he spread word of the experiment among his cronies and sat back to wait for results. What happened to the chained fish nobody knows, because none was ever caught.

Sixteen years later a group of French fishermen cut identifying marks into their fishhooks and tied them to flimsy leads that would break at the first tug, leaving the hook embedded in the fish's mouth. They had better luck—29 fish were recovered when they bit on other hooks.

Then followed a succession of fish tag candidates, ranging from celluloid discs threaded through a gill to pieces of leather strapped around a fin. When the Fish and Wildlife Service began to tag fish in earnest in the late 1940's, technicians set up qualifications for the ideal fish tag. It had to be colorful enough to be seen easily in a catch, light in weight, not damaging to tissue, and easily and rapidly attached to the fish.

Once established, these standards rapidly eliminated unworkable tags. Hook-type tags almost always caused mouth damage. Any kind of strap or band, whether metal or leather, caused chafing and irritation. Silver or copper wire snagged on rocks and kelp.

Early in 1952 Government researchers began an experiment that may be the best answer yet to certain tagging problems. They attached a length of slender nylon twine to a $\frac{3}{8}$ -inch red plastic tag bearing the legend, "\$1 reward for the return of this fish to. . .". Then they threaded the twine into a modified upholsterer's needle and looped it through the second top fin of striped bass.

The results have been encouraging. The nylon has met requirements for flexibility and continued tensile strength in salt water, scientists report, besides not being harmful to fish.

Best of all, total fish recoveries generally are higher. Researchers say this is probably because the tag doesn't tend to hurt the fish and is more durable than previously used types. Thus a truer scientific measure of fish migration is being achieved, a fact that pleases Fish and Wildlife biologists and commercial fishermen alike.

COLOR ON COLORED PAPER

A GRAPHIC DESIGNER ALMOST ALWAYS STARTS HIS THINKING WITH A SHEET OF WHITE PAPER. WHY NOT COLORED PAPER?

Craftsmen in Du Pont's printing plant feared the boss had lost his grip recently when he asked them to run dark blue paper through the four-color press they'd been using to print a color advertisement on glossy white paper. Then he wanted some green paper run, then some gray newsprint—all without any press adjustments or changes in ink. Finally, the artist with him even insisted they feed through some jet black paper. Color printing on *black* paper?

But the boss (Stan Rinehart of Du Pont's printing services) and the artist (Domenico Mortellito, head of advertising design for the company) were completely serious.

They had taken over the company's Philadelphia printing plant for the day to learn more about printing on colored paper. The group they were representing—DuPont's Color Council—is composed of men experienced in color theory, printing, selling, graphic design, advertising and promotion. For over a year and a half they have been collecting and developing basic information on the use of colored paper in printed materials. They've been passing along this information to the paper and graphic arts industries through marketing seminars, salesmen's visits, trade advertisements, trade shows and a periodical magazine.

The Color Council's work so far has been in the two basic areas of market opinion research and printing research. Its first act was to conduct a national survey among commercial printers, art directors and commercial artists. These are the people responsible for the final form in which most printed material reaches the reader. The survey was designed to find out what they thought about color generally and about colored paper in particular.

The results: They see many advantages in colored paper but don't use more of it because of certain technical and artistic limitations they believe it has; because they lack experience in its use and in judging its effects; and because they're trained and

Marget Larsen, attractive and gifted graphic designer for Joseph Magnin, San Francisco, works on one of a series of advertising inserts sponsored by DuPont. Like the two earlier inserts pictured on page 15, Miss Larsen's design will demonstrate the creative potential in colored papers.



announcement in the traditional winter. Complete results of the survey are being passed along to DuPont's die customers in the paper industry to assist them in their own marketing plans. The results will also be shown to the Color Council in planning other DuPont research programs.

The annual work in conducting a survey program to provide the information that graphic designers and printers say they need in order to use more colored paper with confidence.

First, there's an investigation of the kind of paper and materials conducted that day at the printing plant—finding out just what does happen in a large variety of printing jobs when the only variable is the color of the paper. Then comes the classroom research, which has put DuPont's design and printing staffs in developing new colors and experimenting with new techniques for using colored paper as an active element in printing.

Probably the most important outcome of this printing research has been the production of a portfolio, "Color on Colored Paper Criteria." This folder contains seven sheets of paper, representing the primary and secondary colors plus fluorescent colors. They were manufactured especially to insure color accuracy. On them are printed the fundamental elements of most modern flat printing: type, reverse type, halftones, dithering, and pure, screened and overprint dot blocks. All the printing is in inks of pure black, red, blue and yellow. With these criteria for selection, a graphic designer or printer can accurately predict and control printing on colored paper. The primer and the know-how that went into its development already are being offered to DuPont customers in the paper industry for use in their own educational efforts.

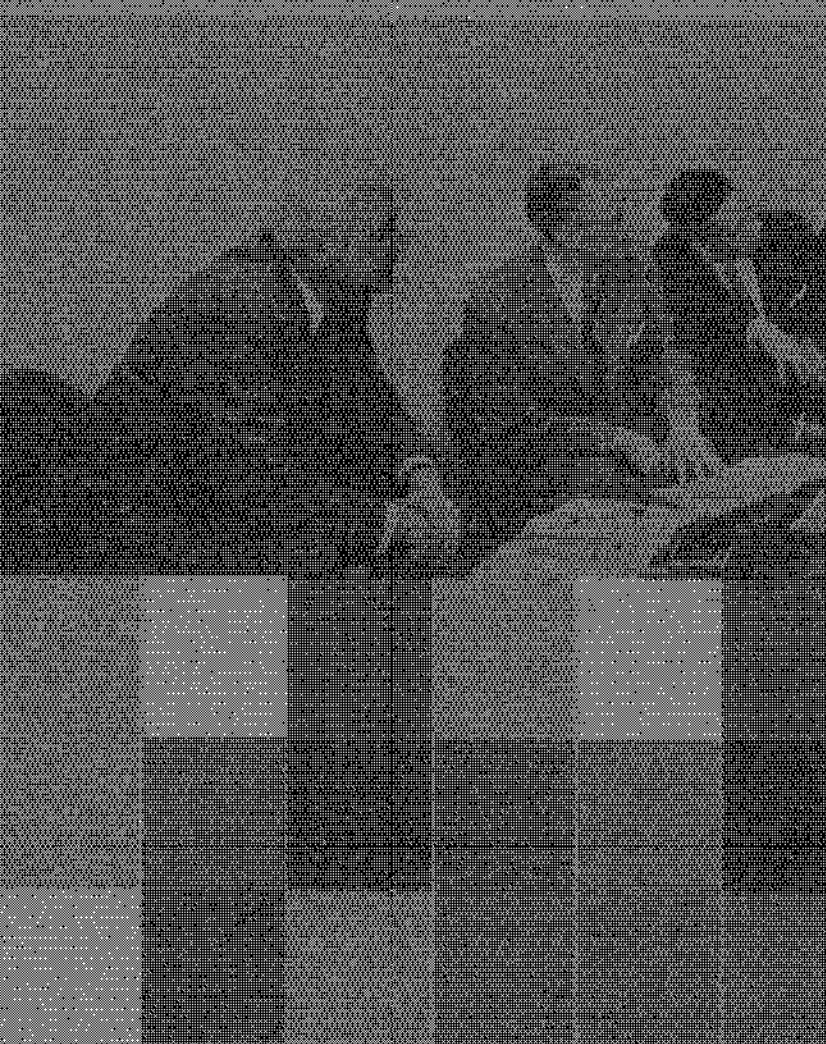
In Paper, Type and Chemical Division, which sponsors the Color Council's work, this is reaching a series of colored paper advertisements in graphic design magazines. Each of these pages, created by the N. W. Ayer advertising agency, displays a leading graphic designer's use of colored paper to solve some specific design problem. The unusual quarterly *Art Design Color Paper* is an idea book on how such problems can be solved by using colored paper. Designers and printers can receive this publication by requesting it on their correspondence from the Color Council, Newman 2400 RE, DuPont Company, Wilmington DE, Del.

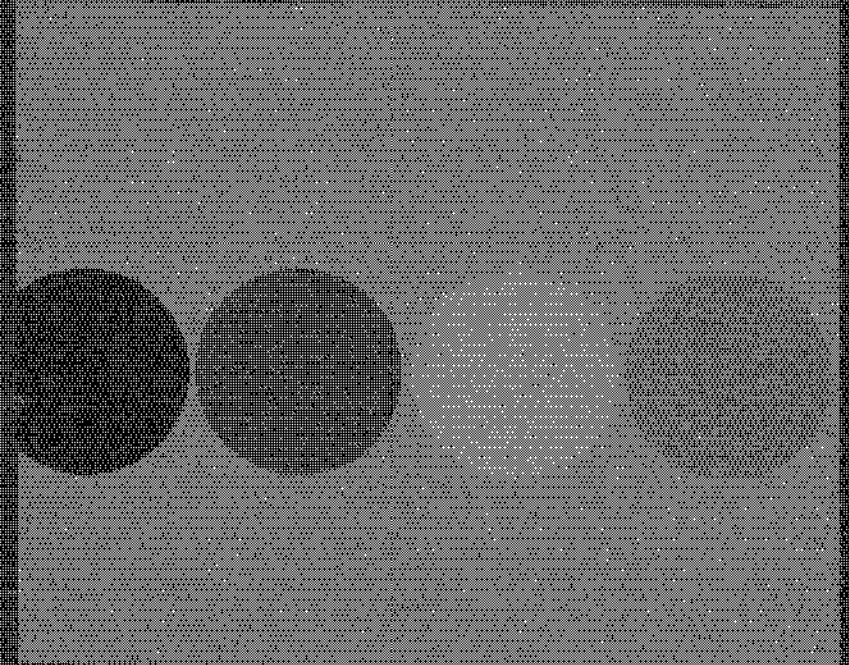
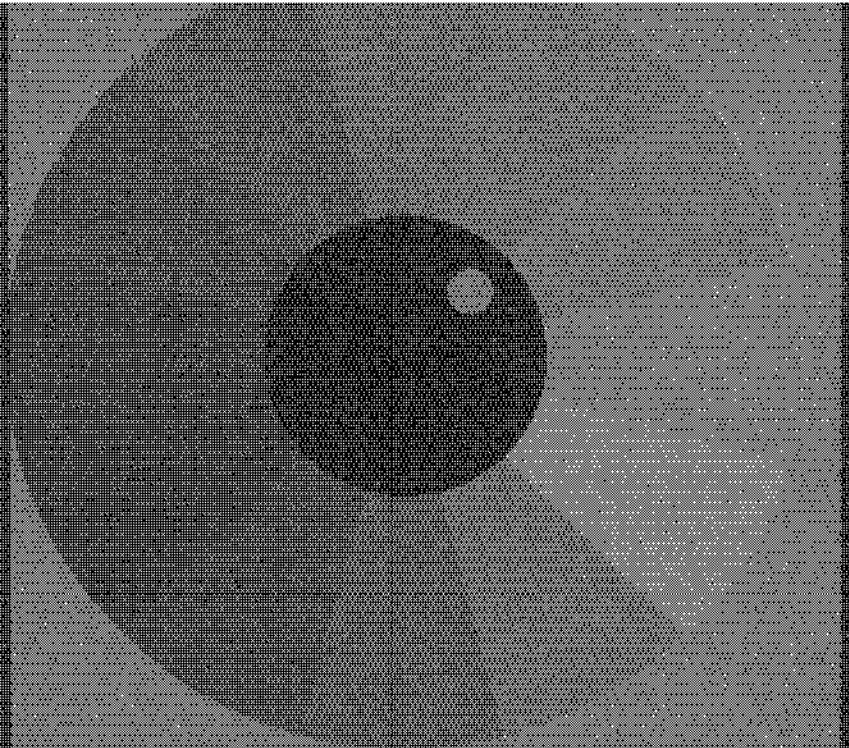
The dynamic effect a colored paper has between the disks printed upon is shown here. The color wheels to the right and the checkerboard patterns below are printed by both the orange and white papers with some emphasis on the orange pigment. This is a natural variation because the orange paper is printed for effect, the white by reflection.

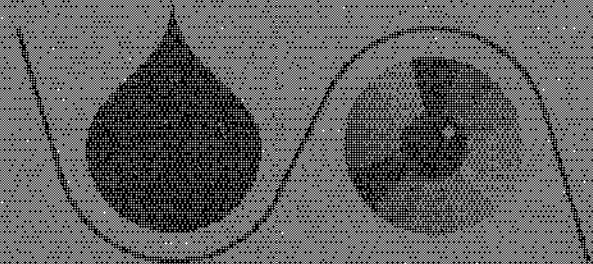
Now, how has this set of pieces performed since release, while the hues and shades of nature. The researchers ran a series of controlled experiments that tested the effects of paper colors on sales. Red, yellow and tan ink produced a 100 per cent increase at the 12, 9 and 5 o'clock positions on the color wheel. The centers between each line hint of the experiment showed a fall of 75, 21, 80, 250 and 2975 per cent decrease in the three o'clock positions below, and three and 5 o'clock, a rise of 44 percent and 100 percent.

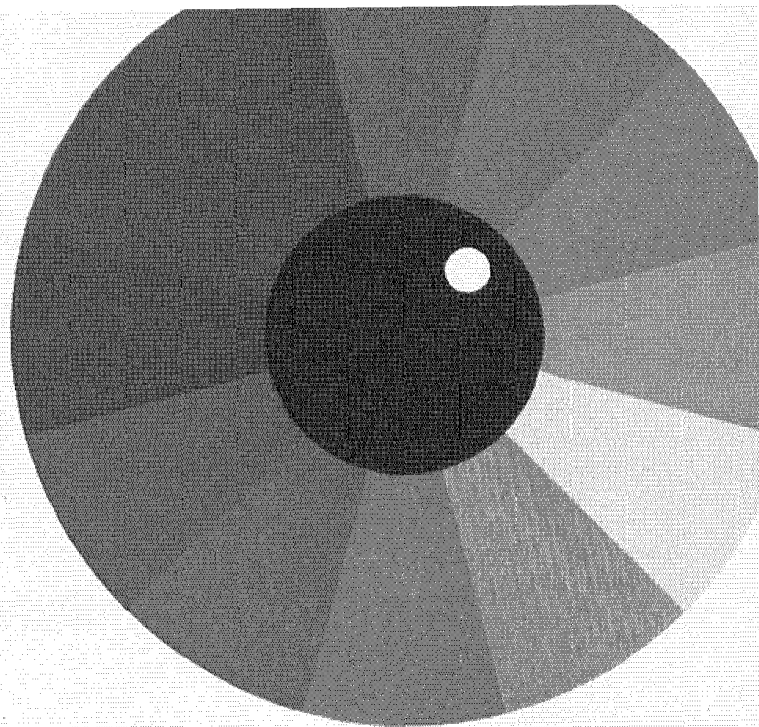
On the same paper all four colors were printed well in the order yellow, red, blue, black. On the fourth color, first the yellow and blue and then the red and black were printed well.

By the _____, I hereby certify that the above is a true and correct copy of the original.



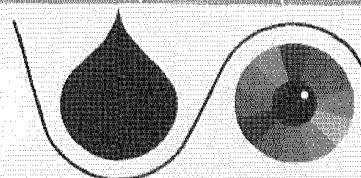
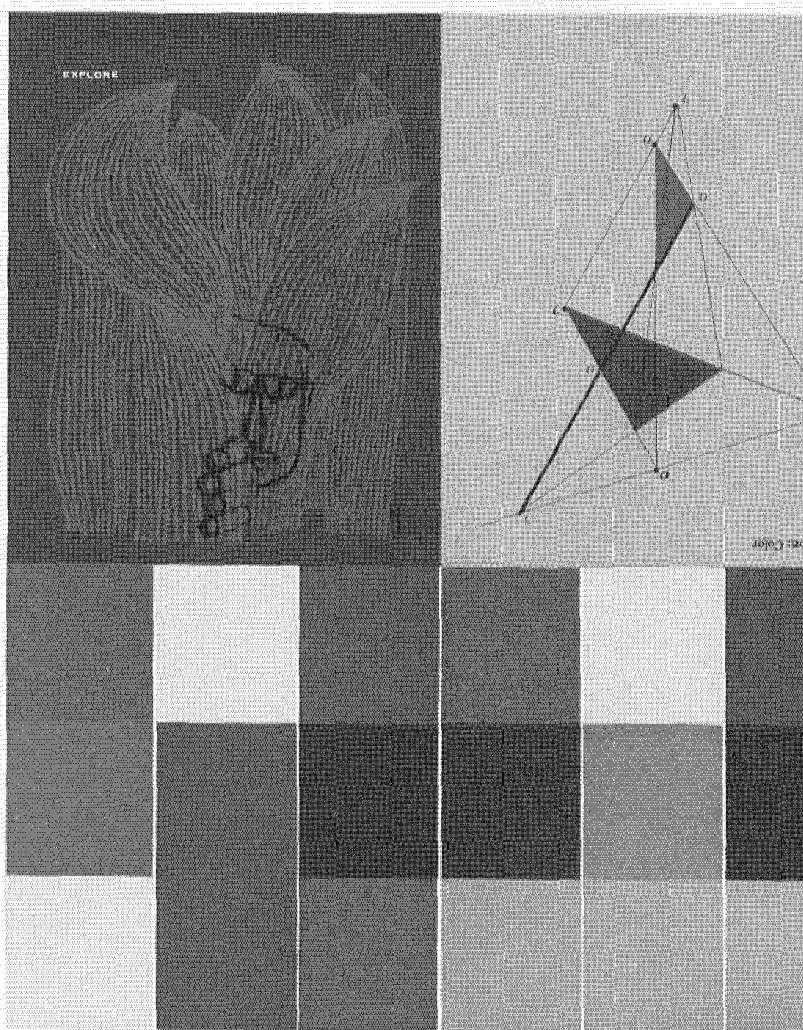






At right are the first two advertisements in a Du Pont series aimed at pointing up the design possibilities in colored paper to professional art directors, designers and layout men. The one titled "Explore" is by Saul Bass, named Art Director of the Year for 1957 by his fellow professionals. The second is the creation of Matthew Leibowitz, who also enjoys an international art reputation.

In addition to the work of Marget Larsen (page 14), the ad series will include designs by Leo Lionni, art director of Fortune, and Joseph Low, noted for his skill in using colored and textured paper.





THIS IS FINE...



BUT SO IS THIS

YES, YOU CAN DRY CLEAN YOUR WASH AND WEAR

Ever wonder whether that wash-and-wear suit of yours can be dry-cleaned? It can be, but nearly half the people questioned last year in a nationwide survey weren't sure of that fact.

To help correct this widespread misunderstanding, Du Pont has joined forces with the National Institute of Drycleaning. Spokesmen for Du Pont's Textile Fibers Dept. point out that such wash-and-wear fibers as "Dacron" polyester fiber, "Orlon" acrylic fiber and nylon are much stronger than natural ones, less sensitive to water and most chemicals, and thus capable of being dry-cleaned easily.

Dry cleaners can use standard procedures on these man-made fibers. And since water doesn't damage them, the dry cleaner is free to remove stains by "spotting" with soap and water.

Of 1,003 women interviewed in the survey, 17 per cent said wash and wear couldn't be dry-cleaned and another 30 per cent weren't sure. Helping dispel such doubts this year are permanent cloth labels in many men's and boys' wash-and-wear suits, stating that they may also be dry-cleaned.

Confusion concerning wash and wear seems to center on the precise meaning of the term itself. Du Pont defines wash-and-wear garments as those that can be worn, washed and worn again repeatedly with little or no pressing. This means that after washing they retain their creases or pleats and require only an occasional light ironing. Wash-and-wear suits, slacks and dresses must meet consumer demands for durability, colorfastness and neatness. Among the popular blended fabrics into which Du Pont fibers go are 65 per cent "Dacron" with cotton, 55 per cent "Dacron" with rayon and blends of "Dacron" with "Orlon".

DIFFICULT TO MEASURE

But there are two problems, says Dr. Donald F. Holmes, Du Pont's men's wear merchandising manager: First, not everybody defines wash-and-wear performance as strictly as Du Pont does and so the term is sometimes applied to garments that don't behave as they should. Second, wash and wear doesn't lend itself easily to measurable ratings.

"Trying to explain exactly what's meant by 'retains a pressed appearance' is almost as bad as trying to define the term 'beauty,'" he said the other day.

Yet neatness retention is often more important to

men than washability, both in buying a wash-and-wear suit and in evaluating its performance.

"In the past several years we've questioned nearly 25 thousand owners of such suits," Holmes explained. "About 30 per cent of them gave dry cleaning as the pre-

ferred cleaning method. The other 70 per cent told us they were happy with the results they obtained by washing the suits. Some, of course, use both methods. One of the joys of wash-and-wear clothing is that it allows owners this freedom of choice."

THIS BUSINESS OF DRY CLEANING

Whether the dry cleaner can handle wash and wear successfully is not the only thing about him that confuses Americans. Although 98 per cent of us use his services, to the tune of nearly \$2 billion annually, many of us know little more than Dennis the Menace about the dry cleaner's work.

The "dry" in dry cleaning does mean "without water"; garments are bathed instead in a solvent—such as Du Pont "Perclene" perchlorethylene—mixed with special soaps and detergents. Gentle agitation in a machine something like a home washer flushes out soil.

Commercial dry cleaning was established in France over a hundred years ago and soon spread to other countries. Even in the twentieth century, however, the service left much to be desired. Many of the cleaning fluids didn't really remove the dirt but simply redistributed it. They left an odor, too, and, even worse, created a fire hazard.

These obstacles were largely overcome with "Perclene" perchlorethylene, introduced by DuPont as a dry cleaning solvent in 1933. "Perclene" left no odor and was nonflammable, so cleaners who used it weren't forced to locate in out-of-the-way industrial areas. Thus neighborhood shops with cleaning facilities in the rear have sprung up everywhere. In fact, in the last five years more than 10,000 new dry cleaning establishments have opened, bringing the U. S. total to about 34,000.

Here clothes are cleaned "on the premises," a fact that's important to many people, according to studies sponsored by the National Institute of Drycleaning. This is because we often regard our clothes as extensions of ourselves and want them to get individual attention, the institute explains.

Not many of us are as fearful as the woman who sent along a note reading: "Please be good to this dress." But a significant number of people still believe that dry cleaning wears out clothes and that even the first cleaning takes something out of a garment. This is not so, of course, but after probing the feelings of several thousand consumers, the NID concluded philosophically: "The average person is incapable of being matter-of-fact and completely rational about dry cleaning."

This study, which was published as "How the Consumer Really Feels About Dry Cleaning," is one of a long list of printed aids offered by the NID to its 8,500 members. They also can get such pamphlets as "You Sell Service" and "Preserving Fashion Is Our Business," as well as advice that ranges from finishing "harem" skirts to setting up accounting systems. From its Silver Spring, Md., headquarters, the institute has issued well over 300 technical bulletins, each representing about \$4,000 worth of research. A recent book, *Focus On Fabrics*, has more than 500 pages of detailed information on 160 kinds of fabric. All of this to help dry cleaners keep pace with new developments.



"WATER? I'M GETTIN' DRY CLEANED!"

The institute also sponsors seven educational courses, including several by correspondence. More than 5,000 dry cleaners have attended a 12-week general course that covers both the practical and technical aspects of their industry.

Touring a model commercial plant, a visitor is struck by the amount of individual care garments get. As each item is received, it's inspected and tagged with a record of unusual stains and any mending that's needed. Next, woolens are sorted from silks and synthetics, and dark colors are separated from light ones. After cleaning and rinsing, excess solvent is extracted and the last traces removed by air drying.

Clothes now go to the spotter, who uses steam and any of some 20 chemicals to get rid of stains that are left. He's not only an expert at removing spots, but he also knows enough to stop before a garment is ruined.

The last step is finishing, and this is where the good dry cleaner distinguishes himself. Some garments—a suit coat, for instance—are finished on a form that looks like a dressmaker's dummy. The form is inflated with air, and steam is forced through it, removing all but the deepest wrinkles. Collars, shoulders and necklines then are touched up in separate steps, giving suits that familiar fresh-from-the-cleaner look.

Cramped for space? The answer—with an assist from neoprene—may be...

Double duty for your roof

Whizzing missiles and satellites notwithstanding, if you're trying to use every square foot in a new building or squeeze the utmost in working room out of an old one, you may consider this the "lack-of-space" age.

Almost everywhere the search is on for additional working area at low cost. Office buildings, schools, factories, hospitals and hotels all share the need.

One solution is the double-duty roof. The concept is simple: Every building has a roof that costs money to construct and maintain, a roof that can provide a greater return on investment if it does more than simply keep the weather out of the floors below.

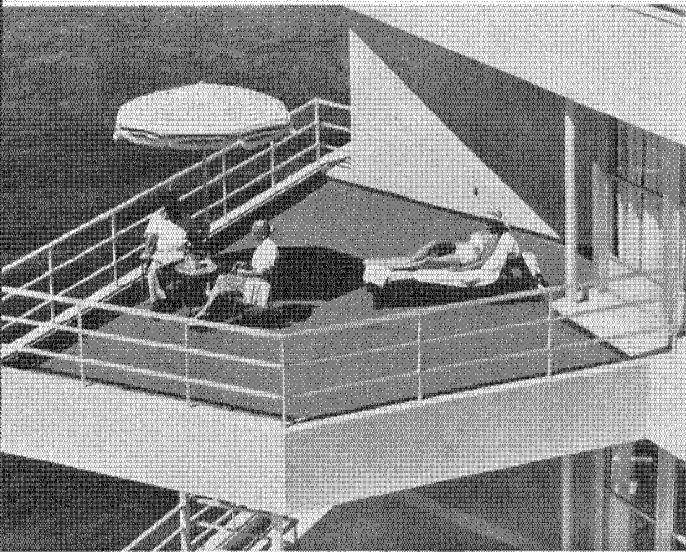
Double-duty roofs already top a variety of buildings. A Los Angeles aircraft manufacturer uses his plant roof as a helicopter landing port, for instance. In Chicago, an insurance company provides an attractive roof-top deck for the relaxation of off-duty employees. In Miami, hotel guests enjoy an all-important sun deck and an easily

maintained patio balcony with tropical décor. Airport terminals send spectators to ramps on the roof. Schools in built-up urban areas gain playgrounds which would not otherwise be practical. Hospitals add roof decks for patients and outdoor lounge areas for nurses. And so on. Ingenious property owners are constantly adding to the list of duties they assign to roof space.

Obviously, the double-duty roof must have a wear-resistant, traffic-bearing surface that also fulfills its primary purpose of weather protection. Past experience has led many architects to shudder at the thought of traffic-bearing roofs, and their concern has been well founded. Conventional roofing materials are normally heavy, requiring expensive support. Lacking elasticity, they frequently have cracked as buildings expanded and contracted. For the most part they have been hard and slippery, too.

Recently, a new traffic-bearing roof system developed by Crossfield Products Corp. of Roselle Park, N. J., has made the double-duty roof a lot more practical. The system gives excellent weather protection and at the same time stands up under heavy foot traffic, movement of carts, furniture or light equipment, and even aircraft landings.

Known commercially as "Dex-O-Tex" weatherwear roofing, and installed only by factory-trained contractors, the system is based on a patented slip sheet anchored at its



Guests of this Miami motel enjoy sun deck and patio balcony, thanks to a new double-duty roof of "Dex-O-Tex" that stands up under traffic and protects against weather.



BEFORE. While this roof offers protection from weather, it has little other use. Shortage of usable space, however, has caused new duties to be assigned to

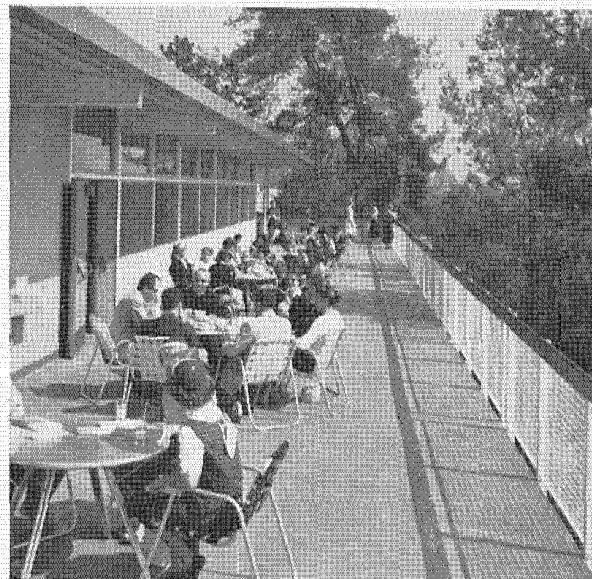
perimeter. The slip sheet is free to move in relation to the roof subsurface, eliminating the complications of normal contraction and expansion. Above the slip sheet are a flexible elastic membrane and coatings of a lightweight neoprene composition installed in a series of trowel applications. The installation provides its own flashing, weighs some two and a half pounds a square foot and is a quarter of an inch thick.

PROVED ON LAND, AT SEA

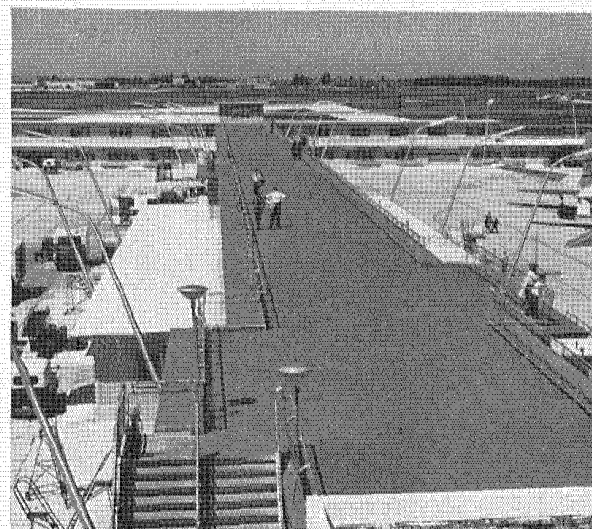
The surface requires virtually no maintenance and can be patched readily in case of damage. Such repairs are not distinguishable from the original surface. Performance has been proved both by test and by long-term use on commercial and institutional buildings—as well as on the weather decks of the S. S. *United States*.

Costs for roof surfacing are considerably lower than those for quarry tile. In commercial installations, the "Dex-O-Tex" costs only about a dollar a square foot more than built-up roofing, which can't be used as a traffic-bearing surface. "Dex-O-Tex" is not considered economically practical, however, for such small-scale applications as private homes.

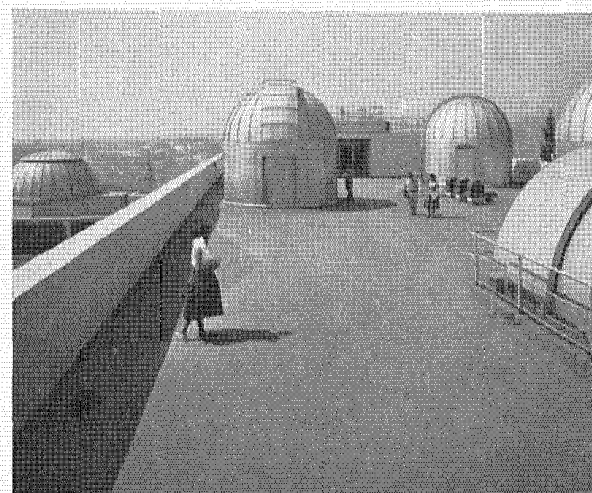
If you're so squeezed for space that it seems there's no place to go but up, it will pay you to think of doing just that. A word of warning, though: A double-duty roof should be part of your early planning for construction or renovation, rather than seized upon as an expedient after limiting factors already have been established. It will pay to consult your contractor in sufficient time to establish specifications and details in advance.



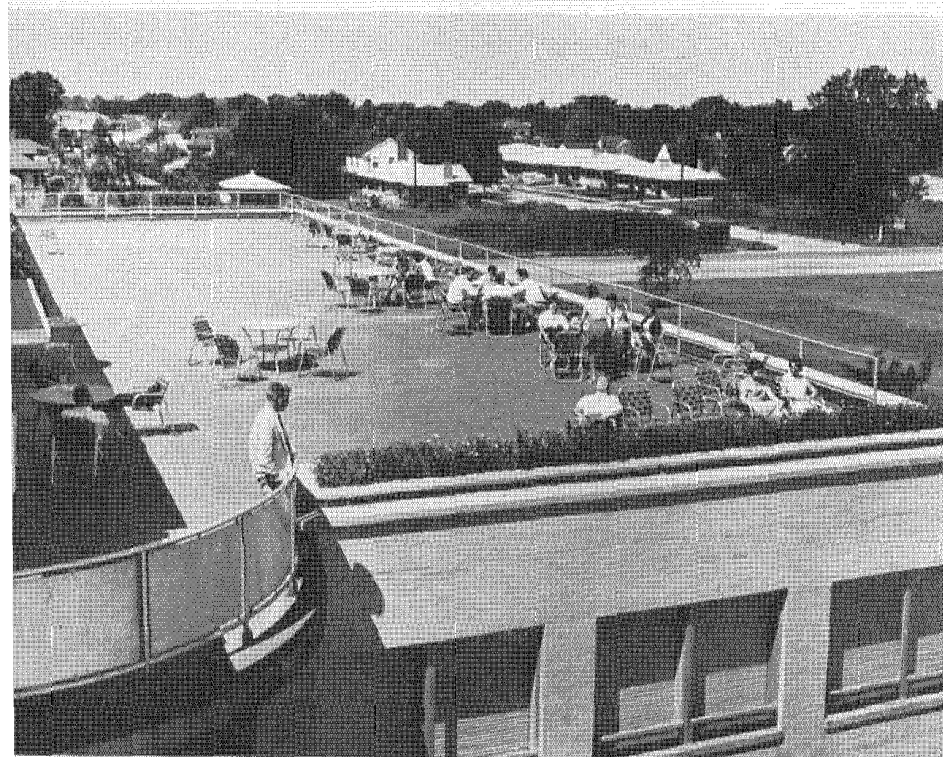
"Dex-O-Tex" turns school's roof space into lunch area



... while Miami airport uses it for roof-top spectator ramp



... and a western university relies on a roof protected by the neoprene-base surface to accommodate laboratories.



AFTER. With traffic-bearing surface now in place, roof becomes a recreational area. Other uses for versatile roofs: helicopter landing port, temporary storage.

This steelmaker thought some added punch at tapping time would help his electric furnaces turn out better alloys. The upshot is Du Pont's new . . .

JET TAPPER

JUNIOR GRADE

New Light Load Jet Tapper is taken from safe storage in Midland plant of Crucible Steel, where need for a faster method of tapping electric furnaces led to development. Le wire is seen taped to side of po



The electric furnace area wasn't part of Rudy Brehm's usual itinerary at the Crucible Steel Company's Midland plant. He generally spent most of his visits around the big open hearths where they used the jet tapper, a unique device Rudy sells for Du Pont's Explosives Dept.

But one day last spring open-hearth superintendent Tom Harkins relayed a message to him. "Bill Kollman wants to see you," he told Brehm. "He's wondering about using tappers on his electrics."

Somewhat dubiously, Brehm walked over to see Kollman. The jet tapper has been making it easier and safer to draw off steel from open hearths for several years. Its explosive head, on a long handle, is placed against the refractory material used to plug a furnace's taphole while the steel "cooks" inside. Detonated electrically from a safe distance, its bazooka-like shaped charge blasts a jet of copper particles into the plug, opening a channel for the steel to pour through. But Brehm feared the power-packed tappers might damage the smaller electric furnaces.

The steelmaker, he found, had anticipated his doubts. "Well, why not make a tapper with less power?" Kollman asked. Should be possible, Brehm agreed, but he had understood that it wasn't needed. While the stationary open hearth drained steel from a taphole at the bottom, the electric tilted over to pour its steel through a taphole high on the side, above the melt surface.

Not true now, said Kollman. Many electric furnaces, including the five he supervised, were producing well above their rated capacity of steel. This put their tapholes below the surface of the melt, which meant they had to be plugged and tapped. What's more, clean, fast tapping was even more important here, because the electrics were producing stainless and other specialty steels. Even a slight variation in pouring conditions could mean scrapping the whole expensive melt.

This report, passed on by Brehm, got quick response from Du Pont. A couple of months later, sales development representative C. P. Williams was on hand at Midland with a supply of new Du Pont Light Load Jet Tappers, and he and technical representative H. L. Schaaf helped the Crucible men run a two-month series of tests with them. Their chief difference from the standard tapper was a 30 per cent lighter explosive charge.

The tests were so successful that Crucible began using the new tappers regularly. Now, after months of experience with them, Kollman can cite a number of improvements they've made. Not only is the new system faster and safer than the older oxygen lance method, he points out, but it also boosts steel quality. "And how can you put a dollar sign on quality?" he asks.

LANCER WAS FORCED TO LEAP

To explain, he contrasts the two ways of tapping. With the lance, a steelman directs a jet of oxygen on the plug material to burn it away. The time it takes to pierce the plug can vary up to 20 minutes. The hole formed is often too small to allow a strong flow of steel; at other times, its course veers so badly that refractories around the taphole are damaged. With the jet tapper, however, a straight hole is punched through the plug instantaneously and a compact stream of steel pours out immediately. While the oxygen lancer must wait gingerly for the last layer of plug to give way, then leap to safety, a helper fires the tapper from 15 feet away.

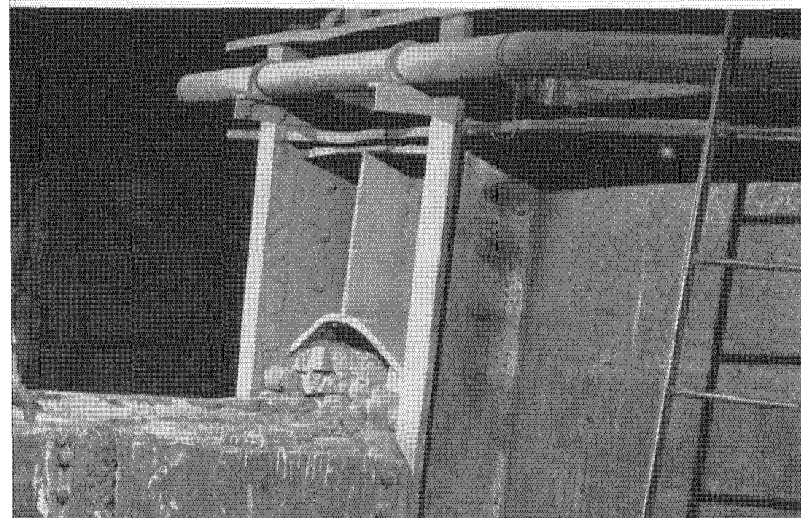
Meanwhile, a preheated ladle waits to receive the furnace's load. Its temperature can be made just right if it's known exactly when the pour will start; otherwise, it cools varying amounts. The same is true of the heated ingot molds into which steel is "teened" from the ladle.

Even more important, says Kollman, is the time it takes all the steel to drain from the furnace. A small or crooked pouring hole projects a small or erratic stream of metal. This exposes more of the steel to oxidation.

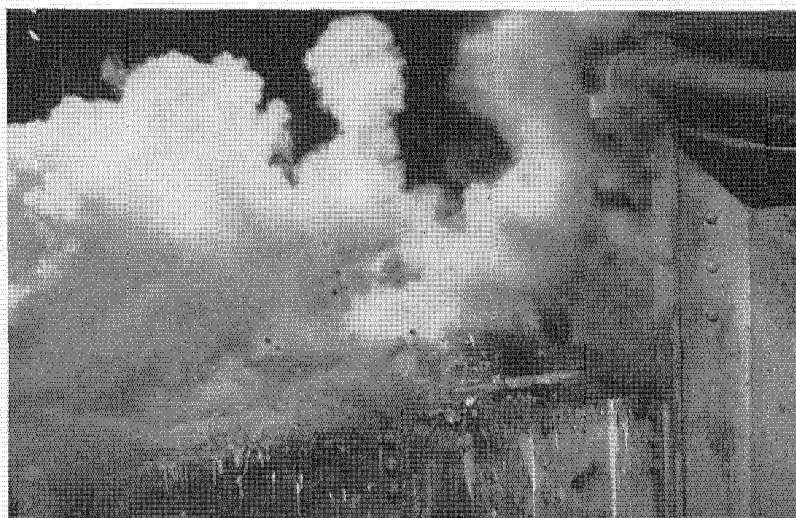
The full, compact stream launched with precise timing by the jet tapper allows a much greater degree of quality control at a crucial time, Kollman notes. He and his men follow highly complex recipes in producing 164 alloys for turbine blades, intricate molds, anticorrosion equipment and other atomic and space age components.

"A housewife mixing a cake with the accuracy we maintain would have to use apothecary scales," says he.

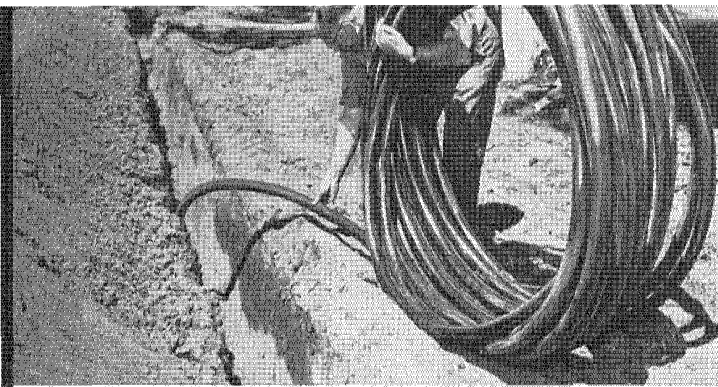
As for the steel they're made of, Bill Kollman figures that consistent quality depends on maximum control of every phase of its production. That's what started him thinking about a junior-size jet tapper—and persuading Du Pont to do something about it.



Second helper, now in this hazardous area only a matter of seconds, places tapper in pouring spout with its head against taphole plug.



Mingled smoke of blast and outrushing molten steel roll over pouring spout instant after tapper is triggered from a safe distance.



Ease of installation is a key to use of pipe of "Alathon" to connect houses with city mains.



Flexibility is another virtue of polyethylene pipe. Here it's shown being run into jet well.



Farmers are among biggest customers for pipe. Last year sales for all uses were \$40 million.



Sprinkler systems for lawns are growing use for the versatile product.

Plastic pipe

A rundown on the advances made by

Steel, hardly the magazine to wax eloquent about anything plastic without good reason, not only predicts that the youthful plastic pipe industry is headed for a record sales year, but adds that it has "fast become a major threat to producers of metal pipe for applications where high temperatures and high pressures are not involved . . .

"Producers," the publication continued, "list these reasons for the mounting popularity of plastic pipe and fittings: 1. excellent corrosion resistance. 2. light weight. 3. ease of installation. 4. nontoxic. 5. price is usually lower than for the metal pipe it replaces. 6. long life. 7. nonconductor of heat and electricity. 8. smooth interior walls."

Considering these advantages, the lusty growth of the newcomer—from sales of \$100,000 in 1948 to an estimated \$60 million this year—isn't surprising. Counting for a major share in this plastics success story is polyethylene. Alone, it accounted for about \$40 million in pipe sales last year.

A major factor in polyethylene's progress has been Du Pont's development of improved pipe resins. "Alathon" 25 polyethylene resin, introduced about five years ago, caught on immediately as a premium material specifically developed for pipe. It had a variety of advantages, but chiefly it could stand sustained internal pressure longer than



progress

f "Alathon", with a note on the latest improvements

pipe made from other polyethylenes. Improvements have been built into the product in the years since—even more resistance to internal pressure and sunlight, and properties that have made the resin easier to extrude into pipe. And it has continued to be more economical than metal in the smaller diameters.

Now comes "Alathon" Super 25, the new kingpin. "This is our biggest advance in a polyethylene pipe resin in four years of research and development," emphasizes Al Stockfleth, Polychemicals Dept. pipe specialist.

Proving out a new resin calls for literally thousands of tests and end-use evaluations. At any given time, some 500 samples of pipe are being put through either accelerated or long-term tests at Du Pont laboratories. Undergoing torture side by side are competing pipes made from "Alathon" Super 25, competitive commercial resins and experimental resins under development by Du Pont. In addition, pipe of "Alathon" Super 25 is being checked in the laboratories of pipe manufacturers, while various Du Pont plants evaluate it under a variety of actual use conditions.

Simplicity of installation is one of the popular virtues of polyethylene pipe. This and its flexibility have made it a logical choice for connecting houses with water mains or wells, for running water to barns and outbuildings, and for lawn sprinkler systems as extensive as the labyrinths buried in factory and country club grounds. Owners of summer homes have an extra reason for using the product: If it happens that water isn't completely drained, the pipe will usually expand rather than burst during a freeze.

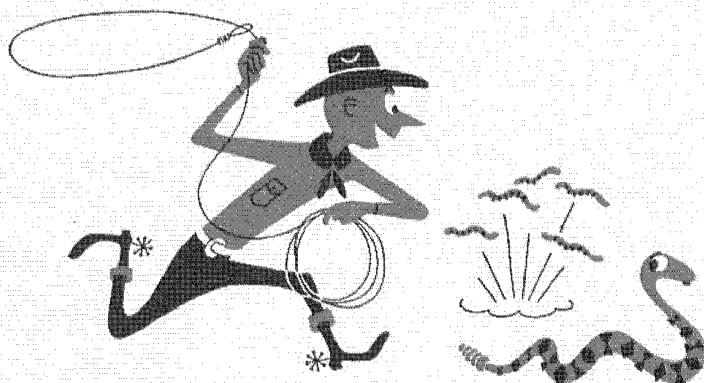
Sales for several recreational uses, including sprinkler systems for golf courses, are soaring. For swimming pools, pipe of "Alathon" carries water from the pool to the filter and back again.

"Developments in plastic pipe promise steady, rapid sales growth," concludes *Steel*. We agree.

Pipe of new "Alathon" Super 25 is under constant laboratory and field testing both by Du Pont and pipe manufacturers.

A BACKWARD GLANCE

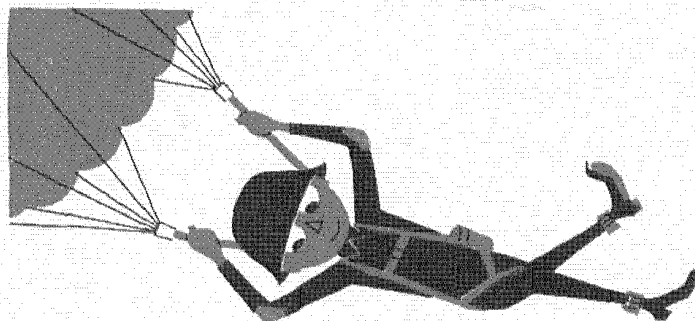
... through past issues of the *Du Pont Magazine*



30 Years Ago (1929)

"Texas ranchers are using explosives to rid the plains country of rattlesnakes. The snakes hibernate in the rocks during the winter months. Parties place dynamite charges in the crevices and blow out the varmints. Those not killed by the explosion are shot, roped or caught with forked sticks."

"Stereoscopic movies, shown on a screen 40 feet wide and 20 feet high, were demonstrated to an audience of publishers, bankers, scientists and motion picture executives. The spectacular included scenes at the seashore and on a country road, plus a talking and singing feature. The film was made by Du Pont Pathé Film Manufacturing Corp."



15 Years Ago (1944)

"Today Du Pont nylon yarn is going entirely into products used by the armed services. But when it returns to civilian use, our capacity will be sufficient to supply most of the hosiery industry. Nylon stockings will not be plentiful, however, until exhausted stocks are replenished."

"A new plastic, polyethylene, is now being offered by Du Pont. It is available in substantial quantities only by specific allocation for war purposes, but it is expected to be the basis for many important peacetime products."

IT'S

NEW

- Unwanted woody plants in fence rows, drainage ditches, utility and railroad rights-of-way and other non-cultivated areas can be destroyed effectively with new Du Pont "Dybar" fenuron weed and brush killer. Pellets are suitable for spot or broadcast application.



- "Jockey" Skants briefs, made of Du Pont nylon, are available in bright variety of solid colors and stripes. Stretch nylon construction makes bikini-type briefs conform to the body, says the maker, Coopers Incorporated, Kenosha, Wis.

- New Du Pont 600-K cellophane is described as the most durable ever offered packagers. The 600-gauge polymer-coated film also offers superior appearance and retains the clarity and moisture protection of other cellophanes, says the Film Dept.

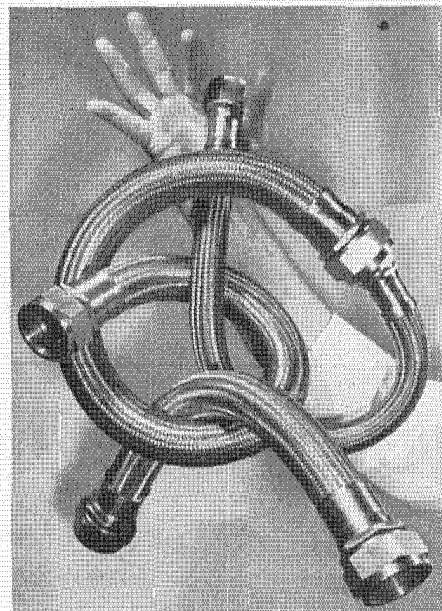
- New "7" Jet Clene loosens soil and removes stains quickly from vinyl, plastic and leather car upholstery. An aerosol powered with "Freon" propellant, it is used with a damp sponge or brush. It also does a good job on pile fabric upholstery and rugs, reports the Du Pont Specialties Sales Division.

- Corrosion inhibitor for aviation gasolines, new Du Pont AFA-1 Aviation Fuel Additive, effectively prevents corrosion in dosages as small as four pounds per thousand barrels of fuel, reports the Petroleum Chemicals Division. Additive has extremely low ash content.

- Starching can be restricted to collars, cuffs or other parts of washable garments with a new aerosol powered with "Freon" propellant. "Aeromagic" push-botton starch soaks into damp fabric to impart usual all-through starching. Sprayed on dry cloth, it forms light glaze on outside surface only. Steam iron works best, says maker, General Aerosols, Inc., 104 Mill St., Shelton, Conn.

- Bright flares for motorists to use as warning signals or emergency lights are available in a new kit offered by Kilgore, Inc., Westerville, Ohio. Kit contains three 15-minute flares made with Du Pont strontium nitrate. They can be lit without matches, burn despite rain and wind.

- First men's rainwear in a 50-50 blend of "Dacron" polyester fiber and "Orlon" acrylic fiber has been introduced by Gleneagles. The Ultimo, designed for automatic wash and wear, is available in three colors. Fabric is said to have exceptional durability, crease retention, wrinkle resistance.



- Flexible hose of "Teflon" TFE-fluorocarbon resin, made by a new process, has minimum bend radius only $3\frac{1}{2}$ times diameter of tube. Springfield "400" hose, made by Titeflex, Inc., Springfield, Mass., is formed of helically wound tapes of "Teflon" and glass fiber that are convoluted, cured and jacketed with stainless steel braid. It resists high temperatures, corrosion and fatigue.

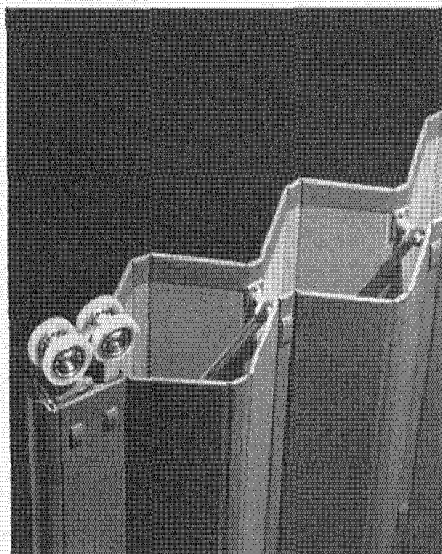
• For additional information on products or services mentioned in any issue, write to the Editor, Du Pont Magazine, Wilmington 98, Del.

- A new pattern in "Fabrilit" vinyl upholstery material that has the appearance and low luster of fine suede is being produced by Du Pont's Fabrics Division. It's available in 12 colors and two weights, Elegance and Crown Elegance.

- Slim-Trim orange and fruit punch dietary drinks contain only one calorie an ounce, reports the Central Canning Co., Inc., Cedarville, N. J. Said to be the first canned fruit juices of this type, they're sweetened with Du Pont "Cylan" calcium cyclamate and are vitamin-enriched.

- Kitchen tangles are avoided with new "No-Knot" coiled appliance cord that stretches up to four feet from electrical outlet, retracts to compact 18-inch length when not in use. Jacketing of Du Pont neoprene withstands continued flexing, resists heat, fats and oils. Maker is Cords, Ltd., of De Kalb, Ill.

- Ground will be broken this month for a \$20 million plant near Florence, S. C., the second in which Du Pont will manufacture "Mylar" polyester film. It will almost double capacity for the product. In addition, a million-dollar expansion is under way at Film Dept. sales development and customer service laboratory near Wilmington, Del.



- Snap fasteners of Du Pont "Zytel" nylon resin attach removable laminated vinyl covers to new Hufcor accordion door made by Hough Manufacturing Corp., Janesville, Wis. Door also uses rollers and other parts of "Zytel" resin.

- Color-coordinated paintbrushes contain 100 per cent tapered "Tynex" nylon filaments in pastel shades that match the handles. Made by Gerts-Lumbard & Co., 3407 N. Kimball St., Chicago, Ill., the two-inch brushes are available in four colors.

- Youngsters waiting for meals can be kept entertained with colorable placemats coated with clear "Alathon" polyethylene resin. Playmats, marketed in sets of four by Hedwin Corp., 1600 Roland Heights Ave., Baltimore, Md., pair bright animal scenes with duplicate line drawings to be colored by hungry artists. Crayon marks wipe off easily.



- Handsome luggage by Travelaire owes its appearance to manufacturer's quest for something new. Friedberg-Grunauer Co., Inc., 46 Fremont St., San Francisco 5, Calif., liked Milan Straw pattern in "Fabrilit" upholstery material. Could Du Pont supply the same pattern in heavier luggage-grade fabric? Du Pont could and does. Popular bags come in gray and blue as well as in white shown above.

- "Du Pont is all around you at Macy's," ran the theme of a recent three-week promotion at the New Yorkstore. Macy's found that Du Pont products—from the synthetic fibers and dyes in wash-and-wear clothing to the plastics in kitchenware—were used in the manufacture of items carried in 173 of the store's 177 departments.



- Fringe on the top is featured in this new Jantzen swim suit of "Orlon" acrylic fiber, cotton and elastic yarn. Knit sheath has adjustable straps, back zipper and matching sleeveless "serape" over-jacket with string tie at neck. Fabric dries quickly and keeps its original shape, Jantzen reports.

- Latest summary of scientific data on ruminant nutrition is contained in *The Digest of Research on Urea and Ruminant Nutrition*, published by Du Pont Polychemicals Dept. Subjects include urea sources, roles of carbohydrates, trace minerals, proteins and fatty acids, and urea as a nitrogen source. Copies are available at \$2.50 each from Du Pont Fairfax, Wilmington 98, Del.

- New aluminum strip-wound electromagnetic coils are said to weigh less and display better space factor and heat dissipation than conventional wire-wound coils. Recently developed by Aluminum Company of America, Alcoa Building, Pittsburgh 19, Pa., they utilize strength, moisture insensitivity and dielectric properties of "Mylar" polyester film to speed winding, maintain minimum coil size and withstand high temperatures.



At midnight, Tennessee plant guard prepares "greeting" for employees arriving for next shift. Such reminders play important role in safety program.

Finding out what causes accidents and then preventing them is a rewarding but complicated business. Here are some of the lengths a new Du Pont plant went to recently in . . .

Setting up for safety

Du Pont, frequent recipient of the National Safety Council's annual Award of Honor, was presented its 14th such award shortly before we went to press. The Council recognized 104 individual Du Pont operating units for their 1958 safety performance.

Last October, some 90,900 Du Pont employees posted more than 15 million man-hours of work marred by only one lost-time injury; a worker in an explosives plant broke his thumb.

October's record-tying performance helped drop the company's 1958 injury-frequency rate to the all-time low of .33 per million work hours set in 1955. But to a determined manage-

ment, that sore thumb stuck out even more than one is expected to. Reacting typically, the company has renewed its drive to reduce the accident rate by exactly 100 per cent. What's more, Du Pont safety men believe it can be done.

Already, a person working for Du Pont is 19 times safer than the average industrial worker, 11 times safer than the average manufacturing chemical worker, and 16 times safer on the job than off it. Further, he's more than one hundred times as safe as he would have been while working for Du Pont 45 years ago.

He's also kept aware that such a degree of immunity to work hazards didn't come about automatically. Safety's sermon reaches him from all directions. It shows up on the pencils and note pads he uses, on bulletin boards and posters, on elevator walls and doors, in company publications and on machinery. Hard hats, safety goggles, steel-toed shoes—even round-nosed scissors—are as familiar as old friends.

Keeping every Du Pont worker eternally conscious of good safety practice—even to the point of mild irritation, if necessary—has proved an effective tool. As the company's Safety and Fire Protection Division has pointed out, "Achieving the ultimate goal of no injuries will mean doing each part of every job the right way, because, in a broad sense, safety consists of preventing mistakes."

To measure the deep imprint of safety on Du Pont operations, we recently watched a safety program take shape at a new company plant in Tennessee.

Actually, the job involved two safety programs, one for the Engineering Dept. construction force which built the plant, and the other for the operating personnel. Parts of the Engineering program, such as the fully equipped firefighting brigade, were absorbed eventually by the plant program. Others terminated along with construction activities.

But when did the new unit's safety program really start? "Well," said Engineering's field project manager Sam Krewatch, "a safety man was standing by when the bulldozer came in here

to scoop up the first load of dirt." For his part, plant manager G. R. Cantwell dug out his file of staff letters—the communications system he set up the day he arrived. The second letter was headed "Personal Injury Prevention."

When a construction craftsman reported for work, he got an immediate safety orientation meeting with project safety engineer Terrel Edmunds. He found the project operating under safety standards outlined in an Engineering Dept. manual and bolstered by procedures drawn up specifically for the plant. Combined, they covered practically every aspect of the design and safe operation of all tools and equipment he might be using. Then, before he hit a lick of work, his craft superintendent briefed him on more particulars.

A week later, then a month later, he got more personal pointers from the superintendent because, as Edmunds puts it, "The first day, the first week, the first month—that's the toughest time for a new man."

The key man in construction safety, Krewatch contends, is the gang foreman. "Success in preventing injuries depends directly on the foreman's ability to keep his men aware and always careful," he says.

Besides keeping a constant lookout for potential sources of injuries, each foreman held "gang box" meetings every Monday morning before his men checked out tools and supplies. Here he relayed to them any pointers growing out of the reports he and the other foremen, as well as Edmunds, had turned in the previous week.

TOP 6 PER CENT WON PINS

Foremen also were given a new incentive to plug for safety. A small lapel pin emblazoned with the green cross of safety was offered to those who established excellent accident records over a period of weeks, then met other requirements including passage of a written examination. Only half a dozen of the 100 foremen who helped build the plant won the pins, and they wore them with pride. Their achievement had added value, too—it was made part of their rating and record files, where it would be in view for the next employer.

When builder Krewatch turned over the complex plant and its safety reins to manager Cantwell, the Engineering Dept. could mark up another job well—and safely—done.

Every midnight, then and now, the guard on duty at the plant gate performs a ritual that's repeated at many Du Pont locations. He walks to a big sign and changes a number in front of the phrase "safe days without a major injury." The new number is the first thing everyone sees as he arrives for work and the last thing he sees as he leaves the plant.

Between times, the several hundred Tennesseans who are starting Du Pont careers at the new plant are exposed to the full force of a safety program designed to be as all-pervading as possible. "We all learn either by shock or repetition," maintains their plant manager. "The shock method usually involves a serious injury or near injury. We prefer repetition."

Cantwell speaks with authority. He made safe workers of former cowboys, Indians and oil field roustabouts at the Du Pont-operated Oklahoma Ordnance Works before being made manager of a company plant at Newark, N. J., in 1946. After establishing a remarkable safety record his first five years there, he instigated a campaign to operate the plant for ten years without a major injury. The Newark plant is now seven years along toward the goal.

Along with the men of the Safety Division, Cantwell believes



Central safety committee, here seeing demonstration of breathing device, sets policy at Tennessee plant.

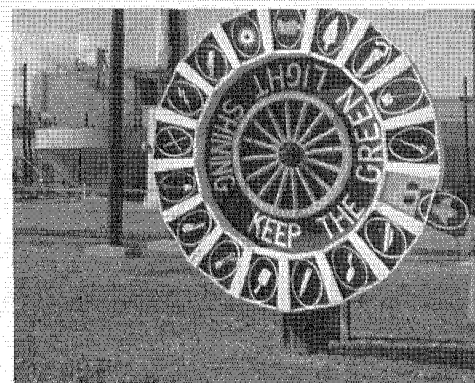


Plant physician, nurse show men on night shift how to use resuscitator while waiting for help to come.



Rash of hand and finger injuries among construction crews was countered by "keep five" campaign.

Construction craft symbols on revolving safety wheel glowed red to record injuries. Crafts with unmarred records rated green light.



that it's possible to eliminate all injuries. "After all," he tells you, "one minute after an injury occurs, an experienced man can tell you how it could have been avoided."

Safety here in the Tennessee plant, employee relations superintendent Herb Shirrefs told us, starts with an 18-member central safety committee that sets up general policies. Department heads and area engineers who are committee members pass these to subordinates at regular meetings that are devoted exclusively to

safety matters. "They aren't a part or tag end of other meetings," Shirrefs noted. A basic safety program manual outlines the procedure in detail.

To make sure that the production force got off to a safe start, a subcommittee of the central group made a special safety inspection of each piece of equipment as it was completed and turned over by Engineering. Until it met every safety requirement, Shirrefs explained, it wasn't accepted.

In addition, the plant's own safety engineer made the rounds with a safety representative from company headquarters. They slapped a quarantine on any hazardous item they found; it wasn't put into operation until the fault was corrected. Eventually, every piece of gear on the plant had to meet their exacting standards.

Humans must operate even the most foolproof equipment, however, and humans make mistakes. The new Tennessee employee, in newly issued hard hat and safety goggles, finds that the machinery or equipment he'll work with has been all but psychoanalyzed.

"Trouble could crop up here . . . or here, if you make a slip," he's told. "This is what you do about it."

"If something goes wrong where that man is working, you do this."

"Here's your assignment if and when the Fire, Fume and Disaster plan goes into effect."

He also gets a set of plant safety rules: no strike-anywhere matches; no loose clothing, wrist watches or rings around moving machinery; never attempt to catch a falling object.

He learns the standard Du Pont safety color code. It helps tell him where he can go and what he can safely do there. Even without countless signs and slogans, he soon knows by its color what to touch and what not to touch. He can pinpoint general danger areas—rollers, moving vehicles, toxic substances, "backward-step" traps, high temperatures and pressures.

The new worker also finds that the plant physician, nurse and first aid teams are ready to help if he does get hurt. His annual physical checkup should turn up defects that might contribute to an accident, and he's encouraged to seek the help of his supervisor in solving any problem that troubles him deeply—sometimes a cause of mishaps.

Along with everyone else at the plant, he's now working toward the first General Manager's safety award. After that, if the safety record is maintained, there are the President's and Board of Directors' awards, each offering him a prize of increasing value.

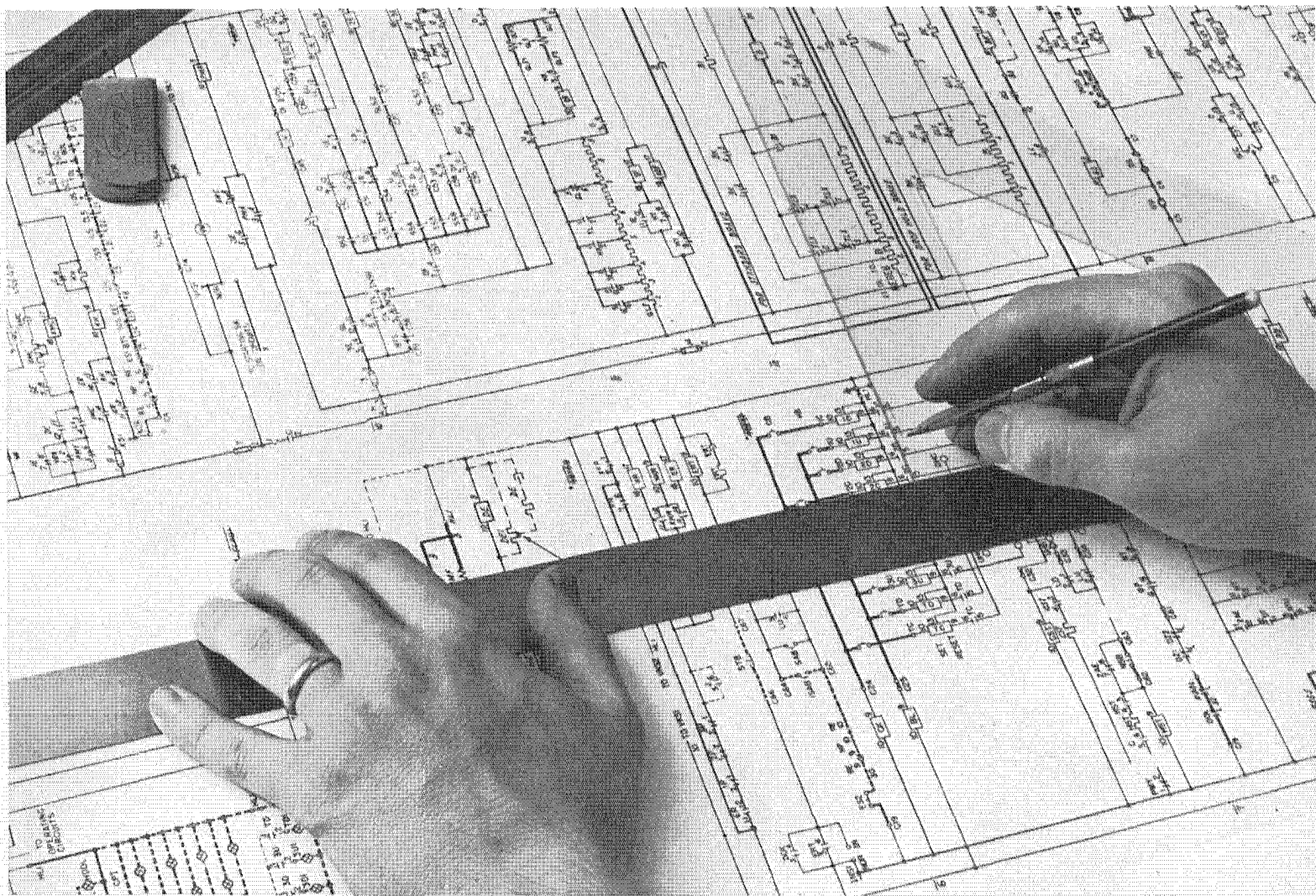
He's also coming under the influence of Du Pont's expanding effort to reduce off-the-job injuries. Many of these occur in the home, and the proved principles of industrial safety are now being aimed with good results at the employee's entire family.

Traffic dangers take the off-hours spotlight. Employees converge on the Tennessee plant from 42 different communities, driving a combined distance equal to more than halfway around the earth every day to get to and from work. That much exposure to highway hazards means trouble, of course, if proper precautions aren't taken by the drivers. This has become one of the major safety goals at the new plant.

So it goes. Safety certainly doesn't stop at the plant gate; in fact, safety doesn't have a stopping place. This is the key fact that dominates the safety program at the new plant and the approximately 240 other locations where Du Pont employees are at work.



Variety of protective apparel, from hard hats to this welder's full-length outfit, is specified for operating plant safely.



NEW FILM FOR THE DRAFTSMAN

A versatile new product, "Cronaflex" polyester drafting film, is making its commercial bow this month under the banner of Du Pont's Photo Products Dept. It has superior transparency, says Photo Products, and its surface has been designed specifically for outstanding pencil acceptance. In addition it can be printed readily by letterpress or offset with standard printing inks.

The film's exceptional transparency means that it can be run through reproduction machines at high speeds. Its pencil acceptance enables lines of uniform width to be drawn easily and there is little or no smudging with either graphite or plastic pencils. The consistency of its drafting surface, says Photo Products, is due to the unique continuous process by which it's made.

The film has other important advantages. Lines can be erased easily without removing the matte coating or leaving a ghost line. It is impervious to moisture, too. Working drawings on the drafting board will not buckle with day-to-day humidity changes, and spills of water or other solutions can be wiped away without damage. It's also easy to clean with any of a variety of conventional drafting room solvents.

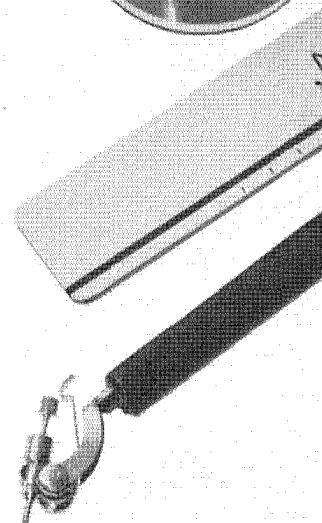
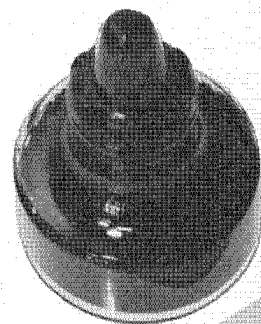
"Easy-on-the-eyes" and "no objectionable glare"

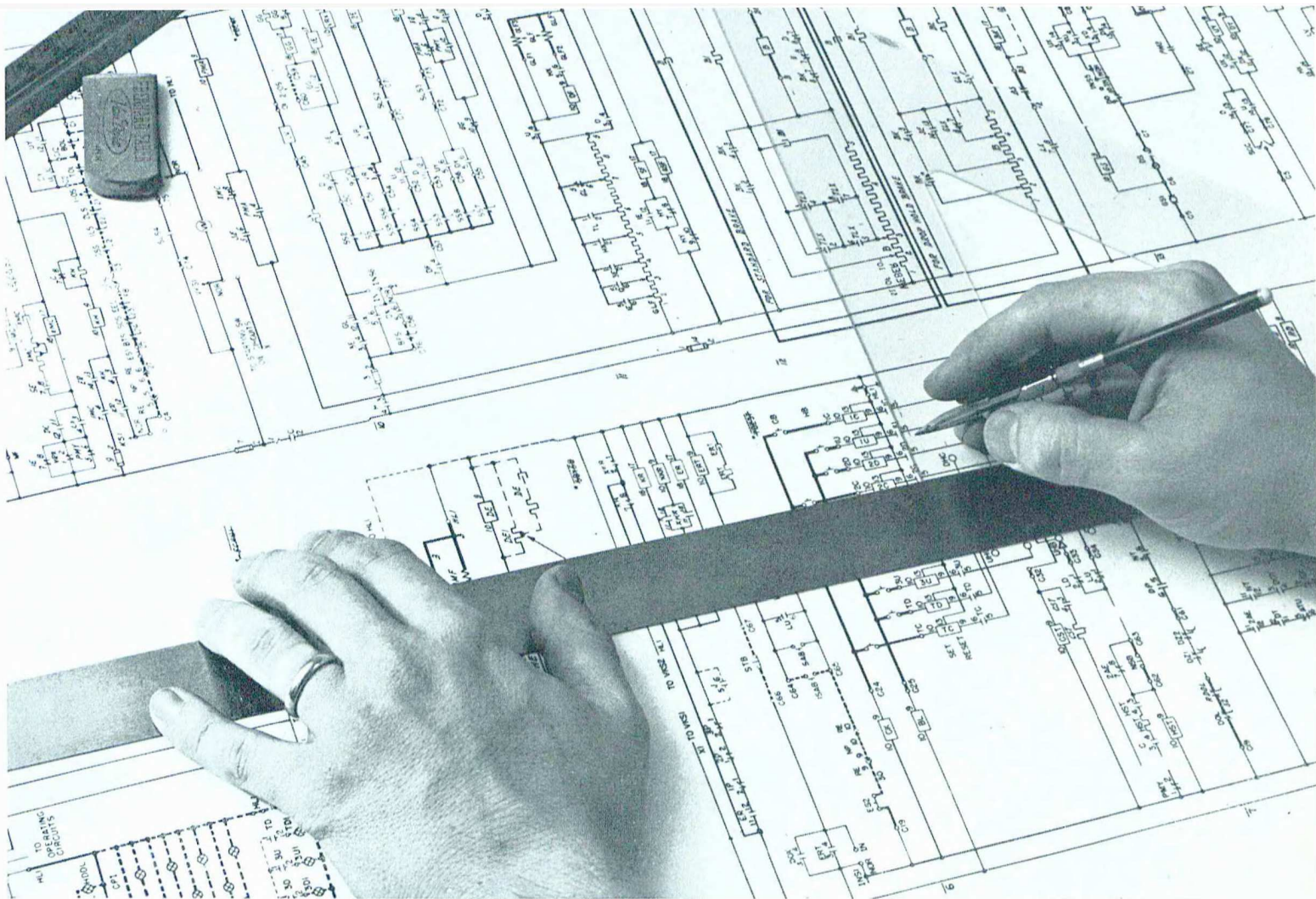
are additional strong points mentioned by engineers, draftsmen and designers who have tested the new film. The users also were impressed with the uniformity of "Cronaflex" from sheet to sheet and box to box, and its dimensional stability.

The new product is rugged: it resists tearing and accidental creasing, and will stay flexible even under extreme conditions encountered in the Arctic or the tropics. Still another feature is its thickness—four thousandths of an inch. This is thick enough to give the body necessary for easy handling, yet thin enough to save space in stockrooms and filing cabinets.

This drafting film joins a family of related polyester-based products developed by Du Pont, the "Cronaflex" engineering reproduction films. Used mainly to duplicate original drawings and as a tool to save time in drafting work, they include contact, projection and direct positive films.

"Cronaflex" drafting film is matted on either one or both sides, as desired, and is packaged in rolls and sheets. A note to the *Du Pont Magazine* or the nearest Photo Products Dept. district office will bring you the addresses of the suppliers in your vicinity.





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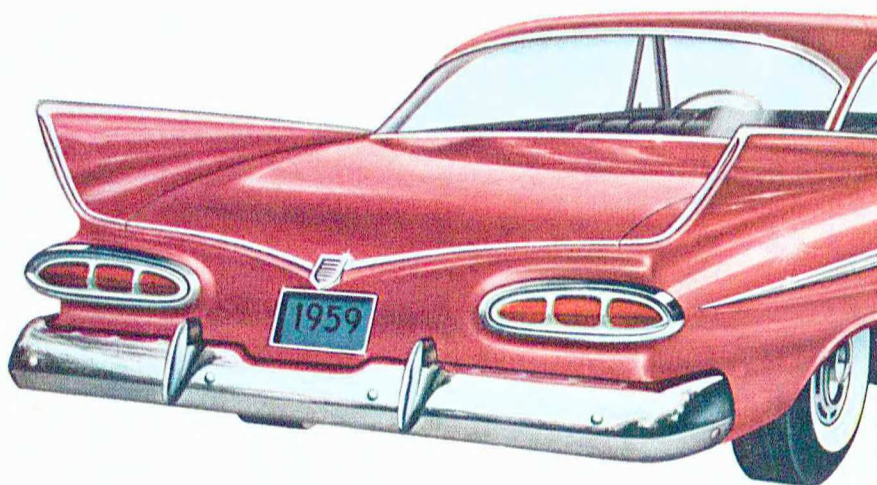
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