

DUPONT magazine

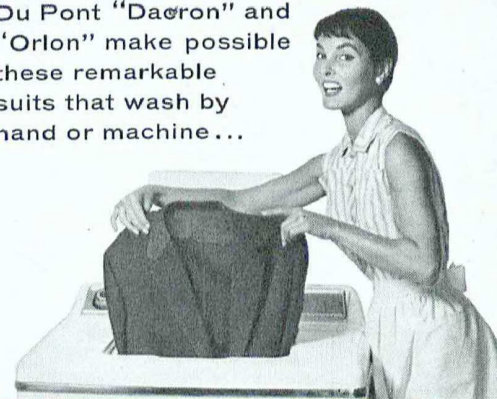


Better Things for Better Living . . . through Chemistry



New
**WASH and
 WEAR** suits
 are easy
 to keep neat

Du Pont "Dacron" and
 "Orlon" make possible
 these remarkable
 suits that wash by
 hand or machine...



drip dry ready to wear!



This summer, you can have a new kind of suit! It's wonderfully lightweight, cool and comfortable with the *extra* convenience of wash and wear. A high percentage of "Dacron" or "Orlon" (often combined with Du Pont nylon) makes possible these featherweight suits that wash easily . . . drip dry neatly pressed . . . *ready*

to wear. They seldom need ironing. What's more, they keep their wash-and-wear advantages for life. "Dacron"* polyester fiber and "Orlon"** acrylic fiber help these suits stay neat *between* washings, too. Enjoy this built-in comfort, neatness and convenience in your new suits this summer.

*"Dacron" is Du Pont's registered trademark for its polyester fiber. **"Orlon" is Du Pont's registered trademark for its acrylic fiber. Du Pont makes fibers, does not make the fabrics or suit shown here.



BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

DACRON • ORLON • NYLON

IS IT METALLIC?

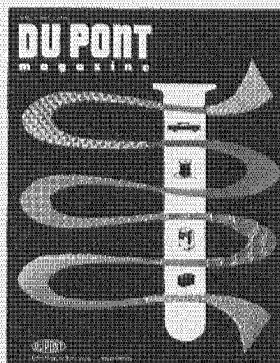
We labor under a handicap, writing these words before we've seen color engravings for our cover. With only white paper, and red, yellow, blue and black ink, we told the engraver, recreate the embossed texture and the metallic glitter of these decorative laminates made with "Mylar" polyester film. Did he and the printer capture what was in Vince Hoffman's original artwork? As we type this, we have all except our two working fingers crossed.

Metallic yarn made with "Mylar", the subject of our lead story, is a fast-growing youngster in the family of decorative materials fathered by the Du Pont film. Others in the family are introduced on page 4.

NO LONGER IGNORED

"Industry recognizes that the time has long since passed when air pollution could be ignored as a factor in plant location . . . Consequently, the abatement of air pollution is just as important a part of (Du Pont) plant design as any other consideration."

—Granville M. Read, Du Pont's chief engineer, addressing the Air Pollution Control Association



CLEAN SLATE

By piling up more than 7,500,000 man-hours over a three-year period without a lost-time injury, the 1,200 Chemical Dept. employees at the Du Pont Experimental Station near Wilmington have set a new world record for safety in chemical laboratory operation. The group beat its own earlier record of 7,188,763 hours, recognized by the National Safety Council at the time as the top safety performance for chemical laboratories.

The Chemical Dept. has a ten-man safety section, but, in the words of its supervisor, "Safety is pretty much an individual responsibility. We may badger and cajole," he says, "but in the end the employees themselves enforce the rules."

DREAM CAR, 1975

Flushed with the success of acrylic lenses in taillights that get bigger and bigger, plastics manufacturers foresee an automobile like the one below, Bill Wall of Du Pont said at the 129th annual meeting of the American Chemical Society. Wall's dream car "proved a welcome relief to members who had been filled with statistics for several days," reported *Chemical & Engineering News*.

On the serious side, Wall said the typical 1956 automobile uses plastics in 105 applications. Yet this adds up to only ten pounds per car. He predicted that polymers with the required physical properties will make possible a hundredfold increase in plastics sales to auto makers.

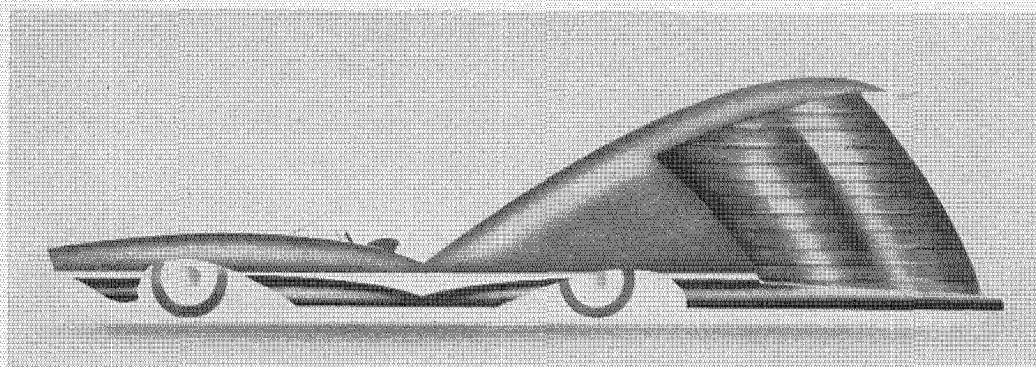


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GORDON H. KESTER
Editor

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The Midas

... is weaving a new chapter

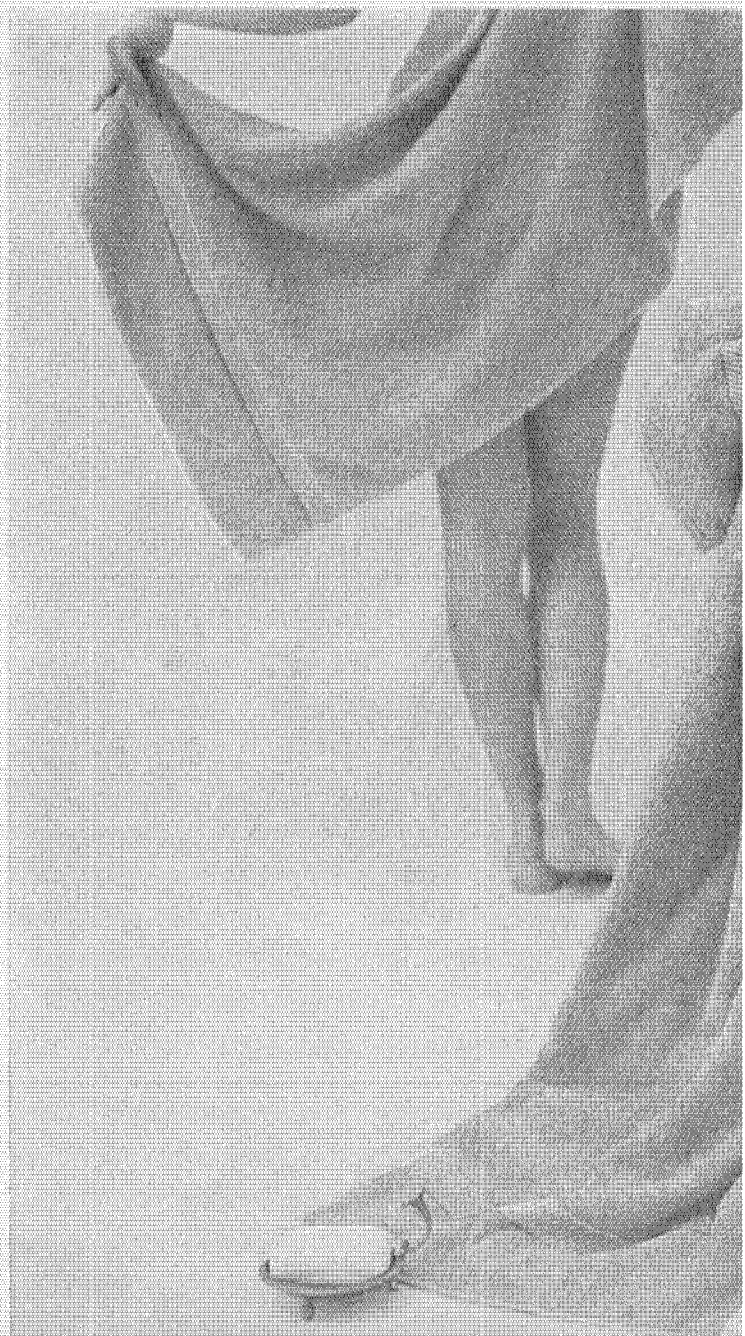
By LOUISE J. GRUBER

Just a short time ago it would have been quite impractical to trim bath towels and face cloths with glamorous borders or stripes of gold metallic yarn. And the girl who bought a bathing suit knitted with metallics definitely would have been the miss whose bathing suit never got wet.

But in 1956 these things have become realities, thanks to the development of an improved type of metallic yarn made with Du Pont "Mylar" polyester film. The introduction of "Mylar" into the field is the latest chapter



A new metallic yarn, made by sandwiching foil or metallic particles between sheets of "Mylar" and slitting to narrow width, is notable for moisture resistance. This permits use of metallics in bathing suit and towels shown here. Unusual strength of the yarn makes possible its use in lace, top right. Other swatches show metallic yarn of "Mylar" in drapery and upholstery fabrics.



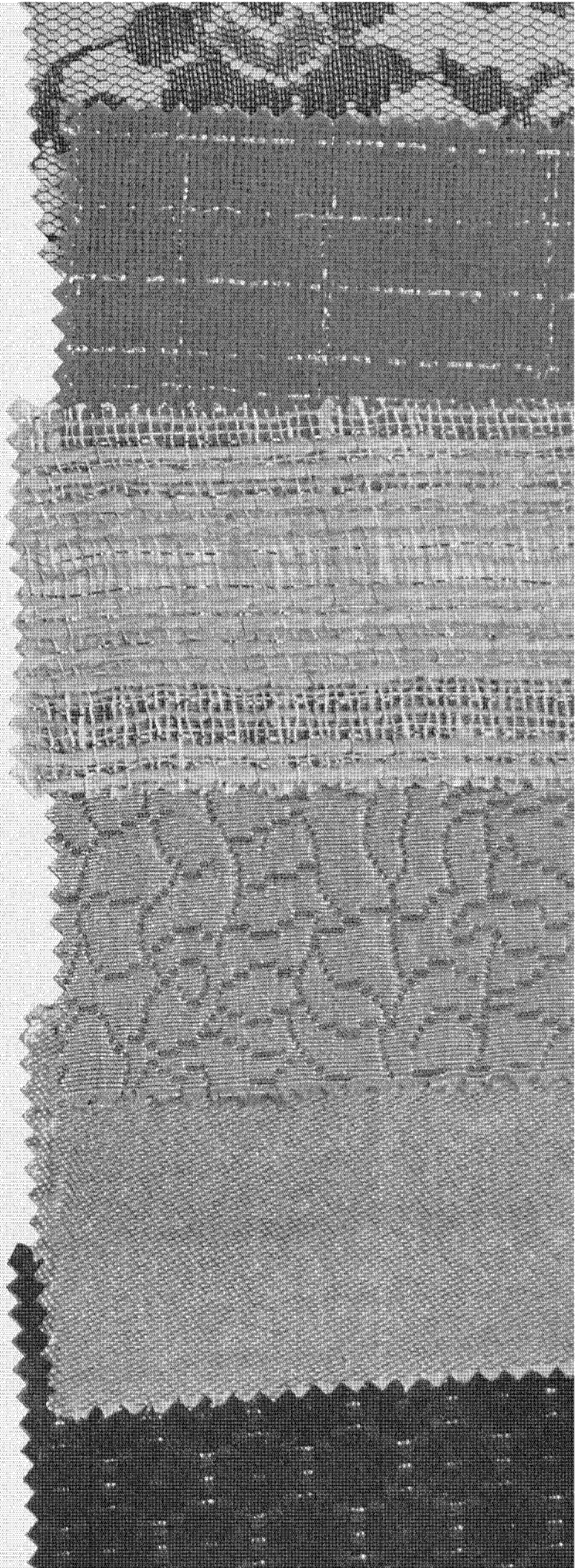
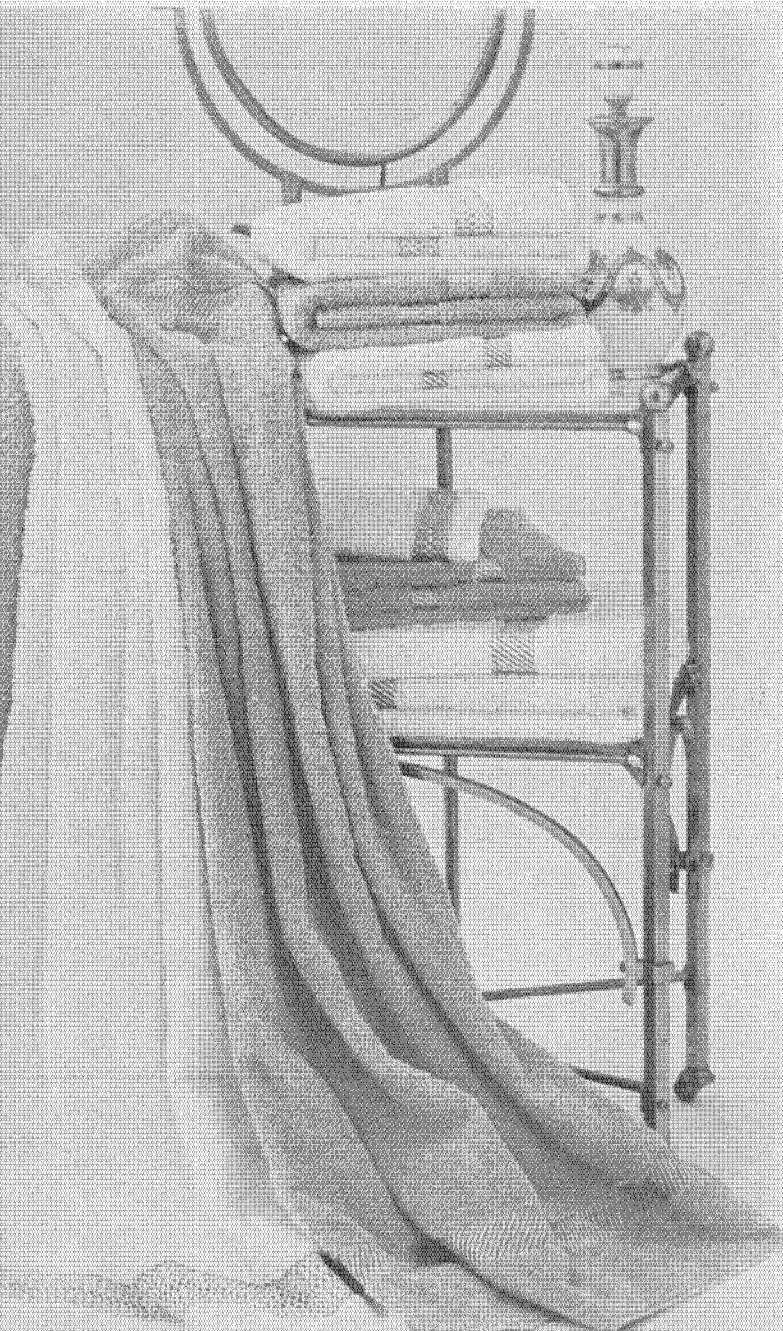
touch of "Mylar"

the brilliant history of metallic fabrics

in the 3,000-year history of the "Midas look" in fabrics.

The textile industry can now use glistening metallics in literally hundreds of new ways: in delicate silks and fine laces, gay cottons and wools; in shoes, raincoats or knitted suits. Your home, too, can have curtains, drapes, linens and upholstery fabrics with metallics as practical as they are stylish.

How is all this possible? Aren't metallics heavy, harsh and impractical? Aren't they usually limited of necessity



to costly dresses to be worn only on special occasions?

The answers are found in Du Pont "Mylar". The transparent film imparts a unique combination of properties to finished metallic yarn.

In one process, yarn manufacturers apply "Mylar" to each side of a thin sheet of aluminum foil, giving a film-foil-film lamination. Another manufacturing technique uses tiny metallic particles as the center of the "sandwich." In both cases, the lamination is slit into narrow widths to become metallic yarn.

Because "Mylar" is exceptionally strong, thin gauges can be used. Thus metallic yarn made with this film is soft and pliable, adding a subtle note to the fabric. Extra strength and abrasion resistance mean smooth production on looms and knitting machines, even where tight turns are involved. In many instances, there's no need for supporting yarn. Thin-gauge "Mylar" yields up to 50 per cent more to the pound than yarns previously used, thereby holding down costs of the finished fabrics.

In dyeing and finishing, the properties of metallics made with the Du Pont film read like the asset side of a balance sheet. Since "Mylar" resists heat, chemicals and moisture, fabrics with this new type of yarn can be dyed at the boil. They also can be piece mercerized, pre-shrunk or heat set.

WASHABLE, TOO

For consumers not directly concerned with production or finishing problems in the textile industry, the properties delivered to the yarn by "Mylar" are still significant. Care is simplified. Fabrics with these improved metallics can be ironed, dry-cleaned and washed in a machine.

Contrast these modern methods of achieving metallic

glamour to those of yesterday—from Biblical times down through the centuries—when gold and silver were tediously hammered out by hand and cut into threads for the ornate gowns and robes of royalty or elaborate clerical vestments. Today, mile after mile of metallic yarn is rolling off high-speed machines to meet the public's demand for bright, sparkling fabrics.

Years ago, the glitter of metallics was limited in its range of colors. But today's technology gives metallic yarns a rainbow range from plain to iridescent, from black to silver. The desired shades are obtained by adding color to the bonding agent used in lamination, or by dyeing the sheets of "Mylar" before lamination.

IN AUTO UPHOLSTERY FABRIC

Alert fabric designers, always on the lookout for new and exciting style possibilities, have been quick to recognize the value of this new metallic yarn. Take the automotive industry, for example. Because durability is as important as styling in cars, yarns made with "Mylar" have been adopted for upholstery in many of the 1956 models; still more metallics will be evident in the '57 cars.

Another new direction for metallics made with "Mylar" is in carpeting for the home. Up to now, metallics for floor coverings have been reserved mainly for custom-made, hand-woven rugs for resort hotels or showrooms.

According to one leading yarn manufacturer, 1956 will be the biggest year yet for the glittering look, thanks to the many fabrics that can now capitalize on the glitter of metallics made with "Mylar". So keep your eyes peeled in the days ahead. If it glitters, chances are it's chemistry's newest contribution to the bright world of fashion.

There's more to this yarn...

The decorative uses of "Mylar"—as opposed to the functional side it displays in sound tape or electrical insulation—don't end with metallic yarns.

If, instead of slitting the metalized film into yarn, you laminate it to plastic-coated fabric and emboss it, you have the lustrous material so popular now on the inside of automobile doors and in upholstery welting. This laminate is not only decorative, it's more durable and scuff-

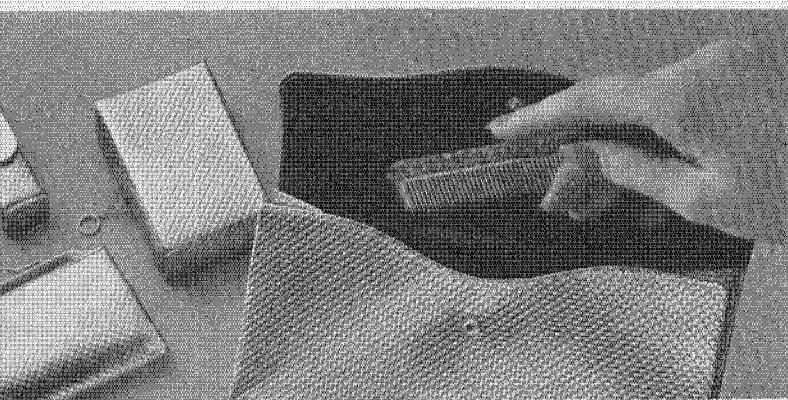
resistant than materials previously used in these areas.

The accessories pictured at left are made of the same kind of laminate. So are such disparate items as the interior trim on new Douglas-built airliners and the exterior of Wurlitzer juke boxes.

A clock manufacturer gives his product a distinctive touch with metalized "Mylar" polyester film laminated to rough-woven cloth. A manufacturer of water heaters saves 80 per cent of what he once spent for chrome trim by using metalized, pressure-sensitive tape made with the Du Pont film.

In the field of home furnishings, Pearl-Wick, Inc., is covering clothes hampers with an attractive laminate of randomly scattered metallic yarn and squares sandwiched between a sheet of "Mylar" and a backing material. Because "Mylar" resists moisture and most chemicals, there's no danger of ruining the surface with bathroom chemicals or shower steam. Lightolier, Inc., is using a laminate of "Mylar" and parchment paper for the shades of its adjustable ceiling lamps. Besides giving body to the shade, the film imparts a soft tone to the light from both white and colored lamps.

As long as product designers continue to have ideas, the flow of new decorative uses for "Mylar" is expected to continue.



Metalized "Mylar", embossed and laminated to backing material, is used in accessories like those above and for decorative purposes.

THF— SUPER SOLVENT

Du Pont tetrahydrofuran dissolves all of the high molecular weight PVC resins

As might be expected, the better some materials are made, the tougher they are to work into usable form. For years this has been generally true in the metals field, and as certain areas of plastics chemistry grow more complex, the same applies there as well.

For example, very high molecular weight polyvinyl chloride resins offer greater tear and tensile strength than lower molecular weight resins and copolymers. They also provide superior resistance to abrasion, flexing, moisture, chemicals and sunlight attack. But the properties that give them these qualities also make high molecular weight resins hard to dissolve, and for certain jobs, PVC resins must be dissolved before they can be turned into top-quality finished products.

That's where the powerful solvent action of Du Pont tetrahydrofuran comes in. This colorless liquid dissolves resins that are practically insoluble in other low-boiling solvents, enabling manufacturers to realize the advantages described. Superior wear-resistant fabrics, for instance, are made by topcoating with a solution of high molecular weight PVC resins. The vinyl upholstery in cars retains its new appearance longer when it is manufactured with such a topcoat.

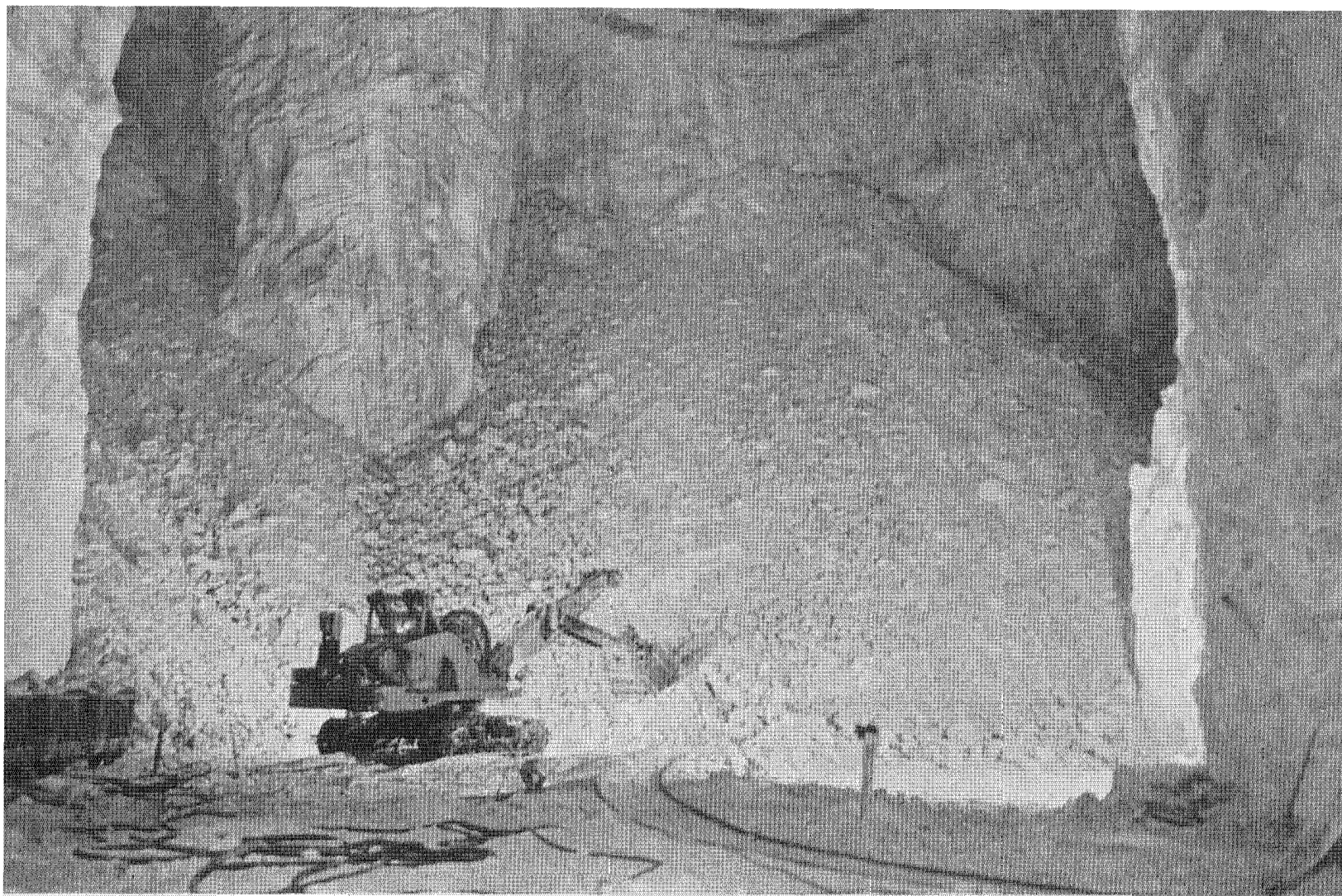
A growing use of tetrahydrofuran is in the film casting field. THF permits manufacture of tougher PVC films because they can be based on the highest molecular weight resins available. The solvent's high volatility and high rate of diffusion also allow increased casting machine speeds.

Similar film-forming solutions properly formulated with plasticizers and other agents can be used as industrial protective coatings. Lower molecular weight PVC resins and copolymers, which are more easily dissolved, are used for similar applications. The high solvent power of THF yields solutions of these resins with the highest solids content possible at workable viscosities. This practice cuts down on the number of coats required, reducing cost and time of application.

Adhesives for PVC resins, too, are made up with tetrahydrofuran as the solvent. For example, adhesives for joining rigid PVC pipe and for making bags and toys from PVC film are made by dissolving 10-15 per cent of the resin in THF.

Although best known as a solvent for PVC resins, tetrahydrofuran is also a powerful reaction solvent medium in the organic chemical field. In addition, it is used as a chemical intermediate in making nylon, other industrial resins and pharmaceutical compounds.

THF, left, dissolves 8 times as much of this high molecular weight PVC resin as next best low-boiling solvent at right.



Dwarfed by huge cavern it helped make, electric shovel scoops up salt in Avery Island mine.

Avery Island, home of famous "Tabasco" sauce, also boasts a . . .

Big rock salt mountain

By FRED C. ZEISBERG

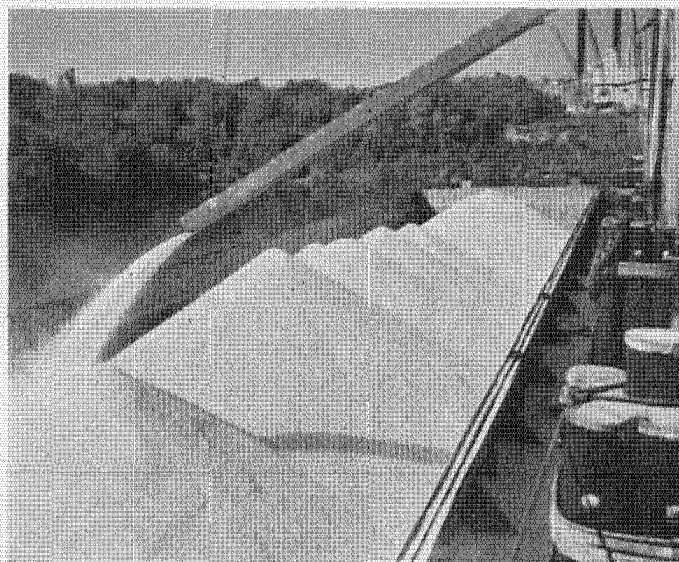
EVERY ISLAND, LA.

Imagine, if you can, a mountain of rock salt higher than Mt. McKinley, North America's tallest peak. Then bury it underground, and you have a good picture of where and what the International Salt Co. is mining here in the coastal marshes of southern Louisiana.

Avery Island miners work in one of the largest domes of salt yet found. When the present level is exhausted, the shaft will be sunk another 200 feet or so and mining will begin all over again, the company says. This move can be made many times, since geologists figure the salt dome extends 21,000 feet beneath the surface.

This "island" is really a hill, rising unexpectedly out

Barges, right, transport salt from Avery Island refinery. Chemical industry is biggest customer for mineral.



of flat terrain, bordered on three sides by marshes and a cove and on the fourth by a cypress swamp. Its Bird City is a sanctuary for the snowy egret, once threatened with extinction, plus many other native and migratory birds. Its gardens are filled with exotic flowers. Grown here also are red peppers which, with salt and vinegar, make the Island's tangy "Tabasco" sauce. These attractions draw some 30,000 visitors a year.

There was a salt works here as long ago as the Revolution. In those days it was produced by evaporating the water from natural salt springs. Then in 1862 the salt dome was discovered, and the first shaft was sunk seven years later. International acquired the property in 1899, and pushed the shaft down to 500 feet. Mining has gone on continuously at that level ever since.

Today great white caverns have been hollowed out of the underground dome. They are dotted with pillars of solid salt that support the roof. The mine is nearly a mile across at the widest point.

STAIRCASE OF SALT

The working face, where the rock salt is shattered with explosives, is approximately 100 feet across and 90 feet high. It looks like a huge staircase with four steps, each 24 feet high. Miners undercut the bottom step, then drill six horizontal rows of holes in the salt, 26 holes to a row. Each hole is loaded with three sticks of Du Pont "Extra" dynamite, and the charge is fired with Du Pont millisecond delay blasting caps. Working atop the shattered pile of salt, miners drill the next step above, shoot it, and so on to the top of the steps. The shattered salt is then scooped up by an electric shovel, put through a portable crusher and transported by conveyor belt and vertical lift to the modern International refinery at the surface.

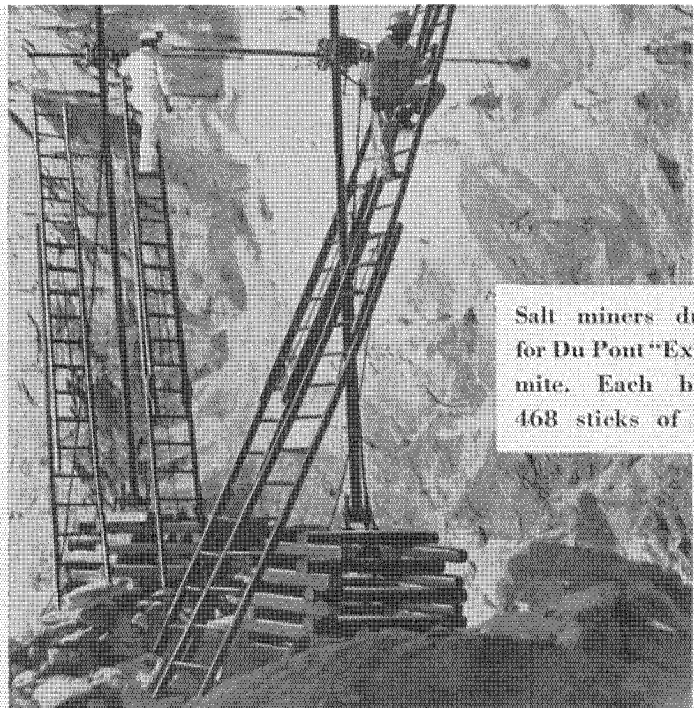
The Du Pont millisecond delay caps used at Avery Island, a special variety developed for use in salt mines, provide an interesting example of the tailor-made aspect of modern explosives products. It is important to some users of salt—tanners, for example—that the product they buy not be contaminated with copper. So, instead of the standard copper wire and copper shells used in other electric blasting caps, Du Pont salt mine caps are made with iron wire and aluminum shells. In processing the salt, International removes the remaining particles of iron wire with magnets.

MINE'S CAPACITY TRIPLED

Erland Johnson, Swedish-born manager of International's Avery Island operation, says the mine now is capable of producing 3,000 tons of salt in an eight-hour shift, three times the capacity before recent expansion programs. The portable crushers are proving to be time-savers, Johnson says. They replaced stationary crushers to which salt had to be carted by rail cars or trucks. The conveyor belts are another link in the new transportation system that today moves salt out of the ground faster than ever before.

International's refinery here produces both rock and evaporated salt. Table salt is made by dissolving extremely fine salt in pure water to form brine. The brine is then evaporated in vacuum pans. The salt leaves here by barge, rail and truck.

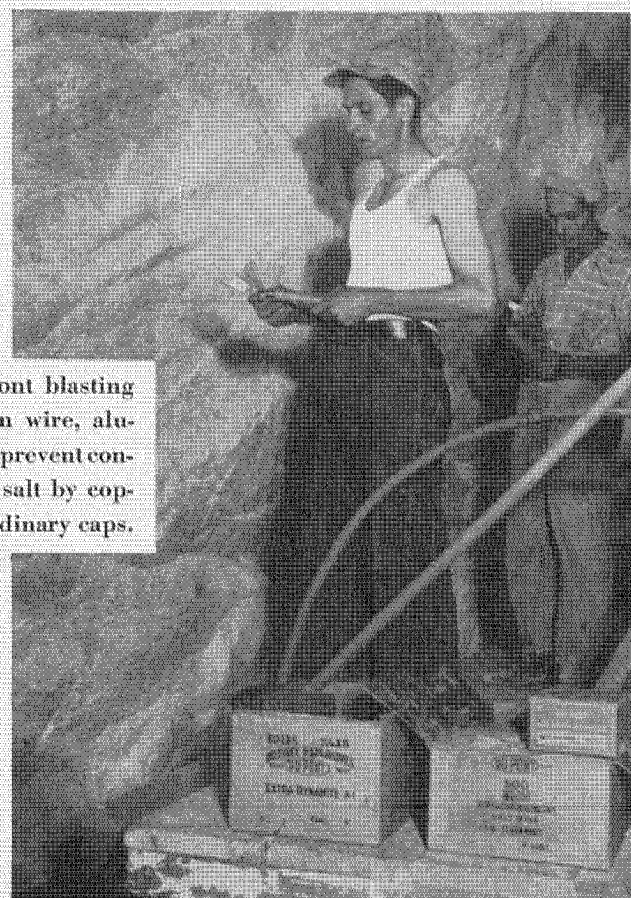
Where does all the white stuff go? Less than three per cent winds up as table salt. Three-fourths of the total U. S. production of 20 million tons a year goes to the



Salt miners drill hole for Du Pont "Extra" dynamite. Each blast uses 468 sticks of dynamite.

chemical industry for the production of plastics, synthetic rubber and other products. Other uses, including the salting of icy streets and highways, account for the remainder.

U. S. production and consumption of salt, two-and-a-half times greater today than in the '30s, is still growing, thanks primarily to booming chemical production. In the years ahead, the big rock salt mountain of Avery Island will continue to be a major source of this necessary mineral.



Special Du Pont blasting caps with iron wire, aluminum shells, prevent contamination of salt by copper used in ordinary caps.

Latest approach to aut

Squarely facing the fact that accidents happen, auto makers are working to lessen serious injuries by applying modern packaging principles to human bodies.

The new concept has gone over so well that it's likely there will be even more emphasis on such safety devices in 1957 cars

Chasing a speeder at 90 miles an hour, the North Carolina patrolman driving the car shown below hit the soft shoulder on a curve. The car traveled 250 feet up a ditch and then rolled over completely. Both doors flew open and the top caved in. Yet the driver, strapped into place with a seat belt, stepped out with only bruises and scratches.

This accident is one of thousands submitted to Cornell University Medical College, where scientists in the Dept. of Public Health and Preventive Medicine have pioneered the study of automobile crash injuries and their causes. This work had a great deal to do with the decision of auto-

mobile manufacturers to introduce new safety features on 1956 cars.

Many of the accidents now being studied by the Cornell research group involve automobiles equipped with such safety devices as seat belts, crash padding or spring-proof door locks. While the number of such cases studied so far is too small to be statistically reliable, all indications point to "materially increased occupant safety through use of these devices," Cornell reports.

Chrysler started offering seat belts as dealer-installed optional equipment just about a year ago. Ford followed with optional factory installation of belts on its new cars. Currently, seat belts can be obtained for all makes. The belts have the wholehearted support of such organizations as the National Safety Council, and several states are considering legislation requiring seat belt installation. Widespread acceptance is coming from state police, insurance companies and organizations that operate auto fleets.

NYLON BELTS STRONG, ATTRACTIVE

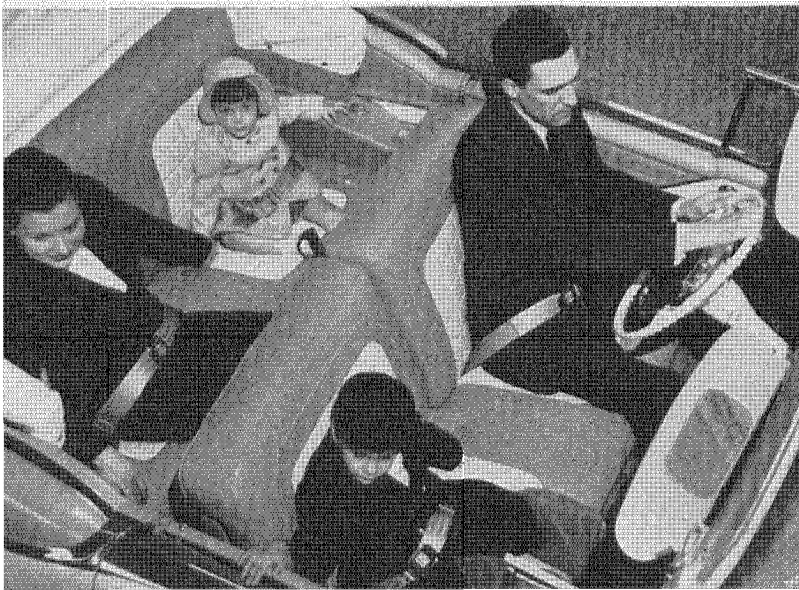
Du Pont nylon is used extensively in seat belts. Nylon has the obvious advantage of toughness sufficient to meet rugged requirements set by the Society of Automotive Engineers and the American Standards Association. In addition, nylon belts can be dyed easily with fast colors that harmonize with car interiors. This is important in overcoming consumer objections to the drab looks of some belts and to the chance of clothing damage from belt dyes.

Also winning recognition for their part in safe packaging of passengers are such equipment as crash padding (see next page) and safety door locks, the latter now standard on most models. Contributing to the effectiveness of many of the new locks are resilient wedges of Du Pont "Zytel" nylon resin that absorb shock from slammed doors. Adopted several years ago, the self-lubricating wedges eliminate the need for grease that might soil passengers' clothes.

No one, least of all the men whose work is back of the new safety devices, is suggesting that they are the chief means of cutting down the dreadful annual toll of highway accidents. But it becomes increasingly apparent that reducing the effects of accidents as well as their number can be a significant help in saving lives.



Restrained by a seat belt, driver of this automobile had only minor injuries, although car rolled over completely, was badly damaged.



Seat belts are available for automobiles of all makes, and popularity is growing. Nylon is used extensively.

mobile safety: packaging the passenger

Press the dashboard on some 1956 cars and your finger sinks in, leaving a slight hollow that returns slowly to place. Such a dashboard is covered with a special type of urethane foam that's notable for being "dead," or impact-absorbing, instead of springy when struck.

The idea is that if your head hit one of these dashboards suddenly, as it's likely to do in a crash, the padded surface would absorb much of the energy of impact and cushion you against serious injury.

The use of protective padding stems from medical studies which show, among other things, that 38 per cent of crash injuries to front-seat passengers come from contact with the dashboard.

The Ford Motor Company, which offered crash pads as optional equipment in its 1956 cars and pushed them as part of its advertised safety package, found that nearly half of its customers wanted them. While the automobile industry hasn't announced 1957 plans, indications are that protective padding may be standard on some models. Chances are, too, that it will be easier to obtain padding as optional equipment on other cars.

WANTED: MORE CRASH DATA

Like most stories, however, the crash padding account has a few complications. Automobile manufacturers still seek more basic information on the cause, extent and nature of automobile crash injuries. This will help in designing the ideal padding and placing it most effectively.

An indication of how fast crash padding has developed is the fact that even a year ago technical articles barely hinted at the possibilities of urethane foams in padding. Today this is a major use for the versatile materials.

Du Pont is in the urethane foam picture as the supplier of "Hylene" organic isocyanates, key ingredients in the manufacture of these foams. Once "Hylene" is mixed with an appropriate reactive resin, a catalyst and water, foaming begins within a few seconds and quickly fills a mold.

Urethane foams can be made in a wide range of densities in rigid, semirigid and resilient forms. Such flexibility encourages a broad range of applications. Since urethane foams are readily self-bonding to most surfaces, crash padding manufacturers can line their molds with the desired covering material before adding the foam. This

process eliminates need for a costly cementing operation.

Resilient foams usually are marketed as slit stock varying in thickness from a fraction of an inch to several inches. End uses include rug underlay, shoulder pads and jacket liners. Rigid foams, because they foam in place even in complicated cavities, are logical choices for thermal and sound insulation and for void filling.

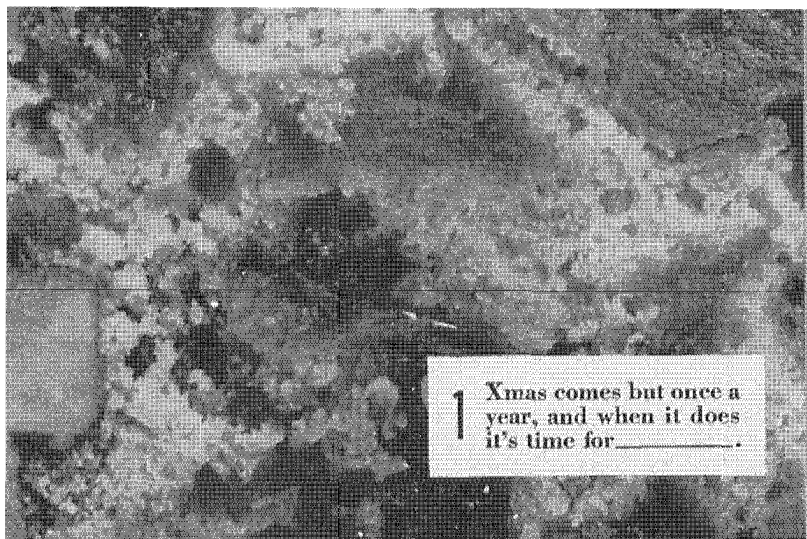
In Du Pont laboratories, work is steadily going on to develop new formulations that will lead both to better foams and to other applications where their unique characteristics can be an important advantage.



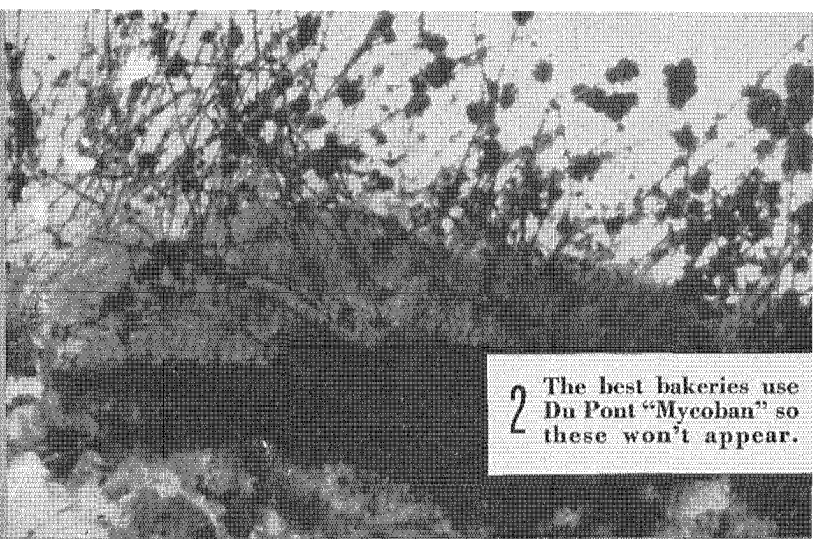
Ford Motor Co. staged automobile crash-ups using life-size dummies to test the effectiveness of such safety devices as protective padding.



New protective padding for automobile dashboards is made of a special urethane foam that absorbs impact.



1 Xmas comes but once a year, and when it does it's time for_____.



2 The best bakeries use Du Pont "Mycoban" so these won't appear.

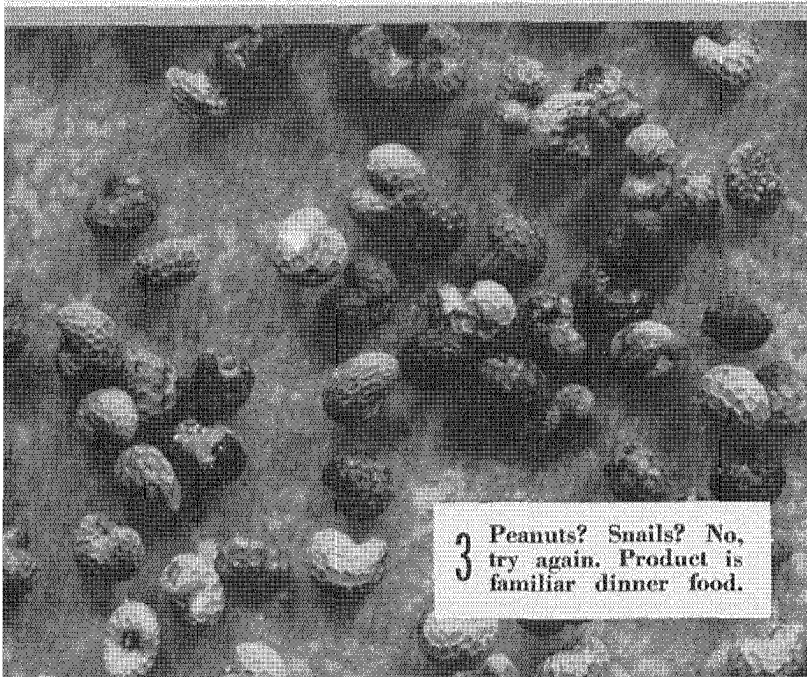
WHAT IS IT?

CLUE: they're all bakery products . . . and all but one are protected by "Mycoban"

Can you identify these well-known baked foods? We have no idea what's par for the course, but the hints for each picture should improve your score. Magnification of these products varies, incidentally. One of the foods is magnified only five times, another 80 times. Here are a few more facts to make identification easier:

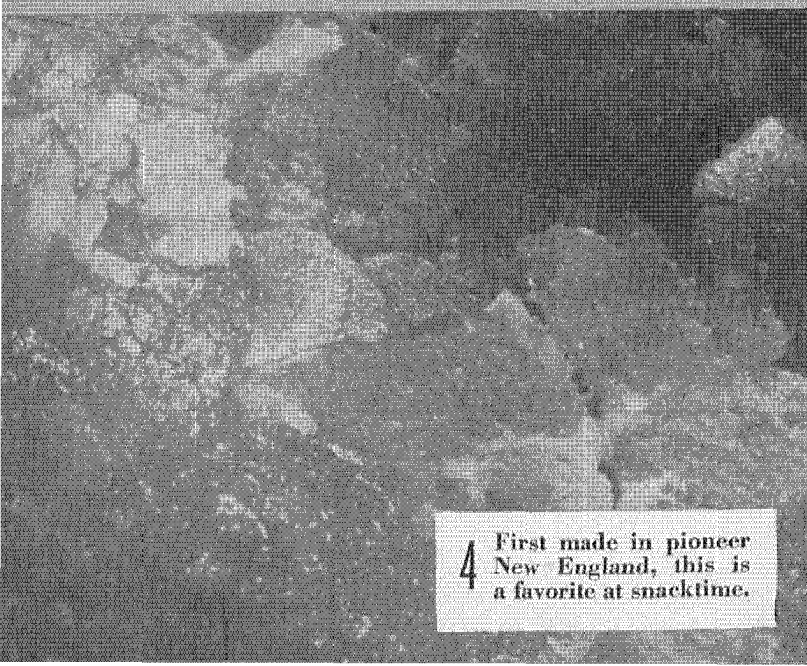
So many good things come from your bakery —breads, pies, cakes, cookies and rolls—that it was only fair to photograph a broad selection.

Some of these baked goods are more popular at one time, season or place than another. No matter what the time or place, however, it's nearly always "mold weather" in your kitchen. That's why leading bakeries in the United States and Canada add Du Pont "Mycoban" sodium or calcium propionate to baked goods such as those pictured here to guard against mold and keep them good days longer.

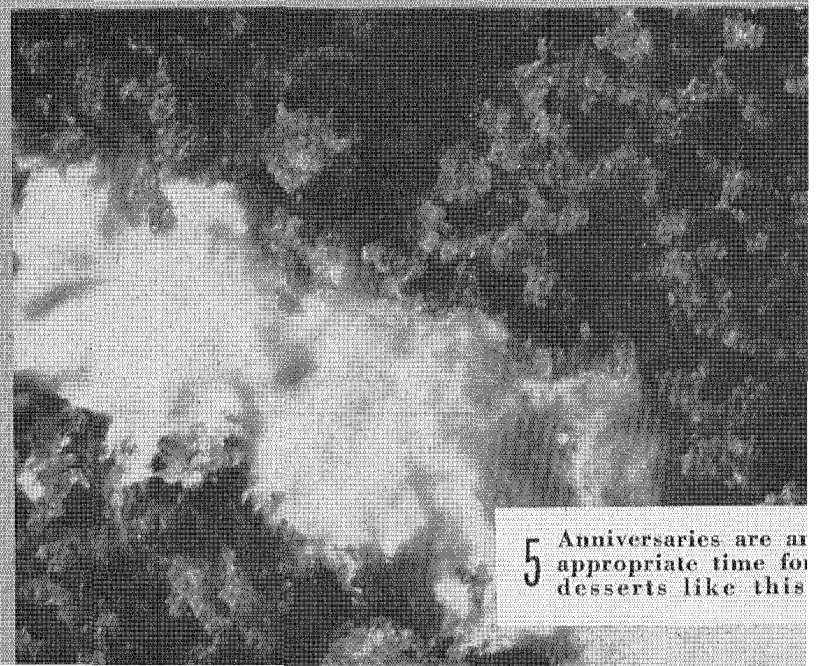


3 Peanuts? Snails? No, try again. Product is familiar dinner food.

1. Slice of fruit cake; 2. Mold spores on a slice of bread; 3. Poppy seed roll; 4. Glazed doughnut; 5. Slice of devil's food layer cake.



4 First made in pioneer New England, this is a favorite at snacktime.



5 Anniversaries are an appropriate time for desserts like this

"MIGHTY-MITE":

big punch in a small tool

This new powder-actuated tool, inexpensive enough for an individual to own, fastens steel or wood to concrete or steel

A new powder-actuated stud driver, designed and priced for small builders in the home construction field and installation contractors, has been announced by Remington Arms Co., Inc., Bridgeport, Conn.

Called the "Mighty-Mite" Model 456 Remington Stud Driver, it complements the line of powder-actuated tools already manufactured by the company. Biggest advantages of the "Mighty-Mite" are its low initial cost and adaptability to low-volume fastening jobs.

Five years ago Remington introduced its first powder-actuated driver, a spade-grip tool that hammered nail-like alloy steel studs into structural materials with the controlled blast from a 32 caliber blank cartridge. Large-volume builders were quick to give it their okay because it speeded fastening jobs, and smaller contractors found the tool so satisfactory they rented it by the day or week.

SELLS FOR \$34.75

The new model, however, makes it possible for the small building contractor to afford his own stud driver and operate it at minimum cost. It retails for only \$34.75.

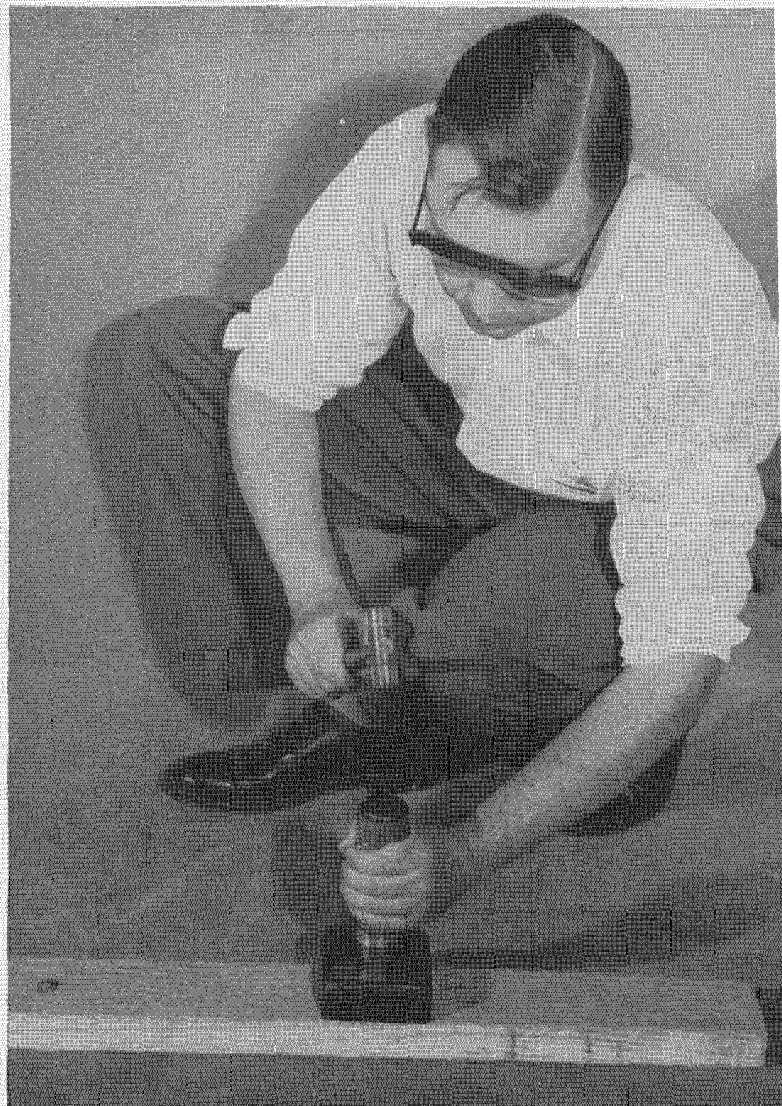
The "Mighty-Mite" consists of three parts and weighs 3 $\frac{3}{4}$ pounds. The operator loads it with a stud and a 22 caliber cartridge, then twists the upper section and depresses the lower part of the tool against the work surface, exposing the firing pin in the top. A light, sharp blow with a hammer on the pin fires the blank cartridge, sending the nail-like stud into the work surface to complete the fastening.

The power loads are made with varying powder charges to give the operator a wide selection for various jobs. Also available are 25 types of quarter-inch alloy steel studs, ranging from 1 to 3 $\frac{3}{4}$ inches in length.

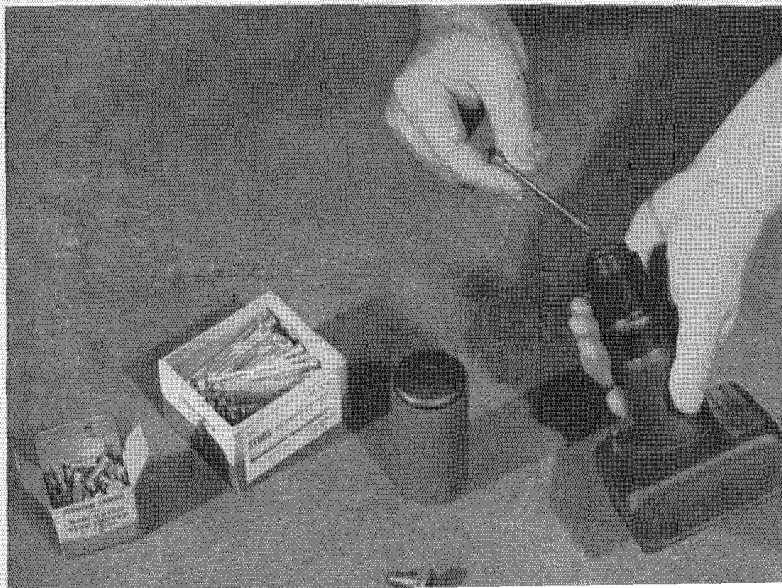
Like its bigger brothers, the "Mighty-Mite" fastens steel or wood fittings to concrete or steel. Some difficult but typical fastening jobs it can do easily: light machinery to concrete; furring to concrete, brick or steel; lighting fixtures and outlet boxes to concrete or steel; television fittings to concrete or brick; shelves, racks, and signs to concrete, and wall ties to concrete and brick.

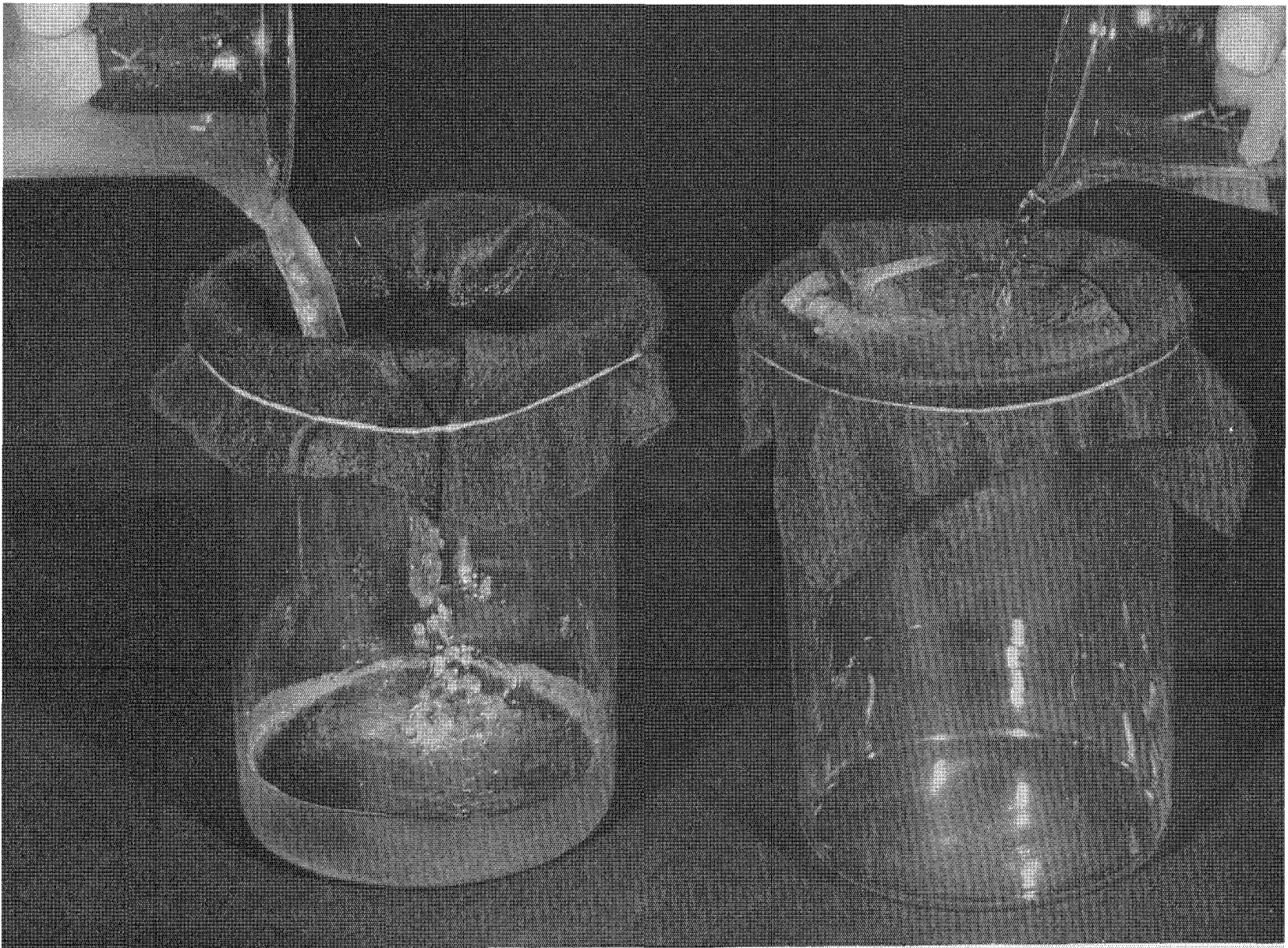
To insure safe operation, the "Mighty-Mite" won't fire unless it is held perpendicular to the work surface, and then twisted and depressed. A neoprene grip keeps the hand steady when pushing against the operating spring.

Tool is loaded by inserting stud, then cartridge. Enough sizes of each are available to fit the job you want done.



Two-by-fours are easy to fasten to concrete with new, low-cost tool. Light tap with hammer fires blank cartridge, driving nail-like stud.





"Armalon" felt filters emulsified water droplets from gasoline, left. Water, right, doesn't penetrate felt.

Two new trouble-shooting fabrics

*A semi-technical report on new fabrics,
available in pilot-plant quantities
for demanding jobs as gasket,
filter and electrical insulation materials*

By KARL WERLINE

Two new fabric families, radically different from one another, recently have been developed by Du Pont's Fabrics Division. One consists of various fabrics coated with "Lecton" acrylic resin and is especially suited for electrical insulation uses. The other, including "Armalon" tetrafluoroethylene felt and impregnated felt, performs well in severe filtering and gasketing applications. Both are now being made in pilot plants with a capacity large enough to meet moderate demands.

"Armalon" felts have the useful characteristics of "Teflon" tetrafluoroethylene resin, familiar to *Du Pont Magazine* readers as a tough, chemically inert material with excellent heat resistance and a low coefficient of friction. Fibers made from the resin are formed into felted material with these outstanding characteristics:

1. Useful at temperatures up to 400°F., and under certain conditions up to 550°F.
2. Practically inert to strong acids and bases. These felts can be boiled for extended periods in such corrosive chemicals as aqua regia, fuming sulfuric acid, fuming nitric acid or caustic soda without appreciable strength loss.
3. Unaffected by all common fuels, lubricants, hydraulic fluids and solvents.
4. No known materials will adhere firmly to them.
5. Low coefficient of friction.
6. Will not absorb water.

These traits suggest that "Armalon" felts are particularly useful as filters over a wide range of severe conditions that would destroy ordinary materials. They are used to filter liquids as well as to remove suspended particles from hot corrosive gases. When the felt becomes saturated with the filtered material, it can be cleaned more easily than a conventional material.

This same felt construction, impregnated with "Teflon" resin, also makes an ideal gasket material under hot corrosive conditions that common materials cannot withstand. Called "Armalon" impregnated felt, it is relatively soft and conforms to uneven flanges to produce a leak-tight joint at low flange pressures. Disassembly of joints is easy and the gaskets are readily cleaned for re-use.

The gasket material is still too new for a complete evaluation of its chemical resistance, but in one case gaskets used with glass-lined pipe carrying 99.3 per cent sulfuric acid at about 400°F. are still performing satisfactorily after eight months. The next best gasket material previously used often had to be replaced in less than two weeks.

Both "Armalon" felt and impregnated felt are being tested in military aircraft and missiles where a wide range of fuels, lubricants and fluids are involved under extreme heat and cold. Impregnated felt, in addition to its high temperature resistance, also has good cold resistance. Samples have held up in impact tests down to a temperature of -320°F. without cracking or shattering.

A whole new family of fabrics coated with "Lecton" acrylic resin is being developed primarily for the electrical insulation field. They combine good electrical properties with resistance to heat and many chemicals. By varying the base fabric, insulation materials are made with different properties:

1. Fabrics of glass fiber or "Dacron" polyester fiber coated with "Lecton" have excellent thermal stability at temperatures up to 270°F. and can be used for extended periods up to 300°F.
2. Coated fabrics of glass fiber or "Orlon" acrylic fiber have excellent resistance to "Freon" refrigerants, a property that makes them of considerable interest to manufacturers of refrigeration equipment.
3. Regardless of the base fabric, these materials are highly resistant to most of the common solvents, lubricating oils, transformer oils and other oils used in electrical equipment.

A whole new family of fabrics coated with "Lecton" is being developed for electrical insulation field. One possible application is insulation for magnet wires.

4. Dielectric strength is essentially unaffected by high humidity.

Besides altering the fabric, it's possible to obtain further property differences by varying hardness of the resin. Softer resins resist mechanical abuse better; harder resins are stiffer and more resistant to solvents.

MANY USES...MANY THICKNESSES

Slot liners and phase separators for electric motors made with "Orlon" coated with "Lecton" are easier to shape than those made from glass fibers. "Orlon" also inhibits plating-out of copper in a hermetically sealed system. The glass fabrics, however, are less costly. All of the coated fabrics are made in single-ply or multiple-ply laminates in a wide range of thicknesses.

Both "Armalon" felts and "Lecton" coated fabrics were developed for specific technical jobs. Broadly speaking, the felts don't replace any other material because they are used chiefly in places where nothing else has worked successfully. The "Lecton" coated fabrics, on the other hand, were designed to give performance superior to that of existing materials.



Remington rifles and ammunition are helping the

Davy Crocketteers emulate their famous namesake as . . .

Junior sharpshooters

By OMER HENRY

As I parked my car in front of the ancient, yellowish building on the outskirts of Washington, D.C., one rainy Saturday morning, I heard the exciting rattle of small gunfire.

"Third relay on the firing line!" Tall Man was barking as I hurried inside. Nine boys and girls lifted polished Remington 22 caliber rifles from a rack, adjusted arm slings, and assumed prone positions on a row of mats before a line of paper targets 50 feet away. The Davy Crocketteers were in action.

"Ready on the right!" Tall Man's practiced eyes scanned the line of boys and girls. "Ready on the left!" He paused momentarily.

"Load!"

Gleaming rifle cartridges clicked into chambers and bolts snapped shut with sharp, almost military, precision.

"Fire!"

Shot after shot split the air.

"Cease fire!"

The kids scrambled to their feet and dashed to the paper targets. "Wow-ee, I got 41 out of 50!" whooped Butch Luker. "What did you get, Steve?"

"Forty-six! Betcha I get the Sharpshooter medal pretty soon."

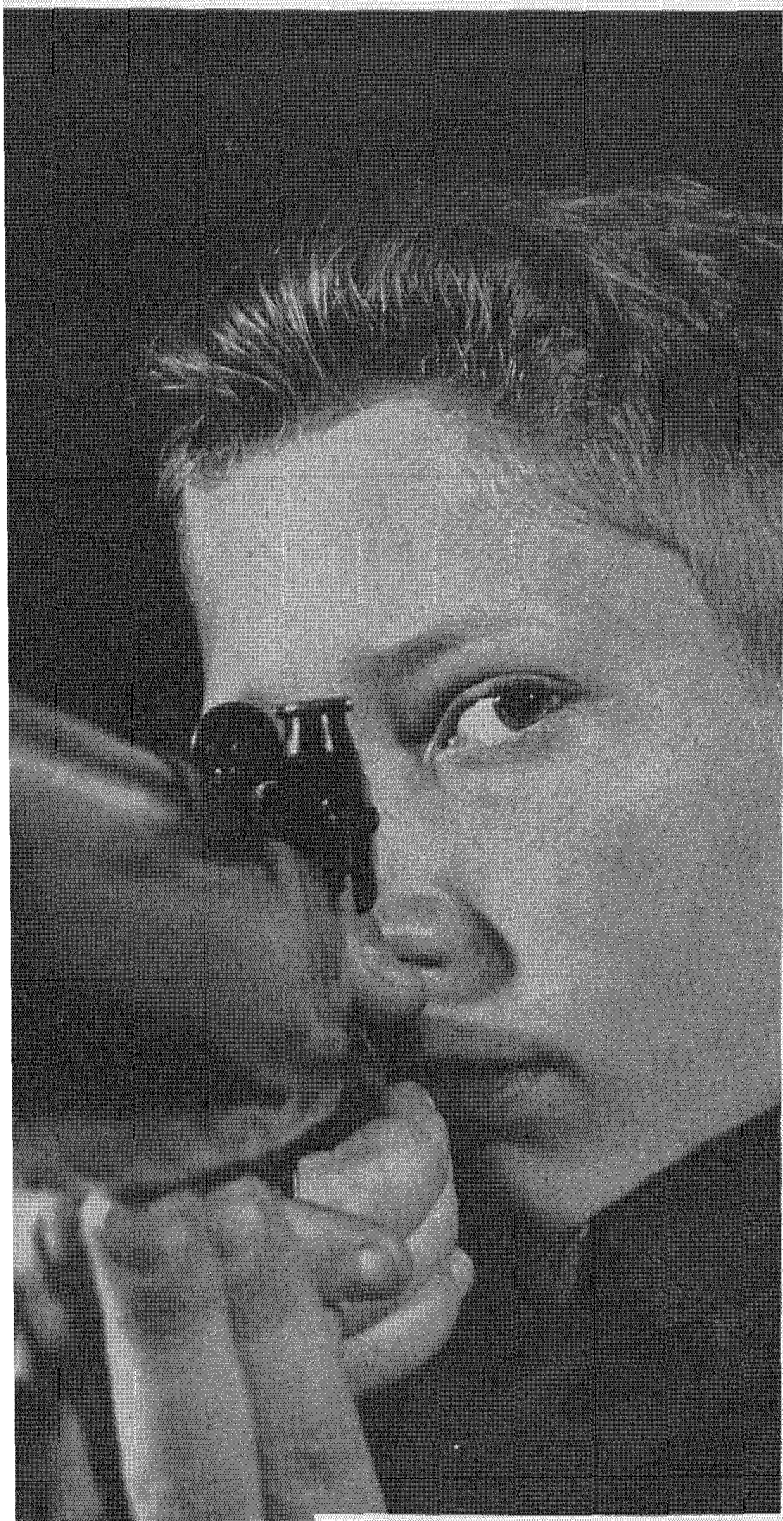
These youngsters, with the thorough approval of their parents, are having real fun and at the same time learning how to handle firearms safely. The cost is low. For the price of a matinee ticket they can buy enough Remington ammunition for a two-hour shooting session at the Davy Crocketteer Junior Rifle Club.

Back of the club is Tall Man—Norris G. Kenny, onetime rifle coach in a military school. "A boy and a gun," he says, "are as inseparable as the stars and stripes in Old Glory. An attempt to separate them would be undesirable. What kids need is training in the handling of firearms."

NO "BANG, BANG"

Air Force Colonel James T. McKee agrees. "My kid," he says, "sees guns firing in every direction on TV shows. I don't want him to think that he can pick up a gun and go 'bang, bang' with it at anybody. If he is to have a gun—and he should have one—I want him to learn the safe way to use it. That calls for adult instruction and supervision."

That is what these boys and girls between the ages of 8 and 15 are getting at the Davy Crocketteers' rifle range. Before starting target practice, Instructor Kenny required each member to learn the various parts of the rifle, memorize the National Rifle Association's eight rules



Club champ Garrard Spoden won title with 144 points out of possible 150.

for safety in handling and firing a gun, and master the four standard shooting positions—prone, sitting, kneeling and standing.

He also showed a color motion picture, obtained from the National Rifle Association, in which Trigger Happy Harry did precisely what one should *not* do with a gun. It was only after the safe handling of firearms had become a habit with the youngsters that Kenny allowed them to shoot at targets.

The Crocketteers' range is 65 feet long and 40 feet wide, with the firing line 50 feet from the targets. This leaves a space of 15 feet behind the line for benches, rifle racks, tables and other equipment. The backstop is a steel plate a half inch thick. It's set at a 45-degree angle to the floor, causing bullets to drop into the sand at the base of the plate.

Target shooting is a source of boundless enthusiasm for the young marksmen. As they become more proficient, they are eligible for graded awards—Marksman to Dis-

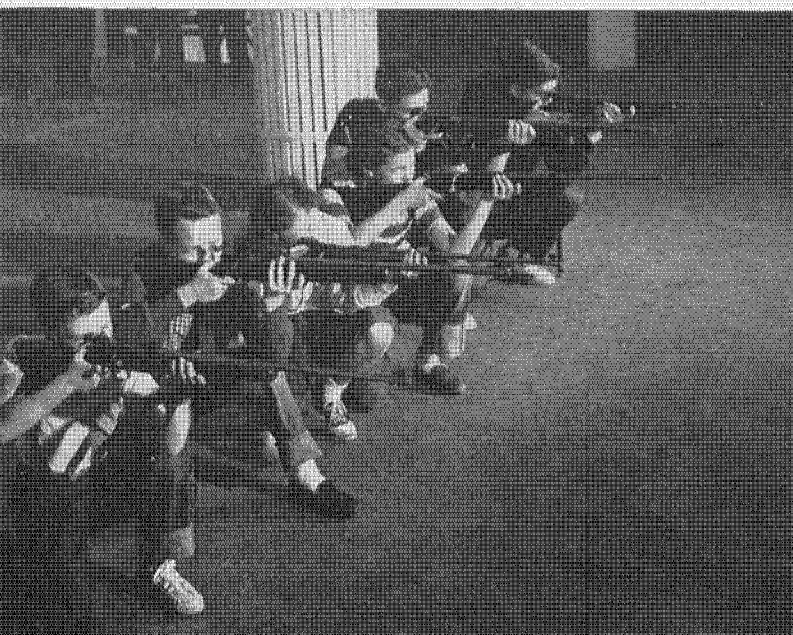
tinguished Rifleman. When a Davy Crocketeer wins an award, he gets a medal, lapel button, diploma, and three-inch felt brassard which he wears proudly on his jacket as proof of his achievement.

Blue-eyed Susan Finley beat out the boys to become the club's first Expert. The club champion is 14-year-old Garrard Spoden, who won the enviable title by scoring 144 points out of a possible 150 with his Remington model 521T.

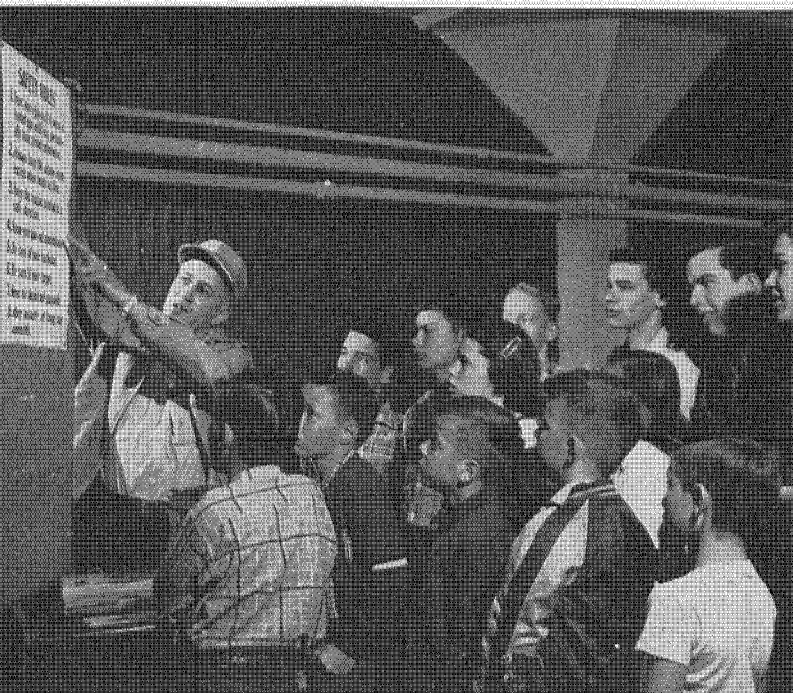
Most of the club members have their own rifles. "We learn how to care for them," says Karen McKee. "We take them down and put them together to see how the various parts work." Because they are simply constructed and inexpensive, Remington rifles—although not exclusively used by the Davy Crocketteers—are their favorites.

"I am delighted," Kenny says, "with the care club members give their rifles. I think the Davy Crocketteers are prouder of their firearms than of any other property they own. With a little guidance from adults, it's no trick for boys and girls to learn to handle guns safely and well."

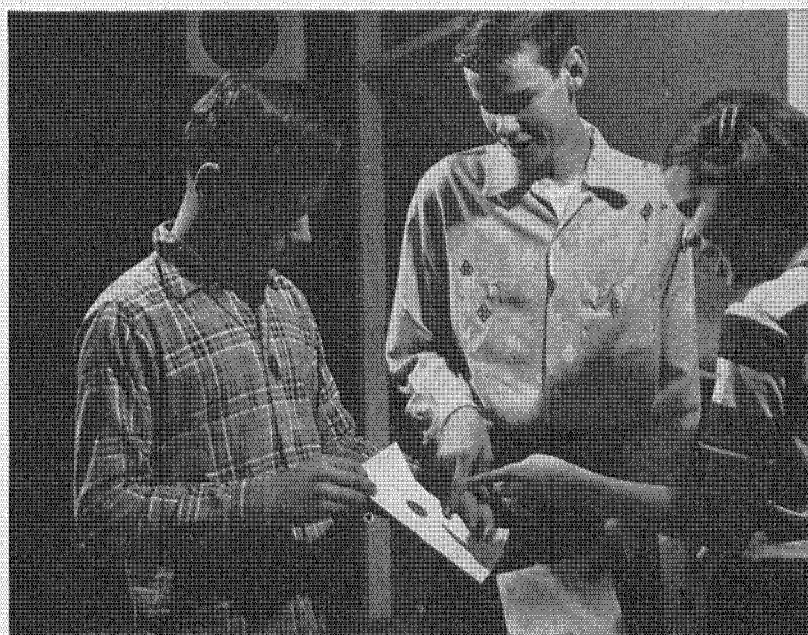
Crocketteers kneel on the firing line at their range in Arlington. Remington rifles, known for their simple construction, are favored.



Before firing a shot, members of rifle club learn eight safety rules for handling and firing guns and four standard shooting positions.

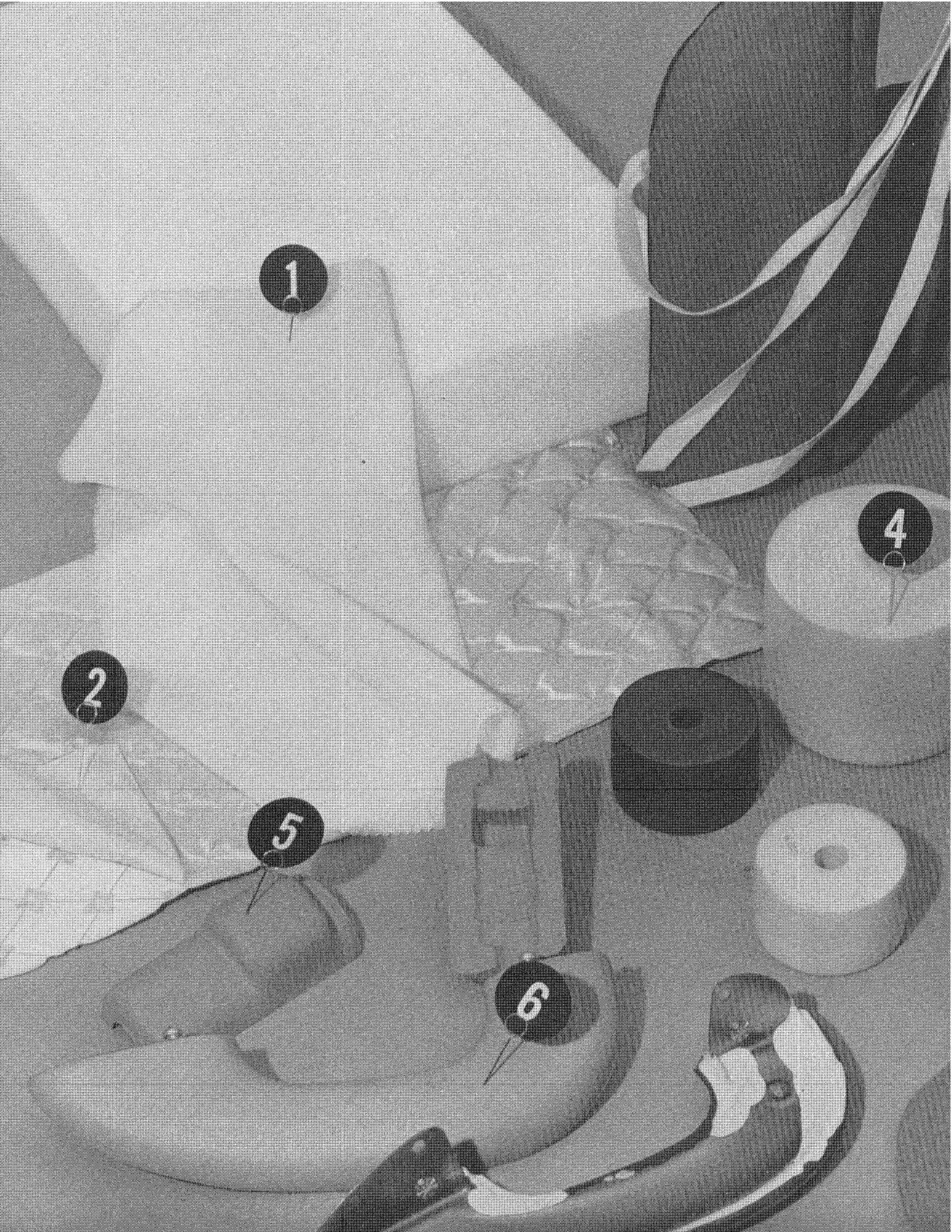


Budge Jenkinson and Bill and Helena Averill compare their scores. Awards for skill range from Marksman to Distinguished Rifleman.



Instructor Norris Kenny—"a boy and a gun are inseparable"—helps John Catterton adjust sling. Kids range in age from 8 to 15.





VINYL WITH A BOUNCE

*Resilient polyvinyl chloride foam,
blown chemically with Du Pont BL-353, intends
to be a stiff competitor in the foam field*

Foam rubber, undisputed king of the resilient foam field since 1947, may have to share its throne with two relative newcomers now clamoring at the palace gates, reports a recent issue of *Chemical Week*. The competitors: vinyl and urethane foams, both of which have impressive claims to put forward.

Foam rubber, of course, has been a postwar sensation. Sales have shot from an estimated 18 million pounds in 1947 to 225 million pounds or more in 1955. Vinyl and urethane foams are expected to surpass even this remarkable growth curve during the next few years, the chemical weekly says. One estimate places total foam production at half a billion pounds a year by 1960, at least 40 per cent of it shared by the vinyls and urethanes.

The way foam markets will be split among the three leading contenders won't be clear for some time to come, and this article will attempt no forecast. Our objective here is to report on a segment of the vinyl foam industry, chemically blown foam.

BL-353 blowing agent, a product of Du Pont's Explosives Dept., has several advantages in the manufacture of vinyl foams. Made from N,N'-dimethyl-N,N'-dinitroso terephthalamide, it is the only available chemical blowing agent that releases nitrogen at a temperature below that at which the vinyl resin and plasticizer fuse. The effect of this is to make possible the manufacture of open-cell foams about one-third as dense as vinyl foams made with competing chemical blowing agents. Low-density foams are important for reasons of economy and in applications

1. This block of vinyl sponge was blown at atmospheric pressure by Crest Chemical Industries Corp., N.Y.
2. Thin sheet sliced from block is heat-sealable, can be sandwiched between fabrics to give quilted effect.
3. Pressure-molded vinyl foam has closed cells and will float. Blocks of material make life jacket buoyant.
4. Linen Thread Co., Inc., Paterson, N.J., made foam for fish net floats, experimental life jacket above.
5. Heat insulating qualities of vinyl foam are put to work by U.S. Rubber in this solenoid valve shield.
6. Vinyl foam is used by Sheller Mfg. Corp. in arm-rests for cars. Cell uniformity is important here.
7. More rigid foam has been made for shoe soles by a newcomer in the field, Foam King, Inc., Bronx, N.Y.

where weight is critical. In addition, BL-353 leaves no objectionable odor and does not discolor the foam.

Perhaps the biggest technical advantage of chemical blowing with BL-353 from the foam producer's viewpoint is the close control it gives him of cell size and density, whether he makes his product in open molds or in closed molds under pressure. As competition in the field steps up, this control of the foam's physical properties is likely to become more important.

SMALL PRODUCERS IN FIELD

A nominal investment in equipment, especially for foam production at atmospheric pressure, is another plus for the chemical method of blowing vinyl. This accounts for the fact that relatively small concerns are beginning to show up on the roster of foam producers.

Blowing foam chemically is quite a bit like making a cake. The plastisol, a mixture of vinyl resin, plasticizer and other chemicals, corresponds to the flour, milk, eggs, sugar and shortening. A chemical blowing agent acts as the baking powder, except that it generates nitrogen instead of carbon dioxide. As the mix is heated, the gas is released. The cake of plastic foam rises and is cured in its puffed-up form.

The excellent cell uniformity of chemically blown foam is important in many applications. Crest Chemical Industries Corp., of Brooklyn, for example, sells its foam to makers of padded vinyl belts and handbags, quilted slippers and so on, in the form of sheet up to an inch or more in thickness. The sheet is sliced—like cheese—from a larger slab of foam. Crest's customers take advantage of the thermoplasticity of vinyl by heat-sealing the sheet stock between layers of vinyl film or rayon satin to give their products body. Irregular and oversized cells would show up

as holes in the sheet, presenting obvious problems to the user.

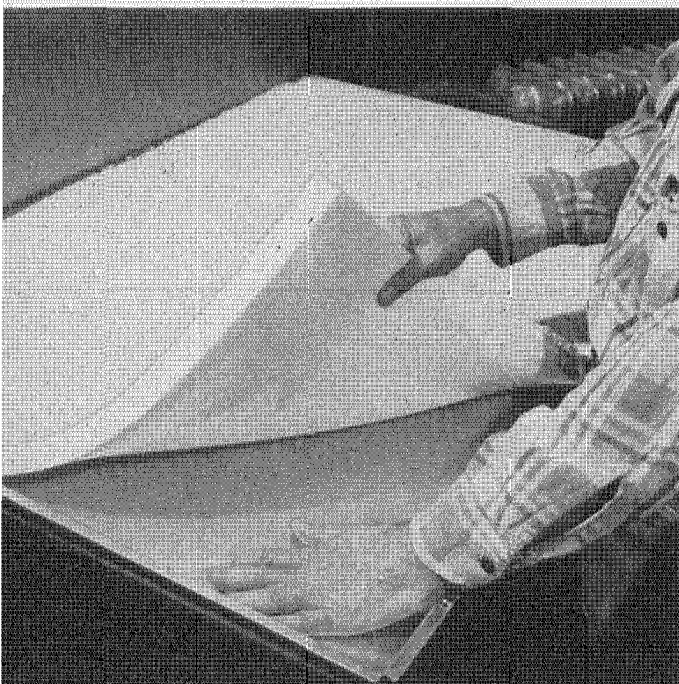
Another low-density sheet foam made by Foam King, Inc., of New York City, is being promoted as an interlining in shoes, among other end uses. The interlining is open-cell foam—that is, the cells are interconnected. Foam King also offers closed-cell foam in a wide range of densities. One grade has been introduced as an improved shoe sole material. Both open- and closed-cell types are blown with BL-353 at atmospheric pressure, Foam King reports.

Closed-cell vinyl foam also can be pressure-molded with the Du Pont chemical. Vinyl net floats, one end product in this category made by Linen Thread Co., Inc., of Paterson, N. J., are said to be a decided improvement on traditional cork floats for fish nets. More durable than cork and less susceptible to waterlogging, the vinyl floats also weigh about half as much. Since a big purse seine has as many as 3,500 floats, the weight saving is impressive. Menhaden fishermen off the East Coast, Linen Thread reports, are able to handle their nets at least 25 per cent faster since vinyl floats were adopted.

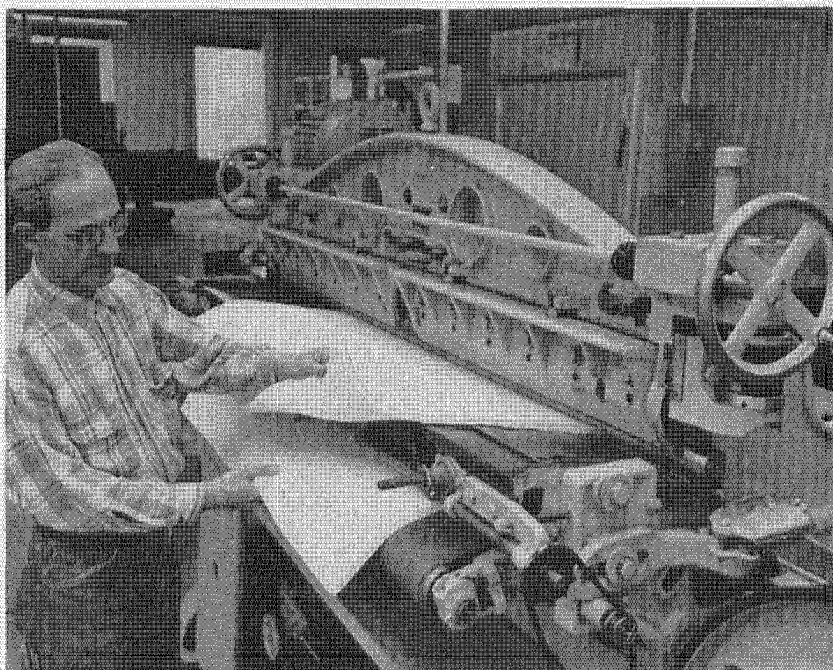
Foam producers are optimistic about the future growth of vinyl foam in the marine field. They have their eye on ring buoys, boat fenders, boat cushions and other products where the buoyancy, durability and fire resistance of closed-cell vinyl give it an edge.

In addition to the end uses we've mentioned, vinyl foam producers are competing for a share of the market for instrument panel padding in safety-conscious Detroit. Their products also are going into seat cushions, automobile armrests and sun visors, padding for athletic equipment, gasketing, aircraft insulation, toys, insulated footwear and bath mats.

Some authorities believe a rigid foam of low-density, closed-cell vinyl would make an ideal floor covering material or even load-bearing structural members for aircraft and buildings. Other hot prospective uses for vinyl foams: backing for upholstery fabrics, insulated clothing, decorative wall coverings, valve floats and various novelty items.



Making foam chemically is like baking a cake. Plastisol containing chemical blowing agent is poured into pan and popped into oven. Here finished foam is taken from pan.



If sheet is desired, block of foam is sliced. Big attraction of chemical blowing method; modest investment required to get into the business.

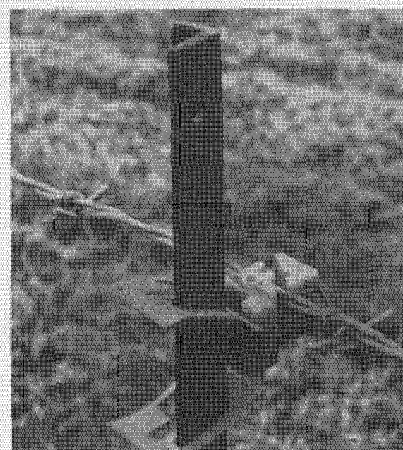
AGRICULTURALLY SPEAKING

Looking for a way to boost yields on second and third hay cuttings? One good bet is to stop leafhoppers with "Marlate" 2-MR insecticide. The crop is safe to cut or graze a week after spraying. More important, it may have up to 25 per cent more protein and twice the Vitamin A content of 'hopper-damaged alfalfa. Applied early in the spring, "Marlate" controls spittlebugs, too.

Application of "Karmex" W herbicide in vineyards this past spring is currently paying off in desired control of many seedling annual weeds, such as crabgrass, foxtail, pigweed and ragweed. This new use for "Karmex" was recommended following field trials in important grape producing areas. For weed control in potato fields, a single spray application of "Karmex" DW herbicide at planting time is proving effective for up to six weeks.

Painting metal roofs and metal siding white is an excellent way to keep livestock and stored crops cooler these hot summer days. The white surface provided by "Dulux" Tank White reflects the sun's rays instead of absorbing them, cutting down on temperatures underneath.

Extra attention to disease control is one of the main reasons why some tomato growers make money while others only break even, a recent study shows. Yet even the best spray and dust programs represented only about seven per cent of production costs. Growers all over the country find that they can check anthracnose, blight and other diseases by spraying "Manzate" maneb fungicide within two weeks after the first tomatoes have set and every seven to ten days throughout the season. For supplemental nitrogen feeding, "NuGreen" fertilizer compound can be combined with "Manzate".



Hot summer sun is the worst enemy of hose used with insecticide and fertilizer sprayers. To avoid equipment failures during the busy season, farmers find it pays to use hose with a cover of weather-resistant neoprene synthetic rubber. Hose with neoprene tube as well as cover also is available for extra protection against various chemicals and oil emulsions that the farmer might use.

These fine looking calves are part of a herd of 700 purebred Herefords that got Du Pont phenothiazine for worm control. J. L. Lawrence, manager of Greene Pastures Farm, Elizabethtown, N. C., finds that low-level phenothiazine in feed gets young stock off to a good start. Older cattle are given boluses each spring and fall with an occasional therapeutic dose in feed pellets over several days. He reports that this method of worm control is both easy and economical.

Studies of how farmers can manage wildlife as an important and profitable addition to their regular crops will be carried on by Remington Arms Co., Inc., on a 2,970-acre tract of land near Chestertown, Md. Once owned by the late Glenn L. Martin, aircraft manufacturer, the property is one of the East's major sanctuaries for waterfowl and other game birds. Remington will actively farm the tillable soil and maintain cattle and dairy herds in addition to conducting the wildlife management study and demonstration center.

Electric fence wires can be easily snapped into place in this resilient insulator molded from "Alathon" polyethylene resin. The insulators, which the maker says won't corrode, crack or leak current, are adaptable to seven types of posts. They are available from North Central Plastics, Inc., Ellendale, Minn.

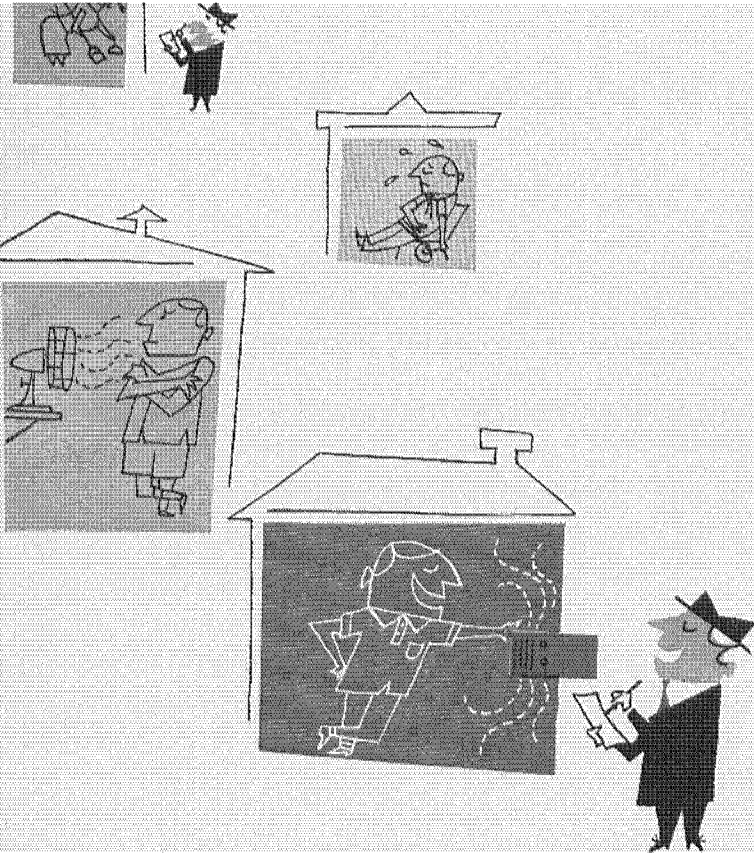


Du Pont surveyed the field

Although only about four households out of 100 currently have room air conditioners, another half-dozen families among each 100 nonowners have definite inten-



Figuring that seeing is believing, many coaches now are backing up their training with motion pictures that give athletes a chance to watch themselves in action.



keeping cool

By EMILY HEINE

tions of buying, a recent Du Pont study shows. What's more, three out of five nonowners questioned say they have wished for air conditioning at one time or another.

The study, based on personal interviews with 13,441 householders in cities and towns, was sponsored by Du Pont's "Kinetic" Chemicals Division, which supplies the "Freon" refrigerants used in most refrigerated cooling systems. The report is part of a continuing program to supply the air conditioning industry with facts about consumers and their attitudes toward air conditioning.

Movies are taken of actual games and practice sessions, and then analyzed by coach and team.

Kenneth G. Bills, supervisor of athletics and head football coach for the Danville, Pa., school system, thinks that better players are bound to result. "If I had to choose between the loss of movies or an assistant coach," he says, "the assistant coach would just have to go!"

ACTION CAN BE RELIVED

Movies are shown to clubs and alumni, but their most important use is in player-performance studies. Since the processed film is returned quickly, each play can be analyzed while it's fresh in mind. At the time of action,

Projected to a national scale, the statistics mean that late in 1955 about 1,720,000 families owned room air conditioners. The total number of units in homes was put at roughly 2,064,000.

Although they are few percentagewise, the people who own room air conditioners are enthusiastic boosters of them. A sturdy 83.5 per cent express complete satisfaction with their units. The chief reason, they say, is that air conditioning makes daytime living cooler in hot weather. Better sleeping conditions are the second most often named advantage. Such benefits as freedom from humidity and dust, greater work efficiency and increased enjoyment of family life, however, also are mentioned repeatedly. These last points are in line with the trend toward installation of the unit in the living room rather than the bedroom.

HEALTH BIG FACTOR IN DECISION

A desire to improve the living comfort of individuals with hay fever, asthma, heart or sinus trouble looms large in the decision to buy a room air conditioner. Twenty-eight per cent of the owners report being influenced to some degree by such health considerations.

Logically enough, practically all buying of air conditioners takes place during the summer. The typical room air conditioner prospect apparently swelters at home until he can't stand it any longer. Then he rushes out, most often to an electrical appliance store, and seeks relief. Unlike buyers of other major household equipment, he isn't likely to shop around. Three times out of four, the survey shows, he buys in the first store where he looks at air conditioners.

As might be expected, room air conditioners are concentrated chiefly among families who own their homes. Geographically, about half of the air-conditioner owners live in the South. But it's significant that 1955 sales skyrocketed 107 per cent over 1954 in the Central States and 96 per cent in the East. This change strongly suggests that home air conditioning is bridging the gap between luxury and necessity.

Measured by the yardstick of the Du Pont survey, prospects for sales of room air conditioners look hotter than a city apartment in July. Almost one in five of the present owners plans to buy an additional unit in the near future. Add this to the number of nonowners who definitely plan to buy, and you have an immediate potential market of 2,444,000—a total greater than the number of units installed in homes in the last ten years.

neither the coach nor his team can see and remember the full story. Runners bunched closely together, for example, create so much excitement that some action is bound to go unnoticed. Movies supply the missing details.

Du Pont makes two motion picture films widely used to record sporting action. Du Pont Rapid Reversal Motion Picture Film, Type 930, gives clear daytime pictures of such outdoor events as track meets and football games, even on overcast days. To film night football games and indoor events such as basketball games and track meets under existing light, High Speed Rapid Reversal, Type 931, is used. Sixty-eight laboratories, serving every section of the country, are equipped to process these Du Pont films.

AN ANTISKID COATING

Can the friction of kraft paper be increased economically without destroying the paper's smoothness? A formula based on Du Pont "Ludox" is doing just that for the newest in skid-resistant bags

By GORDON H. KESTER

Ever since machines replaced human brawn as the primary movers of packaged products, slippery paper bags have spelled trouble. An avalanche of bags from a loaded lift truck is an obvious safety hazard, and those that break



Antiskid coating based on "Ludox" leaves bag smooth for attractiveness, cleanliness.

FOR BAGS

open in the fall represent a money loss, too. The problem has been eased by multiwall bags with rough kraft or creped exteriors, but rough paper brings new woes in the form of poor printability and a tendency to pick up dirt. Certain coatings have boosted the bags' resistance to slipping, but their cost unfortunately has boosted customer resistance at the same time.

To the rescue comes St. Regis Paper Co. with a new, economical "frictionizing" treatment for bag paper. The company's "Lustergrip" coating, announced a few weeks ago, gives smooth kraft paper approximately the same degree of slip-resistance as rough kraft printed with so-called nonskid inks. Smooth kraft stays cleaner and prints better than rough, says St. Regis, insuring a more attractive package. As for cost, multiwall bags with "Lustergrip" are currently carrying a markup only about one-fifth that of an elastomer-coated St. Regis bag that the company says is not significantly more skid-resistant.

ACTS LIKE SANDPAPER

Du Pont "Ludox" colloidal silica, the same product that adds the antiskid property to safety floor waxes, is the source of added friction in the new St. Regis coating. The submicroscopic spheres of silica, so small that they don't mar the apparent smoothness of the kraft paper, nevertheless act like ultra-fine sandpaper to increase surface friction.

Mixed with a filler, "Ludox" is applied to the front and back of finished multiwall bags at St. Regis plants. The coating is rolled on, reports Gardiner Lane, director of product development for the company, without slowing bag production or requiring a big investment in equipment.

"Just as important as the slip-resistance we get with 'Lustergrip' is improved appearance," Lane pointed out. "People are more concerned than ever today with the looks of their product package—even when the package contains an industrial product. We get a beautiful printing job on smooth kraft, and this new coating protects ink

from smearing when the bags rub against each other."

To illustrate the last point, Lane reached for a printed bag coated with "Lustergrip" and pulled a \$5 bill from his pocket. He rubbed both vigorously on a sheet of white paper. The bag left the paper unmarked, but the money left a green smear.

Although the new bags have been on sale only a short time, initial reaction has been good, the St. Regis official said. A plant food manufacturer, who figures his packages must be printed gaily to attract the eye of the retail shopper, is pleased with the improved appearance and is dropping the rough kraft used previously. Two plastic resin manufacturers, Lane added, have shown interest because the smooth bags stay cleaner, lessening the chance of process contamination when bags are emptied into hoppers in customers' plants. Feed and flour manufacturers are other prime prospects for "Lustergrip".

DIRECT ROUTE TO MARKET

Lane said he considers the development of "Lustergrip" a classic of its kind. Unlike many industrial developments that suffer detours on the road to market, this one moved from conception to maturity in less than two years.

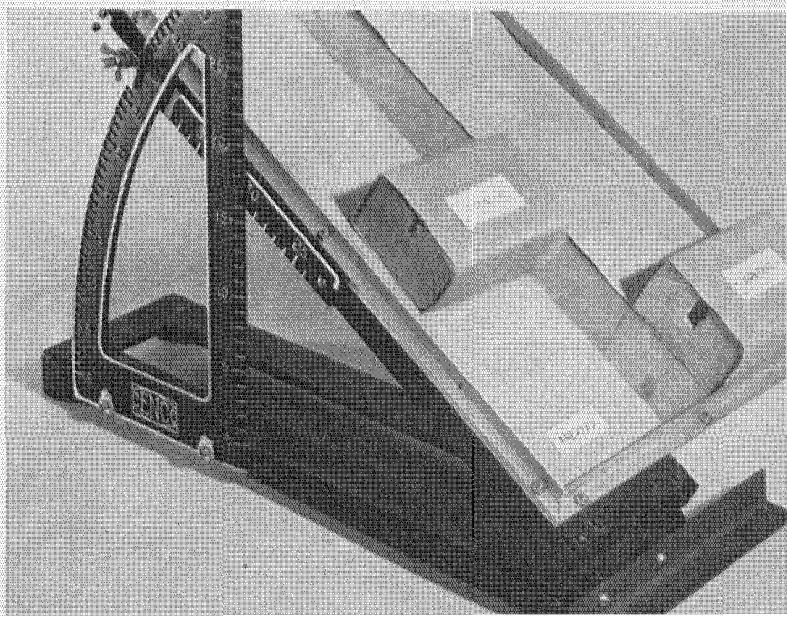
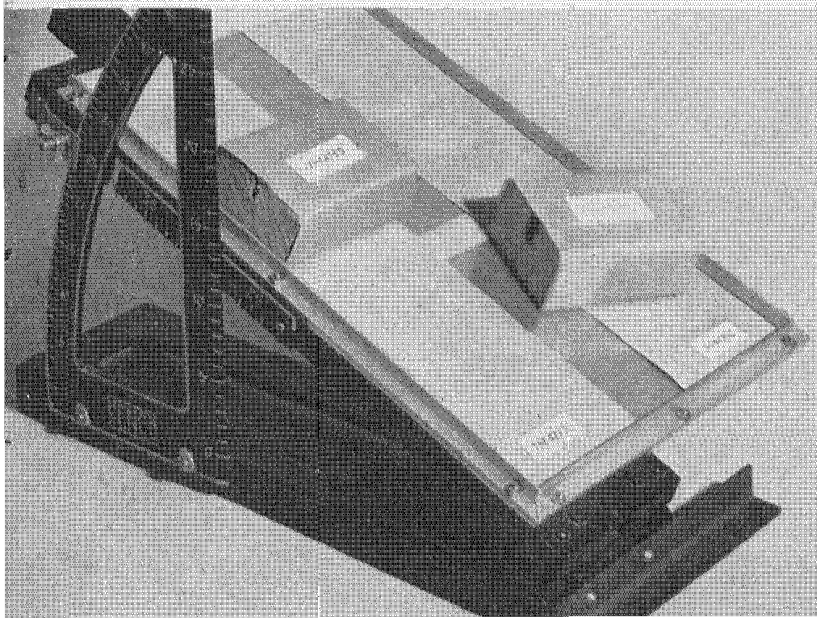
The idea was born in December, 1954, when St. Regis officials attended one of a series of Du Pont-sponsored meetings aimed at introducing new chemicals of interest to the paper industry. "Ludox" was one of the products, and Lane still has the notes he took that day—"improves adhesion and slip-resistance of paper surface."

At St. Regis' request, two Du Pont technical men journeyed to the St. Regis multiwall bag factory at Pensacola to help with experiments. "Ludox" alone didn't do the trick, Lane said. The present "Lustergrip" coating was worked out by St. Regis chemists in subsequent months.

"We also worked closely with Du Pont in introducing the idea of sewing multiwall bags with 'Super Cordura' high tenacity rayon yarn," Lane recalled. "We believe this new development is one that will prove just as satisfactory from the point of view of both makers and users of multiwall bags."

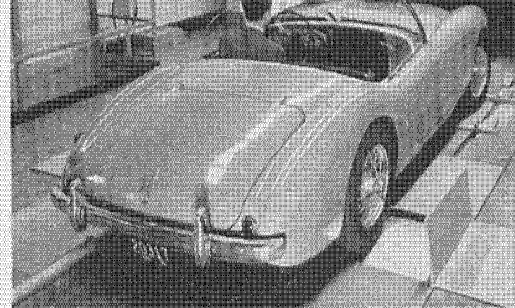
In addition to the grade of "Ludox" used by St. Regis in its new antiskid coating, Du Pont is now marketing two others. Together the three grades meet a demand for colloidal silica of differing chemical characteristics and particle size for a wide variety of industrial uses.

In picture at left, block wrapped with ordinary kraft paper begins to slide at angle of 28 degrees. At right, with plane inclined at 37 degrees, paper coated with "Ludox" begins its descent.

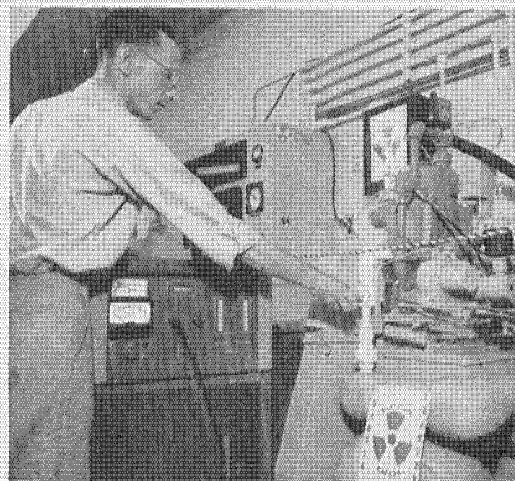




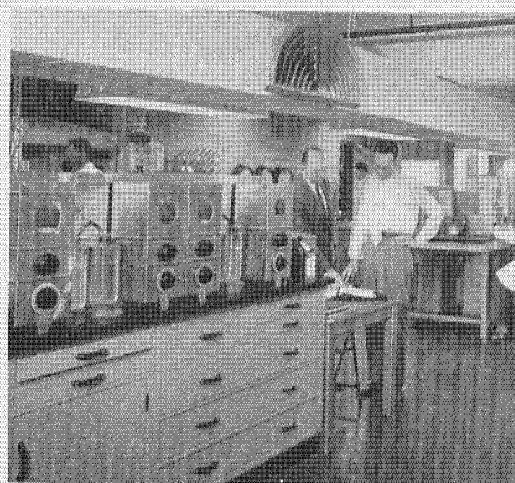
Du Pont test-car fleet nears its New Jersey home base. Company's research program is closely tied to developments in autos and in automotive fuels.



Fully equipped chassis dynamometer broad scope of the research into such troublesome problems as deposits in combustion chamber.



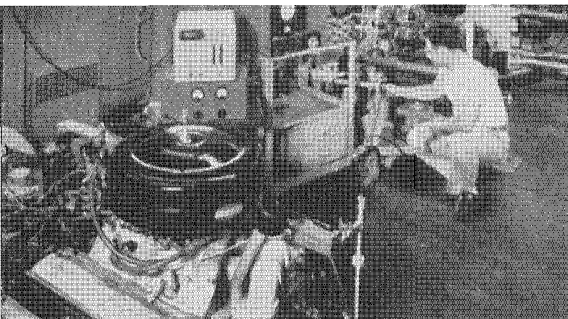
The piston ring in this engine is radioactive. By checking radioactivity of lubricating oil, scientists will learn more about engine wear.



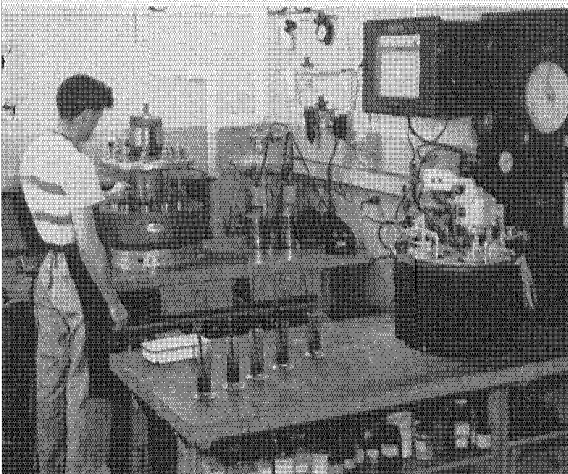
Petroleum Chemicals Div. has 5 well-equipped regional laboratories, such as this one in Tulsa, to help customers on routine problems.

In the beginning

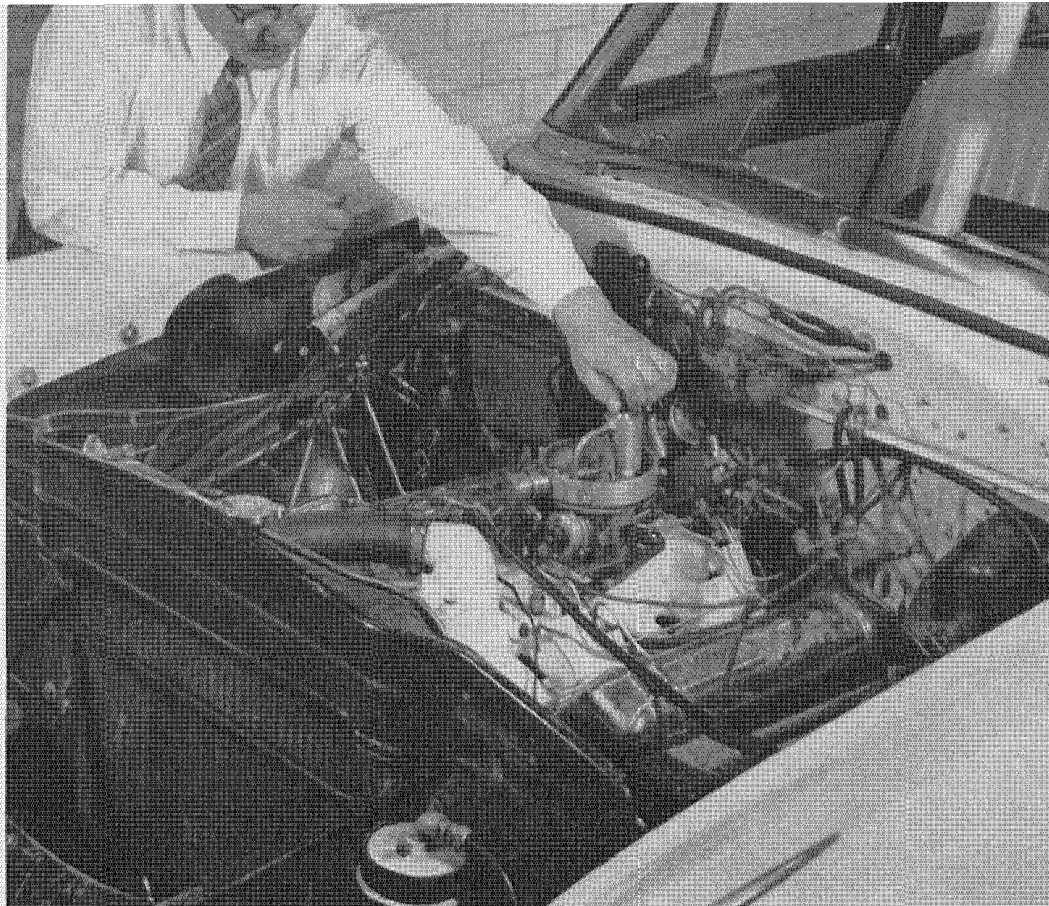
*Backing up the petroleum industry
with motor fuels and lubricants*



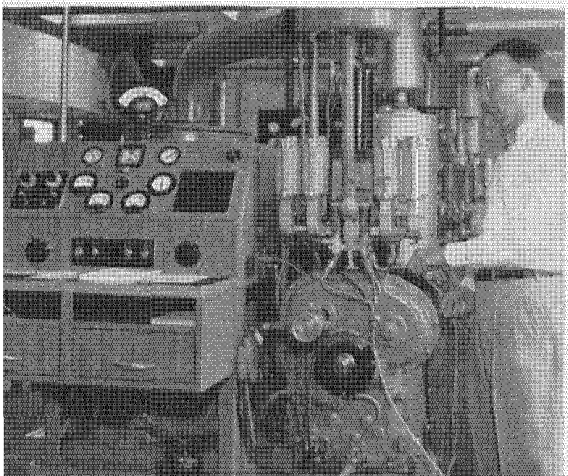
Here, Petroleum Laboratory's multicylinder engines test fuels containing new additives designed to make your car more efficient.



Another important phase of petroleum chemicals research is directed at improving the quality of lubricating oils and greases.



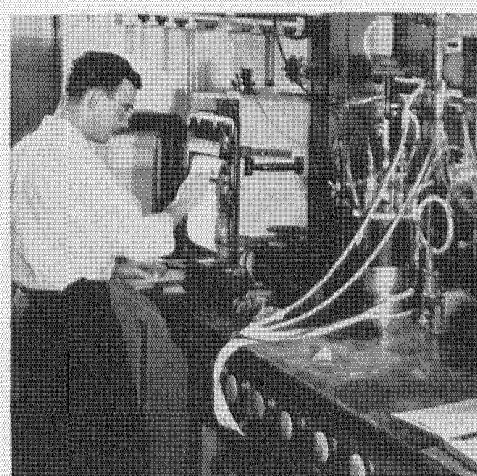
Instead of being fed by a carburetor, fuel is metered into this engine by injection. Fuel injection is being studied to determine its practicality under actual driving conditions. New fuels and new Du Pont additives may be needed if method succeeds.



Regional laboratories, too, have single cylinder engines to assist in study of fuel problems that arise in the areas they serve.



When Petroleum Lab works on fuel dyes, the specialists in Company's Tech Lab lend aid and counsel. Here dye strength is checked.



Diverse labs and specialists assist Du Pont petroleum chemicals research. Example: this organic chemicals group.

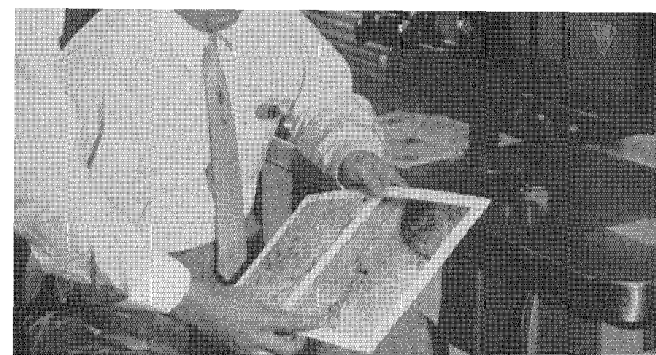
RESEARCH

insistence on high performance from the weight of Du Pont research

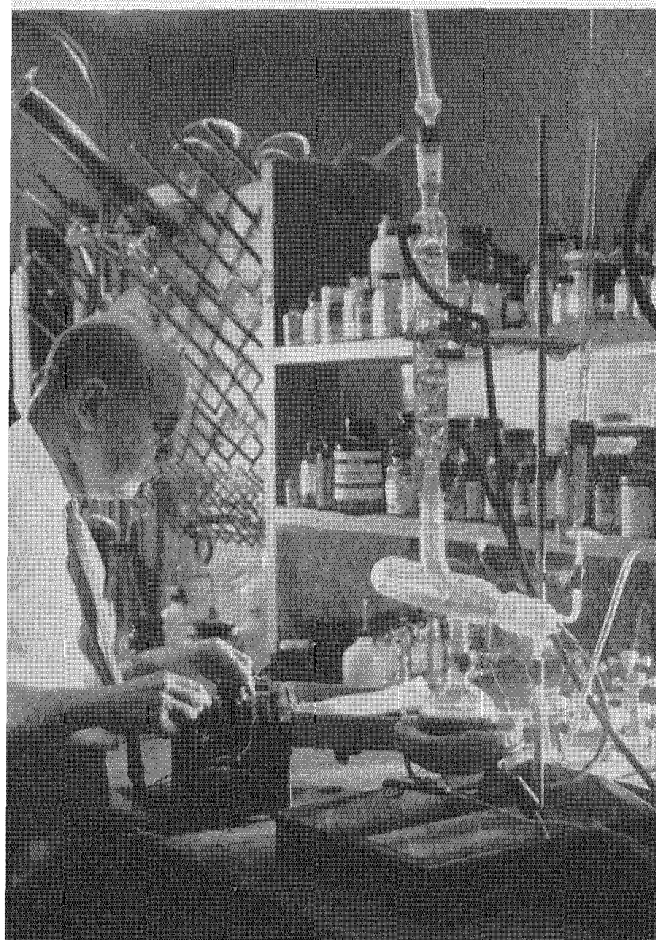
By JAMES H. McCORMICK

After 15 years at Du Pont, including a stint in a lab, you get mighty used to research. It's logical that this should happen, for the Company's extensive research program is one of its best known features. Even so, when summing up the personnel and facilities at the disposal of just one Company research unit, that of the Petroleum Chemicals Division, I was amazed by the size and scope of the effort.

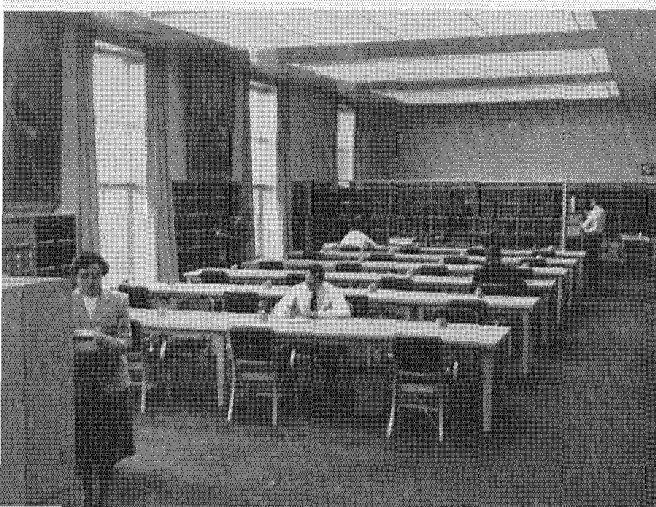
Important products made by this Division include tetraethyl lead and other fuel, lube oil and grease additives. Some 350 persons are on the laboratory team



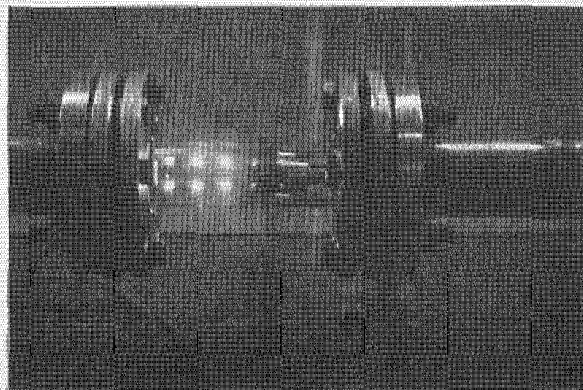
Representative of the researchers with specialized technical skills available at Du Pont to work on petroleum chemicals projects are two metallurgists above, shown examining photomicrographs of metal failures.



In yet another area, research chemists conduct fundamental studies to learn such things as the volatility characteristics of engine fuels of many varied types. Eventual goal: development of better fuel additives.



Company libraries are equipped to serve researchers. For example, they contain some 200,000 patents and more than 700 current technical publications and trade journals, as well as thousands of copies of technical books.



A new phase of Petroleum Chemicals Laboratory research is in realm of jet fuels. This jet burner shows effects of different fuel additives. For instance, does a given additive cause smoke or clog nozzles?

working on problems directly related to products for the petroleum industry.

A sizable number are concerned with improving the process for manufacturing tetraethyl lead—work that already has resulted in a new continuous process. Another group conducts fundamental research to find even better fuel additives, and men with an eye to the future probe the mysteries of combustion and lubrication for the engines of tomorrow. Other projects include fundamental studies of jet fuel combustion and lube oil additives. Studies of engine deposits, preignition, spark plug fouling, valve burning and octane requirements also are carried out. Applied research is conducted on anti-knock compounds, scavengers, anti-preignition additives, fuel stabilizers, fuel oil stabilizers, diesel and jet fuel additives, gasoline antioxidants, fuel dyes, metal deactivators, and additives such as inhibitors, detergents and compounds to improve the viscosity index of lube oils.

TRAINED MEN BACKBONE OF RESEARCH

The greatest strength of this research effort lies not in excellent facilities nor the wide scope of the research work but in the men conducting the program. The variety of graduate and undergraduate degrees they hold is one measure of this. Another is the tremendous range of specialization. Not only are there men experienced in problems of petroleum chemistry but there are metallurgists, mechanical engineers, physicists and electronic specialists. Research authorities throughout the Company are available for consultation on such subjects as dyes, detergents, polymers and a dozen unrelated fields covered by Du Pont's diversified chemical interests.

Only a research-minded company could field such a team. Since its founding 150-odd years ago, Du Pont has considered research essential to progress and steady growth. Today more than 5,000 technical graduates and an even greater number of assistants and technicians are engaged in research at the Company's more than 60 research and development laboratories. The Petroleum Laboratory is an important link in this chain of activity, serving the interests of the petroleum industry and its customers, the American public.



RIDERS IN THE SKY

*A curious blend of bus, train and airplane,
the monorail soars overhead on nylon cord tires*

Imagine riding to work in a coach 30 feet above the street, reading the morning paper in soundproof, air-conditioned comfort. You fly along at better than 50 miles an hour, far above the snarl of traffic, and arrive at the office relaxed and ready for work.

If Monorail, Inc., of Houston has its way, millions of commuters may be whisked into metropolitan centers in cars like the one described above. According to Monorail, transit authorities are looking at this modern flying carpet as a possible way of solving their cities' traffic ills.

To sell its idea, Monorail recently unveiled a 970-foot pilot line in Houston complete with a demonstration monorail coach. The streamlined car seats 60 people and has standing room for almost that many more. Recorded music plays softly while passengers recline in molded plastic chairs. Those who have tried it say the trip is as smooth and quiet as a ride in an elevator.

DOWN TO LOAD, THEN UP AGAIN

The car is suspended from a single rail which is held aloft by towers shaped like an inverted J. The rail dips close to the ground at stations to permit ground-level loading, then soars upward again. The car has been operated at 50 miles an hour, but the manufacturers say that in actual service it could operate at twice that speed.

The suspended monorail is not new. An all-steel system has been operating in Wuppertal, Germany, since 1903. But the German monorail is outdated, and runs at approximately 25 miles an hour.

To compete with other American transportation, the Houston builders of the monorail had to offer speed, com-

fort and safety. They realized these objectives with an overhead system of pneumatic rubber tires on which the suspended car rides quietly and safely.

Since space was limited, the designers called for tires with a maximum load-bearing capacity. What they got were 28 tires constructed with Du Pont nylon cord. The extra strength of nylon makes possible the packing of additional load-bearing capacity into a thin tire carcass.

Eight of the tires are 8.25 - 15 nylon cord trailer tires. These carry the weight of the coach and provide traction. Twenty additional 4.00 - 8 nylon tires ride horizontally against a vertical fin on the overhead rail to prevent the coach from swaying.

Besides the comfort, quiet and safety of the ride, says Murel Goodell, president of Monorail, the system is economical. He estimates basic construction cost at about \$500,000 a mile, and says this is cheaper than building a freeway, a railroad line or a subway.

So the next time you hear a whoosh overhead in your town, it may be neither a bird nor a jet plane. It could be a monorail coach.

What's New

• **NEW "LUSANE" Blue B dye**, developed by Du Pont for cotton and rayon fabrics, is fixed within rather than on the surface of the fiber and is both brilliant and fast.

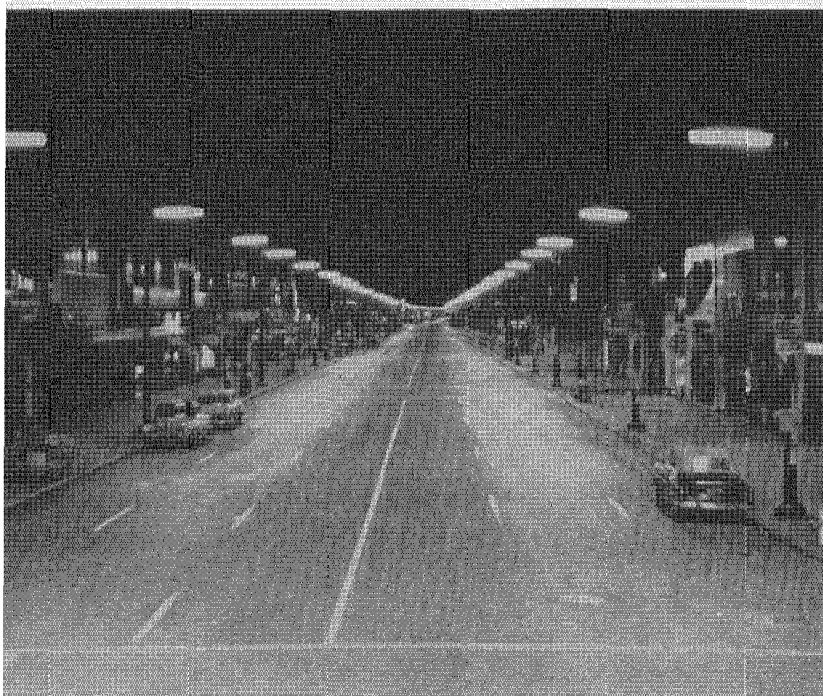
• **FISHERMEN** can get the latest information on "Tynex" nylon monofilament for spinning lines and leaders from a new booklet, available from Du Pont's Polychemicals Dept., Room TY-B, Wilmington 98, Del.

• **"ODOR ACTION"** fish lure, an aerosol, can be sprayed on bait, flies or plugs. A product of Robert J. Kerr Chemicals, Inc., P. O. Box 89, Park Ridge, Ill., the lure comes in five scents. It is dispensed with "Freon" propellant.

• **ASTHMA SUFFERERS** can easily administer orally a measured dosage of medication with "Medihaler" aerosol medication dispenser, a product of Riker Laboratories, Inc., 8480 Beverly Blvd., Los Angeles, Calif. It consists of a breathing tube and a small, replaceable vial of medicine, dispensed by Du Pont "Freon" propellant.

• **SODIUM CYANIDE** from Du Pont now is available to the electroplating industry in one-ounce, pillow-shaped briquettes. "Cyanobrik" sodium cyanide features extremely low sulfide content, and is recommended particularly for use in sulfide-sensitive electrolytes.

• **"SX" PAN PHOTOGRAPHIC FILM**, available from Du Pont's Photo Products Dept., is designed for volume users, such as industrial and school photographers, who need high speed and custom quality even under adverse lighting conditions.



• **NEW FLUORESCENT LIGHTS** on Cleveland, Ohio's Euclid Ave. achieve better distribution of light through troughs made from "Lucite" acrylic resin and are less expensive to operate than the former incandescent fixtures.

• **SIAM, A NEW PATTERN** in "Fabrillite" vinyl material for upholstery, has a unique silken appearance due to a new color finishing technique. The colors have outstanding fade resistance and the material stays clean with a minimum of care.

• **COLOR-SEALED BLACK NYLON** yarn is now available from Du Pont. The color is added during production of the yarn, insuring fastness that will withstand strong sunlight and repeated washings. The new type of yarn is expected to find use in upholstery and clothing fabrics.



• **FOUL WEATHER CLOTHES** and industrial protective garments of "Aldair" micro-porous neoprene-coated fabric allow water vapor from wearer's body to escape. Neoprene also resists oil and grease, weathering and chemical attack. Fabrics are available from Aldan Rubber Co., Tioga and Salmon, Philadelphia, Pa.

• **METAL CLEANING** by vapor degreasing with Du Pont "Triclene" D trichlorethylene is explained in a new publication available from Du Pont's Electrochemicals Dept., Du Pont 3090, Wilmington 98, Del.

• **THREAD OF DU PONT NYLON** manufactured especially for shoe sole repair work is now available from Heminway & Bartlett Mfg. Co., 500 Fifth Ave., New York 36, N. Y.

• **CORRUGATED ALUMINUM OUTER JACKETING**, used for some years to cover insulated pipes, is now being made with an inner lamination of kraft paper and "Alathon" polyethylene resin. The "Alathon", which bonds the paper and aluminum, serves as a moisture barrier and permits the jacketing to be used in extremely wet conditions. "Al-Cor-Jac" corrugated aluminum jacketing is made by the Aljon Manufacturing Co., 54-18 43 St., Maspeth, N.Y.



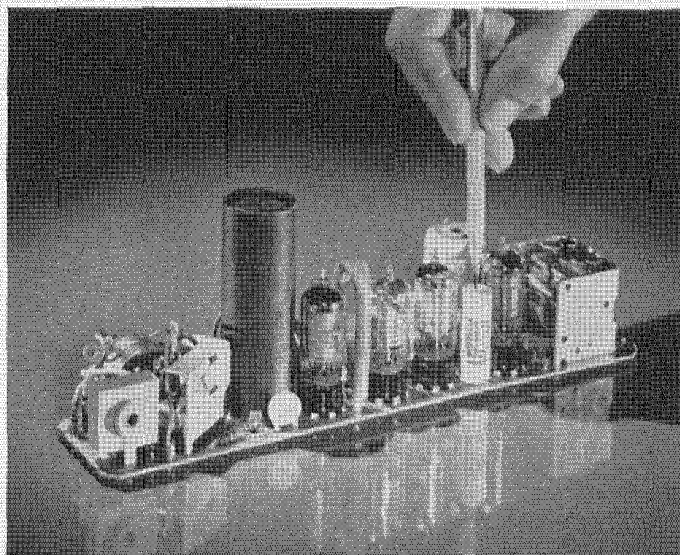
• **NEW AUTOLOADING SHOTGUN**, the Remington Arms Co., Inc., Sportsman-58, is gas operated to lessen recoil and make possible a fast handling gun weighing only about seven pounds. Barrels can be interchanged without adjustment, and the load control insures minimum recoil with all standard length shotgun shells.

• **NEW "PREPARAKOTE" PRIMER-SURFACER** dries in two to three hours as opposed to the four hours previously required. Recommended for over-all undercoating work by fleet painters, commercial body builders and passenger car refinishers, "Preparakote" comes in white, gray, light gray and oxide.



• **YOUNG MOUSEKETEERS** can have their pick from Du Pont's new Disneyland line, which includes Mickey Mouse Club combs and toothbrushes, the latter tipped with miniature Disneyland figures; Jiminy Cricket holders and toothbrushes; and a clubhouse containing brushes and a comb.

• **PERMACEL 69 TAPE**, which has a cloth backing and a coating of "Alathon" polyethylene resin, is widely useful in industry because it is waterproof and resists chemicals. Available from Permacel Tape Corp., New Brunswick, N.J.



• **CAPACITORS INSULATED** with "Mylar" polyester film are being used in portable radios (above) because they are insensitive to moisture, perform well at high temperatures and take up less space. In television receivers, such capacitors withstand voltage stress during prolonged usage.

Tagged for quality

If the finished product you buy carries one of these symbols, you have the assurance that it contains Du Pont materials used according to recommendations

When the man next door bought a raincoat recently because of the small tag dangling from its sleeve, he joined several million consumers who annually use Du Pont quality tagging programs as a guide in making purchases.

The tag read: "Fabric treated with Du Pont 'Zelan' water repellent." Started in 1937, the program for "Zelan" is older than most, but otherwise typical of Du Pont tagging procedures.

Textile finishers who use "Zelan" submit samples to an independent organization, Better Fabrics Testing Bureau, for approval. Only fabrics that meet the Bureau's water repellency standards may carry Du Pont tags.

Such quality tagging programs, Du Pont believes, encourage better finished products, particularly in highly competitive fields, and give a sales advantage to the manufacturer as well as a buying tip to the consumer.

Manufacturers who agree to construct marquissette curtains of 70 denier "Dacron" polyester fiber with a finished count of at least 52 x 34 threads per inch are eligible to take part in the Du Pont labeling program. Extruders of "Lucite" acrylic resin must send samples to the Polychemicals Department's laboratory to be tested for uniform caliber and low shrinkage before they can use a Du Pont quality seal.

Whether they identify "Dulux" enamel, "Fabrilite" vinyl material or some other Du Pont product, the tags pictured here represent similar stories of quality.





Attractively painted trucks of Sites Silver Wheel Freightlines, Portland, Ore., are mobile ads for this regional hauling firm.



"Budweiser" beer is advertised on trucks like this. Painting plan was designed by Anheuser-Busch for use by its local wholesalers.

Billboards on wheels

Paint, used wisely, turns trucks into traveling ads

A clever girl chooses the shade of makeup that sets off her charms, puts it on carefully and steps out into the world, confident that she's her own best advertisement. Somewhat the same principle is applied by fleet owners who let their attractively painted trucks deliver a selling message for them. A striking design, used tastefully and uniformly on a fleet, may never compete with a pretty face, but it's an easy and effective way of letting the public know who you are and what you have to sell.

As a supplier of finishing materials to fleets and independent refinish shops from Tallahassee to Tacoma, Du Pont has helped many fleet owners choose billboard color schemes for their trucks. The toughness and lasting gloss of Du Pont "Dulux" enamel have helped keep these same rolling advertisements fit for the public eye.

Anheuser-Busch, Inc., one of the firms Du Pont has aided with such painting specifications, recently drew up a colorful design for the trucks that deliver "Budweiser" beer. The St. Louis brewer sends detailed painting instructions, stencils and decals to local beer wholesalers who paint and letter their delivery trucks uniformly for country-wide recognition.

"Painted in the new red and white color scheme, there's no doubt a truck is a calling card to the dealer and a traveling billboard to the consumer," Anheuser-Busch says.

A distinctive painting plan can advertise just as successfully for a local firm, Harold Postma of Grandville, Mich., believes. The entire 1956 advertising program of his H. F. Postma Gravel Co. is wrapped up in

the striped paint job he's using on his 50 trucks. All are finished with "Dulux" enamel.

Sites Silver Wheel Freightlines of Portland, Ore., unlike Anheuser-Busch and Postma, has no product to sell. But the 220 units of its imaginatively painted highway fleet are effective salesmen for the company's hauling services. A regular schedule of washing and refinishing with "Dulux" enamel keeps the transports' appearance up to snuff, adding appreciably to the company's prestige in the area it serves.

Two pointers from those who have been successful with the traveling billboard idea:

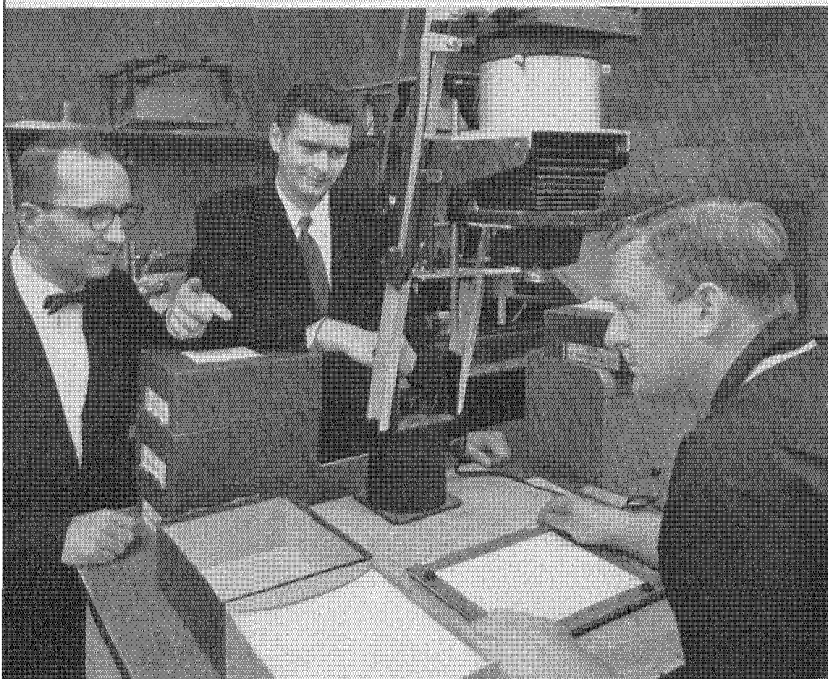
1. Make your design different, but keep it simple. It has to tell its story in a split second.
2. Specify quality finishes when you have the job done. They'll look better and cost you less in the long run.

Michigan gravel company used "Dulux" enamel on fleet of trucks. Whole 1956 ad budget was devoted to project.

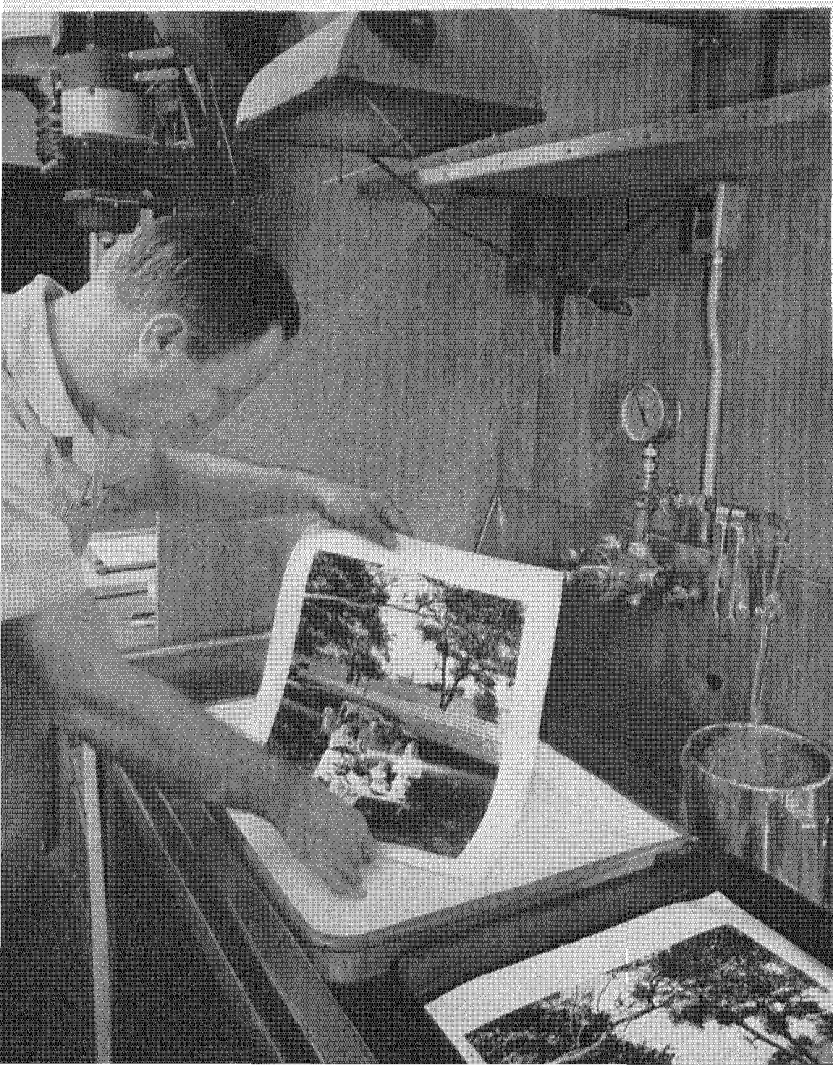


These Bluegrass boosters

... say it with photos, turned out by the thousand on Du Pont "Velour Black" photographic paper



Jim Warren, right, talks with the Du Pont Photo Products men who told him originally that "Velour Black" could help him fill orders faster.



It was early December. Most of the people in Frankfort, Ky., were getting ready for Christmas. Four Frankfort photographers, however, were thinking more about summer vacations. Busy making pictures for a new publicity program to illustrate Kentucky's tourist attractions, they had 25,000 photographs to print in only 20 days.

This might seem routine, even humdrum, to a studio with mass production facilities. But Jim Warren, senior photographer of Kentucky's publicity division, had no mass production facilities. He had only three colleagues—fellow photographers who doubled in the darkroom—two enlargers and two print driers.

Yet Jim and his staff were able to meet the deadline and spend Christmas with their families without sending out a single print they weren't proud of.

"Quantity printing with limited facilities," says Jim, "demands a photographic paper that has good speed, wide latitude, and is suited to fast, easy processing. We were able to fill that print order and others like it with the help of just such a paper—Du Pont 'Velour Black'."

Kentucky, like every other state, is keenly aware today of the importance of tourist dollars. In 1948, realizing that appropriate, well planned photographs could add punch to the state's story, the Kentucky Division of Publicity added a photographic section. The section serves the photographic needs of all state agencies, but more than 90 per cent of its work involves supplying publicity photos to newspapers, magazines, the American Automobile Association and the state Chamber of Commerce. More than 400 periodicals receive Kentucky's publicity kits every six months. Each kit contains editorial material on events and points of interest in the state and about 100 assorted 8 x 10-inch glossy photographs—scenics, news shots, pictures of buildings and pretty girls in bathing suits.

NEED FOR QUALITY PARAMOUNT

"Because our prints are intended for magazine and newspaper reproduction," says Jim Warren, "we need quality above all. A substandard printing job would jeopardize the success of our publicity effort."

"We aren't as experienced in processing as regular darkroom men, and we're bound to make mistakes. But the wide latitude of 'Velour Black' and its fine photographic and processing properties give us the leeway and the results we need."

To be ready for orders like the one that hit at Christmas time, Jim Warren and his associates order 100,000 sheets of "Velour Black" at a time. That way, no matter how great the pressure for speed, they can be sure they're giving the most favorable picture of the Bluegrass State to prospective visitors.

Warren and his three-man staff once made 25,000 prints in 20 days on the Du Pont paper without diluting quality.

FROM SINKS ...TO LINKS

*Du Pont finishes are engineered
for the job at hand*

The Toledo Desk & Fixture Co., makers of Beauty Queen vanities and lavatories, count on colorful and durable baked enamels to add salability to their products. Campbell Chain Co., on the other hand, wants a tough, fast-drying finish for color-coding its new "Measure-Mark" chain.

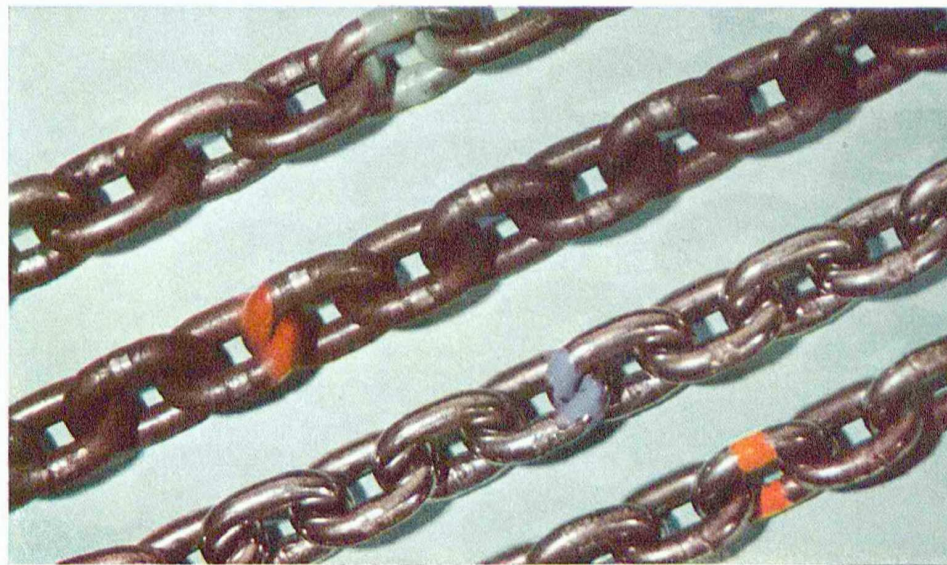
It's not unusual that these radically different requirements should have led both companies to Du Pont's Industrial Finishes division. Du Pont paint chemists, field service men and salesmen daily run the gamut from sinks to links.

Tailoring finishes to meet the special needs of industrial users is the job of this division. Ten laboratories and hundreds of technically trained employees see to it that the Du Pont finish supplied meets conditions imposed by the user. The criteria are economy in application and maximum resistance to failure in service.

Whether it's utility alone or beauty plus utility you're after in a finish, look to Du Pont for help in finding the answer.



Cabinet of Beauty Queen "Valette" vanity is finished with Du Pont baked enamel. Colors have been coordinated with those used by plumbing fixture manufacturers.



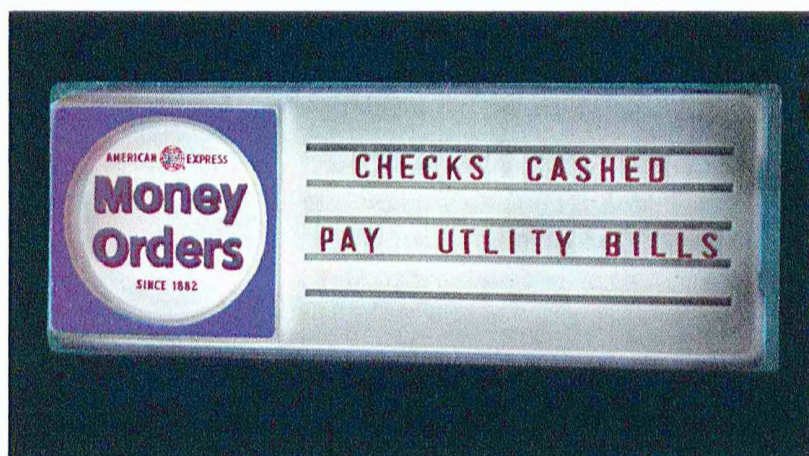
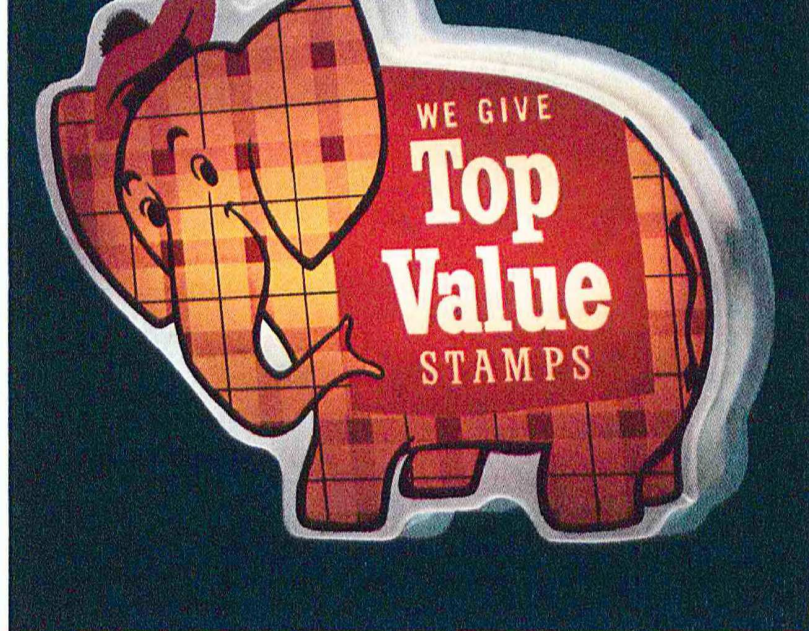
Campbell "Measure-Mark" chain is striped with Du Pont lacquer every five feet to make measuring easier. The colors identify four distinct grades of Campbell chain.

Du Pont Industrial Finishes

Chemically engineered to do the job better!



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



EYES LEFT, EYES RIGHT

...EYES ON SIGNS OF **LUCITE**[®]



Sign men are turning to sheet of extruded "Lucite" acrylic resin for easily formed, brightly colored, eye-catching signs.

They find they are getting years of advertising service from them, too. Signs made of "Lucite" are outstanding in durability. "Lucite" has high impact strength and resists weathering, cracking, chipping and crazing. The resin also is light in weight and can be colored easily.

For information on how you can put the advantages of Du Pont "Lucite" to work in your signs, write to E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Room 766 Du Pont Bldg., Wilmington 98, Del. (In Canada, Du Pont Company of Canada, Ltd., P. O. Box 660, DM-1, Montreal, P. Q.)



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

Watch "Du Pont Cavalcade Theater" on Television

This "Quality Controlled" label may be used only by qualified extruders of Du Pont "Lucite" acrylic resin. It assures the sign industry that the extruded material conforms to standards for low shrinkage and uniform caliper established by E. I. du Pont de Nemours & Co. (Inc.)

