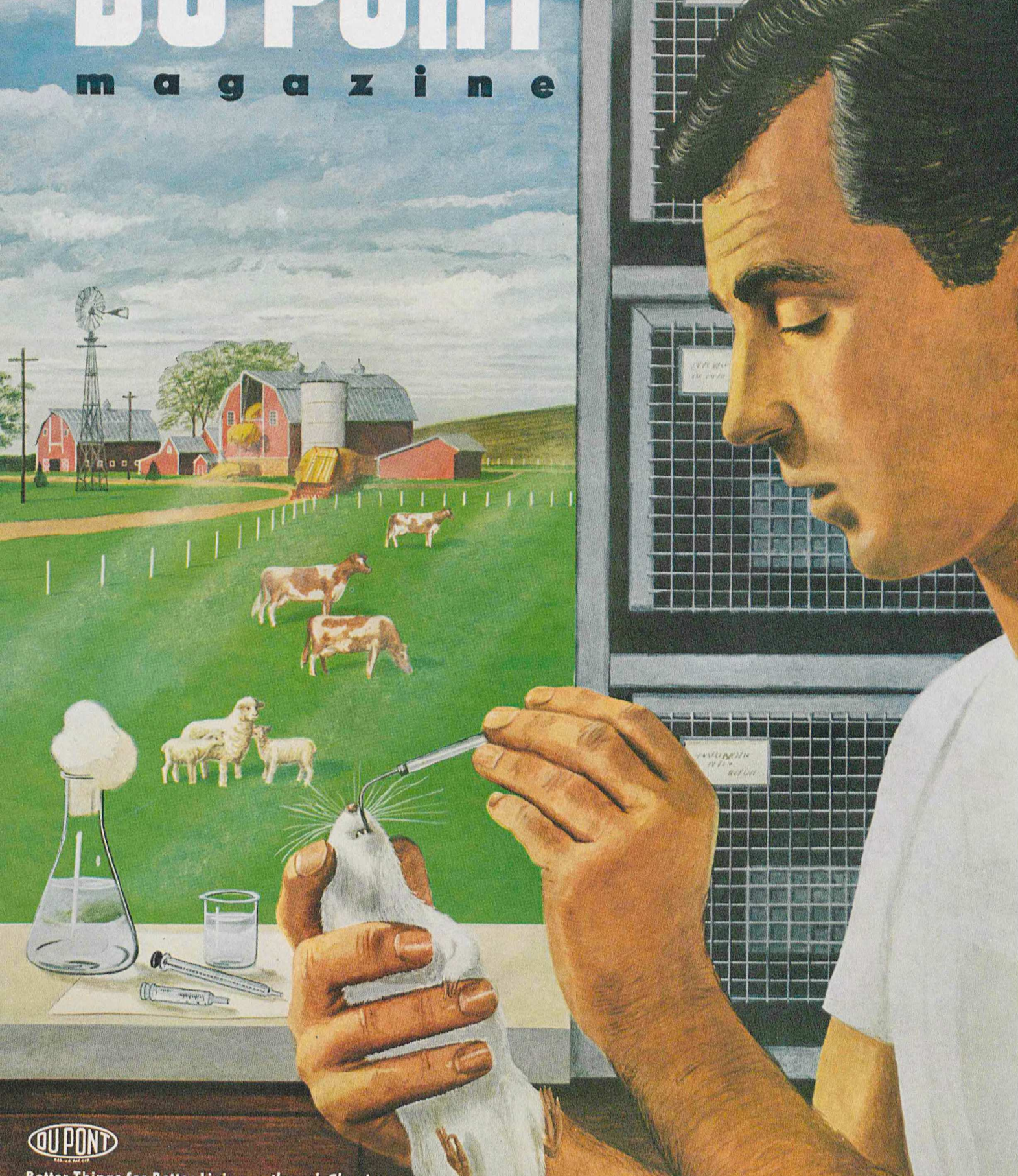


DU PONT

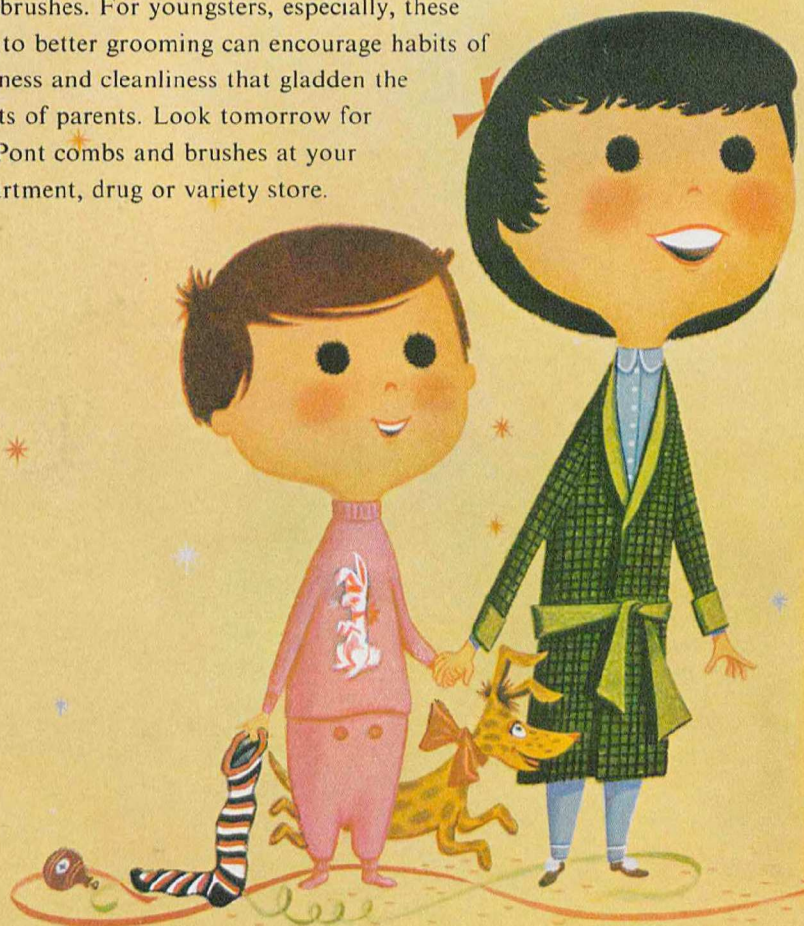
m a g a z i n e



Better Things for Better Living... through Chemistry

Those Extra Gifts,

on the whole, should be (a) edible; (b) outrageously impractical, or (c) useful. On the useful side are Du Pont nylon combs and brushes. For youngsters, especially, these aids to better grooming can encourage habits of neatness and cleanliness that gladden the hearts of parents. Look tomorrow for Du Pont combs and brushes at your department, drug or variety store.



*Du Pont Nylon
Combs & Brushes*

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING

... THROUGH CHEMISTRY

DU PONT MAGAZINE

Vol. 48 No. 6

JAMES H. McCORMICK, Editor

*Associate Editors, GORDON H. KESTER
MARY ELLEN EVANS*

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Battling hidden hunger

Du Pont's slogan, "Better Things for Better Living . . . *through Chemistry*," is perhaps nowhere better illustrated than in the Company's research on nutrition. Begun modestly more than 20 years ago, these basic studies into unknown factors of human and animal nourishment are today a major Company effort with vast potential for human good. This is the story of nutrition research, the last—and, in the editors' judgment, one of the most important—in a two-year series of lead articles on broad fields of scientific investigation at Du Pont.



Rat on left, fed exclusively on ordinary bread fortified with lysine, grew bigger, healthier than one at right fed on unfortified bread.

By GORDON H. KESTER

In a third-floor office of the Du Pont Building in Wilmington hangs a map of the world on which the areas of human undernourishment are shaded in pink. The shading casts an unhealthy flush over most of the Far East, Africa, the West Indies, Central and South America and parts of

Europe. In some of the areas actual hunger exists, while in the rest the hidden hunger of a low-protein diet leaves the inhabitants stunted in growth and prone to disease. Milder degrees of protein, vitamin and mineral deficiency are frequently observed even in more fortunate countries like the United States, according to physicians' reports.

The problem of raising these low nutritional levels is complicated by the fact that, while world population is free to rise, the supply of tillable land for crops and livestock is relatively fixed. In short, we face a continuing short supply of the food proteins so essential to life.



In one of many floor pens, young turkeys are fed fortified rations at Du Pont's Stine Laboratory, Newark, Del.

As a British nutritionist has put it: "It used to be said that every new baby born brought a pair of hands into the world, as well as a stomach to be fed. That is still true; but unfortunately it does not bring also a fresh acre of cultivatable soil. . . ."

Recent advances in nutritional research, however, throw a strong ray of hope on the problem. By learning more about the protein molecule, one of the most complicated in nature (the smallest is 13,000 times larger than a hydrogen atom), scientists are getting closer to the heart of the matter. They have begun to understand how the body uses food protein to build the protein present in muscle, bone and skin. For example, the protein molecule is known to be various combinations of simpler molecules called amino acids. Twenty-two of these amino acids have been identified, and ten or so of them have been tagged as essential because of their key role in our diets. A

shortage of any one of these essential amino acids in food protein lowers its nutritive value proportionately.

Meat, milk, eggs and fish, in general, contain protein with an adequate balance of these essential amino acids. The high quality protein from these animal sources builds vigorous bodies. But most vegetable proteins—those in wheat, rice and corn, for example—are short in some of the essential amino acids, and to the extent that this shortage exists are limited in their value as sources of protein for the body.

Making up amino acid shortages in order to upgrade low-quality protein foods is one way, then, of tackling the nutritional problem. This is the area in which Du Pont research and production are playing a part. At present, two essential amino acids, lysine and methionine, are being manufactured by the Company—lysine in a pilot plant at Niagara Falls and methionine in a new Texas plant—while research in and out of Du Pont laboratories continues on their use in the nutrition field.

... IT STEMMED FROM CORNCOB

Research on chemical reactions of the corncob chemical, furfural, led Du Pont Electrochemicals Dept. scientists to a practical route for the production of lysine. Development of the process was undertaken in 1945, and by 1947 samples were in the field for nutritional evaluation. Du Pont's lysine has now been christened "Darvyl" L-lysine monohydrochloride.

Osborne and Mendel had shown more than 30 years earlier that added lysine boosted the nutritional value of wheat protein, which contains too little lysine naturally for efficient use by the body. But would the added lysine be effective after the wheat flour was baked into a loaf of bread? Dr. Hans Rosenberg, at that time in the Organic Chemicals Dept. biological laboratory at New Brunswick, N. J., experimented with rats to find out. He observed that white rats fed exclusively on ordinary white bread fortified with a small amount of added lysine grew larger and were healthier than those fed on unfortified bread.

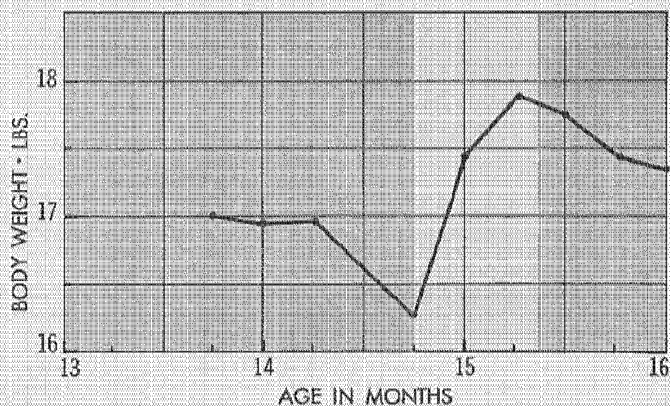
... IT BOOSTS BREAD PROTEIN VALUE

A practical result of this pioneer research project, and others like it, is that bakers will soon be offering, in a few localities, bread fortified with lysine for improved protein nutrition. It has been estimated that "Darvyl" added in the recommended percentage to dough boosts the protein value of the bread 70 to 100 per cent. Those who get an important fraction of their daily protein needs from bread and other cereal products—and this includes a large percentage of the people in the United States—will find in such bread an added source of high-quality protein.

In addition to making up the deficiency in natural lysine in cereal foods, raising the lysine level of the total diet appears to have other advantages, even when the diet is of good quality. Dr. Anthony A. Albanese of St. Luke's Convalescent Hospital, Greenwich, Conn., recipient of a Du Pont research grant in 1952, reported in September to the American Chemical Society on his findings. Lysine-fortified milk fed to 15 normal infants at St. Luke's increased the growth rate, the body's nitrogen retention, hemoglobin level and the per cent of protein in the blood plasma of two thirds of the group. Those who had previously been growing at less-than-average rates were benefited most by a lysine supplement.

"The possibility that lysine supplementation of cereal

Dr. Albanese weighs one of his young charges at St. Luke's. Of 15 babies, 11 showed improvement when "Darvyl" lysine was added to their formulas. Baby cereal, too, can be fortified.



Weight chart shows how one infant in Albanese study responded to the addition of one gram of lysine a day to its formula (yellow area). Appetite and weight improved.

foods, especially wheat products, would enhance their food value, has long been recognized . . . The reported findings now suggest that the nutritional value of many infant foods, including cow's milk, can be improved by small additions of lysine. This seemingly revolutionary idea arises from our newer knowledge of the specific amino acid needs of infants," Dr. Albanese's report says.

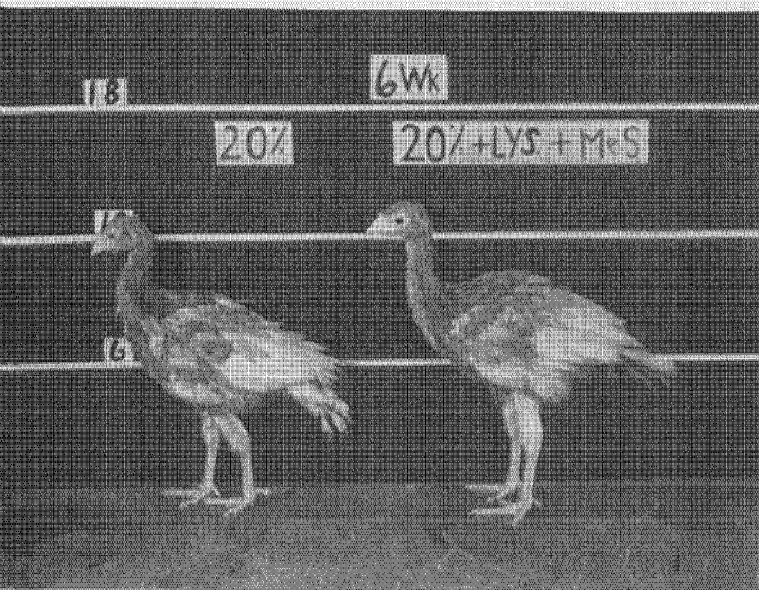
As a result of this work, lysine-fortified supplements for infant formulas are slated to be on the market this winter. They will be available on prescription. Children's cereals, too, are expected to be offered with lysine fortification. Availability of bread and cereal foods fortified with "Darvyl", as well as pharmaceutical products, will be restricted for some time, however. Facilities for making lysine are still limited.

STUDIES IN ITALY AND PERU

Meanwhile, grants have been made by the Company for further outside research on lysine-supplemented diets. Dr. Norman Jolliffe of the New York City Dept. of Health and Dr. Gino Frontali, director of the University of Rome's Pediatric Clinic, will conduct a joint study in Italy on the effects of fortifying such foods as bread and spaghetti with lysine. Dr. Frederick J. Stare of Harvard's School of Public Health is undertaking research of a similar nature here and in Peru.

Anthropologists offer a fascinating sidelight on this work. Their studies indicate that diet deficiencies rather than heredity are probably the reason for the small stature attained by many peoples. This new research may provide a more definitive answer to the question.

In addition to raising the protein value of human food,



Six-week-old turkeys: one on the right was fed ration with both methionine and lysine added.

amino acids are being used to bolster the human diet indirectly by improving the nutritive value of animal rations. "Darvyl", for example, may find a place in pig feed, if present research indications are borne out. Methionine, the other amino acid of immediate concern to Du Pont, is already established as a valuable additive for poultry feed.

Methionine research offers a good example of how a number of laboratories, working together and exchanging information, can speed the evaluation of a new product. While Du Pont has been conducting poultry feeding trials with added methionine for several years, universities and agricultural experiment stations have been doing similar

work with young chicks, and supplementation with both lysine and methionine appears to be called for. In experiments so far, a 22 per cent protein ration, with lysine and methionine added, has given about the same growth rate as a 28 per cent protein ration of unfortified feed.

It was through the hen house, incidentally, that Du Pont first entered the field of animal nutrition. "Cel-O-Glass" plastic coated wire mesh for chicken house windows, although it doesn't sound like it, was the Company's first nutrition product. "Cel-O-Glass" let the sun's ultraviolet rays shine on young chickens, providing Vitamin D for good bone growth and the prevention of rickets.

But the sun was an uncertain source of the essential vitamin. A source that could be relied on in every season and clime was needed. The answer was provided in part by Du Pont's Dr. James Waddell, who found that a substance present in the spinal cord of cattle and in shellfish could be irradiated with ultraviolet light and converted to Vitamin D for chicks. From this research came the first "Delsterol" "D"-activated animal sterol. With meat on the ration list during World War II, "Delsterol" made it possible for chicken growers to meet the challenge of increased production with healthy birds. New Jersey growers gave Du Pont a "Golden Egg" award after the war in appreciation of this work on "Delsterol".

NITROGEN FEED COMPOUND

While "Delsterol" was in the research hopper, university and state agricultural station experimenters were busy checking out another Du Pont product, "Two-Sixty-Two" feed compound. "Two-Sixty-Two" is essentially urea, a nitrogen-rich compound made by high-pressure synthesis. Nitrogen and oxygen from the air are captured in the process of making urea.

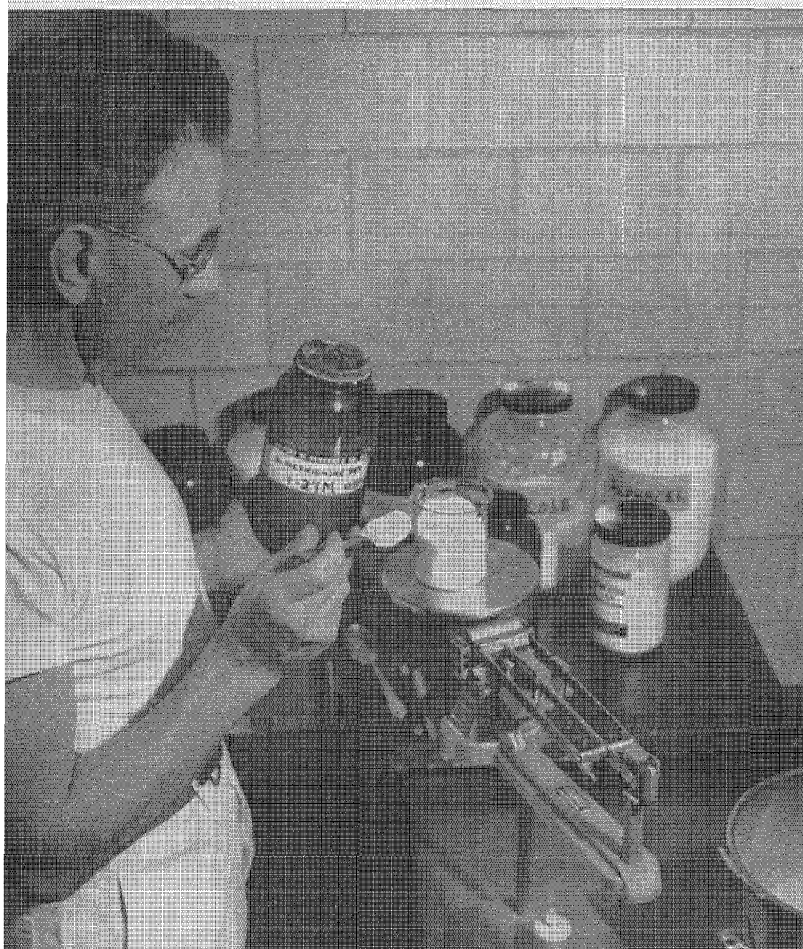
It happens that the cud-chewing animals, through a remarkable synthesis of their own, can convert this non-protein nitrogen to protein by combining it with other feed ingredients. Thus "Two-Sixty-Two" can supplement some of the protein-rich—and often scarce—vegetable oil-meals found in cattle rations. Again, as in the case of the amino acids, the effect is to make high-quality protein foods go further.

Today Du Pont's own research on nutrition is centered in a handful of yellow brick buildings, the Stine Laboratory of the Grasselli Chemicals Dept., 15 miles from Wilmington. Orchem's biological laboratory was transferred from New Brunswick two years ago to become the nucleus of the present nutrition section at Stine. White-clad biochemists, bacteriologists, nutritionists and lab technicians work here with rats, guinea pigs, rabbits, chicks and turkeys to measure the effect of amino acids and other factors on food and feed efficiency. Guided from here also are dozens of allied research projects conducted by outside laboratories.

"ENDLESS BENEFITS POSSIBLE"

"I believe we are making a considerable contribution to human progress," says Dr. Rosenberg, head of Stine's nutrition section. "We have shown that essential amino acids can reduce protein requirements for animals."

He goes on to say that much more needs to be learned about the chemistry of living bodies, their nourishment and growth, and that the possibilities for human benefit are limitless as this probe into the basic questions of life on earth continues.



Feed supplements are weighed carefully at the Stine Laboratory. Chick feed may have as many as 40 ingredients.

work. These experiments have been repeated many times at different locations. In animal experiments, where so many conditions are of necessity uncontrollable, this duplication is valuable.

When Du Pont's methionine plant in Texas went on stream two months ago, the researchers' pooled knowledge amounted to approximately this: Methionine added to balanced feed makes broilers average three per cent more in weight while eating three per cent less feed. It increases the gross profit per thousand birds by \$20 to \$30. It also improves feathering, resulting in a better grade for dressed birds.

With turkey poults, the response is even greater. These young turkeys require a higher protein diet than



Donors (l. to r.) wear basket weave oxford, batiste, piqué and broadcloth shirts, all containing "Dacron".

Wash-and-wear shirts

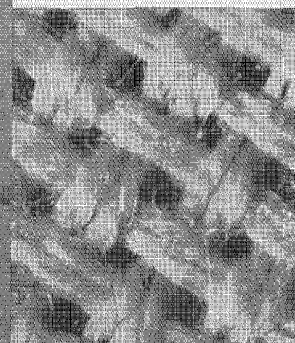
*Available now in a variety of weaves and patterns,
they're better looking than ever*

Here's good news for you and the *descamisados** on your Christmas list. Shirt fabrics that look and feel like traditional weaves, yet have the easy care qualities of "Dacron" polyester fiber, are on the market now in substantial numbers. You have a choice of broadcloth—the favorite of most people—oxford cloth, or the lighter batiste. Collars are standard, button-down or rounded. Colors range from white through restrained solid shades to pink, mauve and yellow. The batistes, also available in sports shirt styles, come in stripes and checks as well.

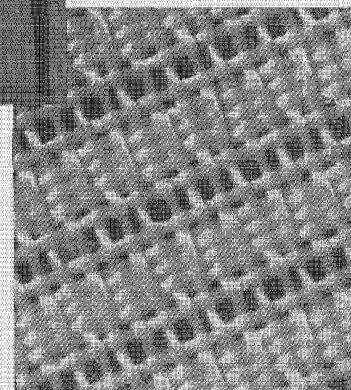
These are blended shirt fabrics, containing 65 per cent "Dacron" staple and 35 per cent cotton. That means they have a conventional look and feel that many men prefer to the continuous filament shirts which were the first synthetics on the market. The high percentage of "Dacron" means, too, that the shirts resist mussing and usually look fresh even at the end of the day. You can wash them by hand or machine, they dry in a relatively short time, and ironing, if needed, is a cinch. "Dacron", high in abrasion resistance, adds extra wear life to the shirts, too.

Prices start at about \$7.50 for the broadcloth, \$8.50 for the oxford, and \$10 for the batiste. On the labels you'll find names like Arrow, Brooks Bros., Excello, Manhattan, Matson, Ramey, Tyson and Van Heusen, as well as the names of well-known stores. For those who want the ultimate in ease of care, continuous filament shirts of 100 per cent "Dacron" are also available.

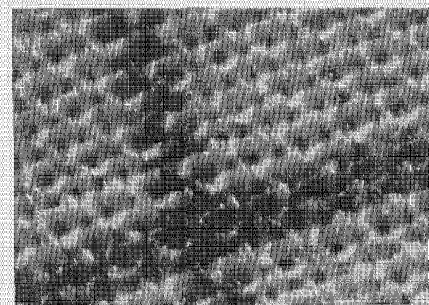
**shirtless ones*



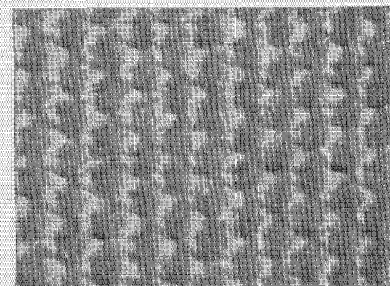
This is the basket weave oxford, magnified 13 times.



Piqué, above, is all "Dacron"; other fabrics shown are blends.



Batiste, soft and lightweight, comes in solid colors, stripes and checks.



Like other blends here, the broadcloth is 2/3 "Dacron", 1/3 cotton.

New caboose on the scouring train

*Karagheusian pioneers in continuous dyeing of
carpet wool with fast "Capracyl" colors*

▲ Before continuous dyeing was instituted at Karagheusian, all carpet wool was batch dyed in big kettles like this.

A new continuous wool dyeing technique that may cut coloring costs in half was unveiled recently at the Roselle Park, N. J. spinning plant of A. & M. Karagheusian, Inc., makers of "Gulistan" carpets.

Developed in cooperation with Du Pont dye chemists, the process is built around the use of rapid-dyeing "Capracyl" dyes. The beauty of the new technique is that it requires no big investment—probably less than \$500 will put a mill in a position to reap the quality and cost-saving benefits of continuous dyeing.

At the Karagheusian plant, raw wool is scoured in a series of tanks. The wool moves through the scouring line on a conveyor system, passing through washing and rinsing baths. In the trade the whole setup is called a scouring train, and the individual tanks, which hold as much as 2,000 gallons, are called bowls.

Ordinarily the wool is batch dyed after scouring. Nine hundred pounds of wool at a time is packed into giant kettles, boiled for an hour or more in the dye solution, then taken out and dried. Afterwards the colored wool is spun into yarn and shipped to Karagheusian's Freehold, N. J. mill for weaving into carpets.

In the new continuous dyeing process, the last bowl in the scouring train is converted into a dye bath. The whole business of transporting the wool to the dye kettles, boiling it and drying it once again is eliminated. The wool, pushed along through the bowl by mechanical fingers, travels through the dye bath in a minute and a half. It comes out ready to be dried and spun into yarn.

The only added equipment consists of stainless steel or lead-lined tanks from which dye solution and a mild acid solution are each siphoned at the rate of a gallon a minute into the bowl. Here Karagheusian's Engineering Dept. made its contribution.

But let Arthur Hooper, dyeing superintendent at

Continuous dyeing system, put in on the advice of Du Pont, colors wool at end of scouring line, saves time and money.

the company's process in a spinning plant, run it his way. "As I see it, one of the big advantages of continuous dyeing is that the wool ends up in better condition. You eliminate the boiling and drying steps that tend to make the fiber brittle and weaken it.

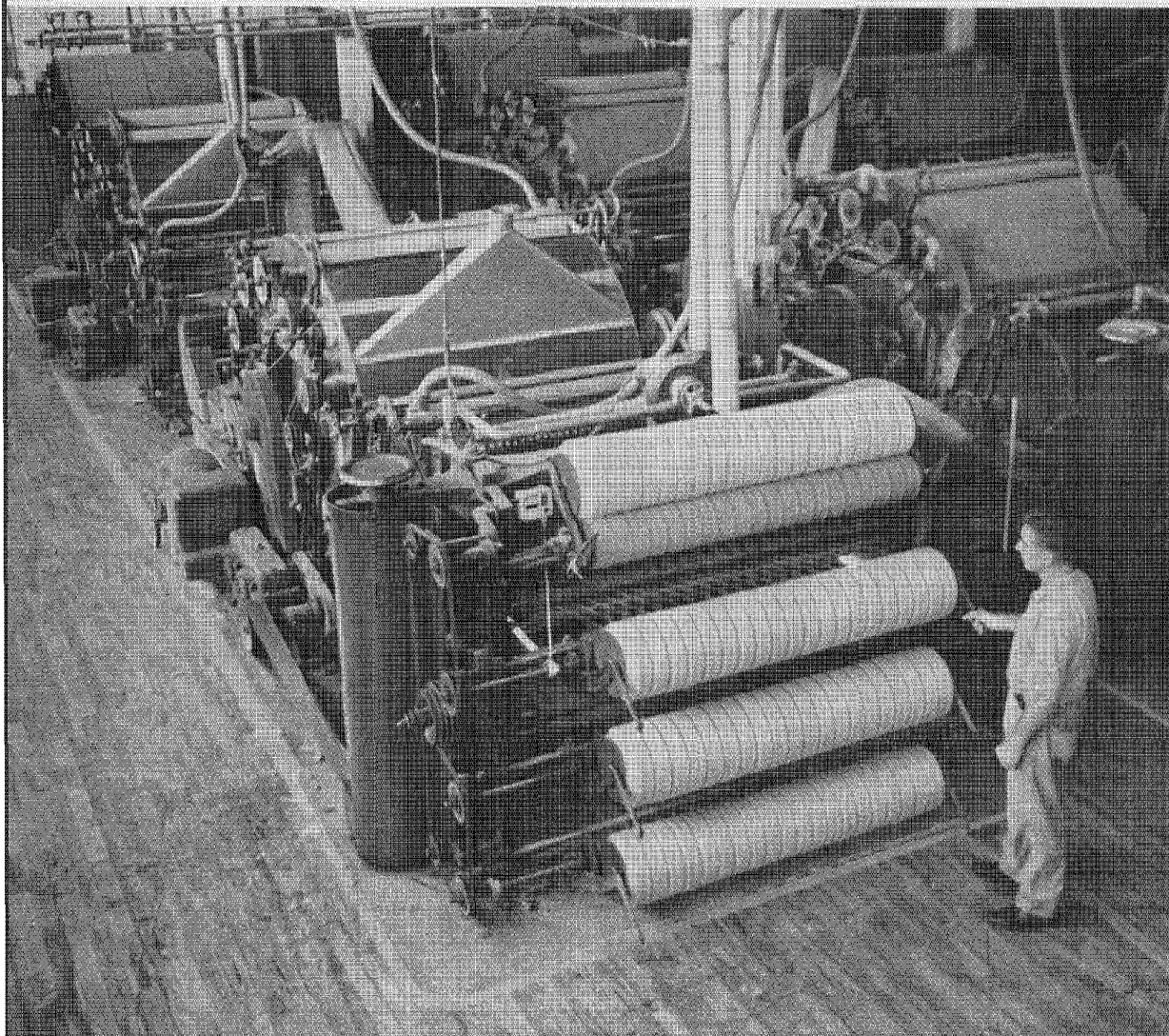
"There's a saving in labor, too. When we're dyeing continuously we're able to reassign some of the dye house men to other parts of the plant. It cuts way down on our handling of the material. I'd also say that we can get even dyeing more easily by the continuous process than by the old batch method."

"This continuous dyeing is an important development, no question about it," echoes Pete McKone, Hooper's assistant.

The only disadvantage cited by Hooper and McKone, the fact that "Capracyl" colors are soft-hued rather than brilliant, turns out to be not so much of a handicap after

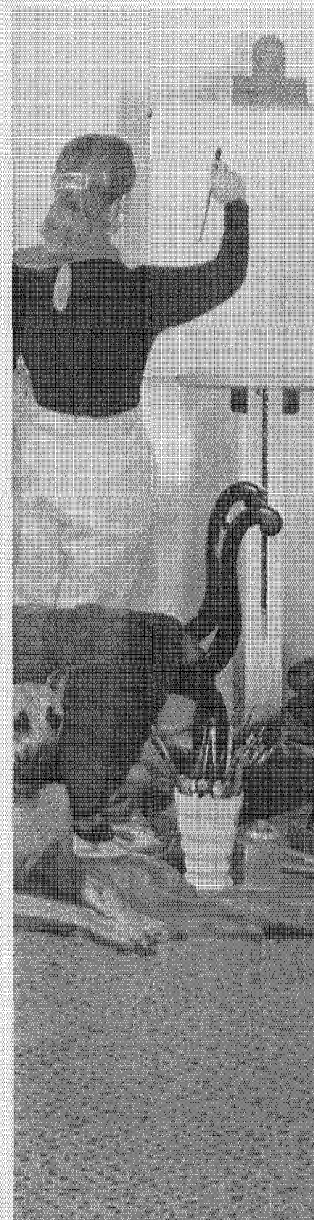
all. In the first place, most of the carpets sold are in the softer shades of beige, green and gray which "Capracyl" can give satisfactorily. In the second place, Du Pont laboratory studies now show that a selected group of acid colors, added to the "Capracyl" group, can give the deeper and brighter colors heretofore thought unattainable by the continuous process.

"This has been an unusual development in that it has proceeded without a major technical hitch," reported Harry Clapham, a Du Pont dye sales supervisor who worked closely with Karagheusian on the process. "We're enthusiastic about it because it gives wool color with fastness equal to that obtained by the batch method, and because it guarantees savings in money, valuable time and steam. It looks so good that several other carpet manufacturers are putting the same caboose on their scouring trains. We're ready to roll."



After continuous dyeing with "Capracyl" colors, carpet wool is wound on beams for shipment to the Karagheusian weaving mill.

Karagheusian is the maker of "Gulistan" carpets, long famous for quality and appearance.



RIVETS FOR

By WILLIAM REYNOLDS

"Sustained airplane speeds up to 3,000 miles an hour at sea level and 7,000 miles an hour at 185,000 feet will be possible with heat barrier materials already tested for high-speed purposes."

This look at the future comes from Spencer L. Shaw, design specialist at Douglas Aircraft's El Segundo plant, who made the prediction at a recent national aeronautic meeting in Los Angeles.

At a speed of 7,000 miles an hour 35 to 40 miles above the earth's surface, the outside temperature on the skin of a plane would approximate 1400°F. The alloys used on present-day planes, however, begin to lose their strength characteristics far below this temperature. Thus crossing the so-called heat barrier poses the problem of improving metals for high-speed flight.

When the aircraft industry turns out planes that will fly at 7,000 miles an hour, Du Pont will be ready with aircraft rivets capable of withstanding the high temperatures. In fact, the rivets are available now. They are already meeting high temperature and strength requirements of jet engines. Meanwhile, Du Pont is developing rivets to withstand temperatures of 1800°F.

Speed of installation has always been a point in favor of Du Pont rivets. Now Company research has speeded up the process further by making rivet charges that can be fired in one-half second. This shortens recommended firing time by two thirds.

ONE-HALF SECOND—AND IT'S DONE

In developing these rivets, researchers learned to fire them by directing high frequency radio waves through them or by spinning a small phenolic-impregnated fiber cup on the rivet heads. Now Du Pont laboratories have devised a tool that can be adjusted to fire large or small rivets in one-half second with uncanny accuracy. In a recent test using this new Du Pont MDL tool at a major aircraft factory, the fastening job involving 4,700 Du Pont rivets was completed with a saving of 25 per cent in time. Result: a better job with appreciable dollar savings.

When applied to a rivet, the new tool pre-heats the charge for a fraction of a second and then automatically pours additional heat into the



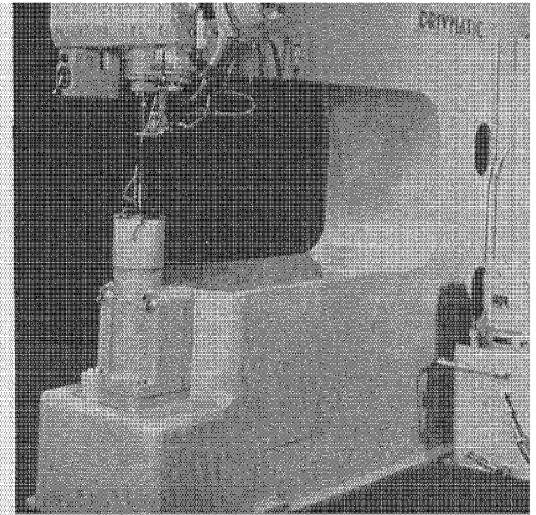
Rivet is expanded by applying heat to rivet head. Plugged end prevents escape of blast.



Honeycomb structure for guided missiles is locked in place by newly designed rivet.

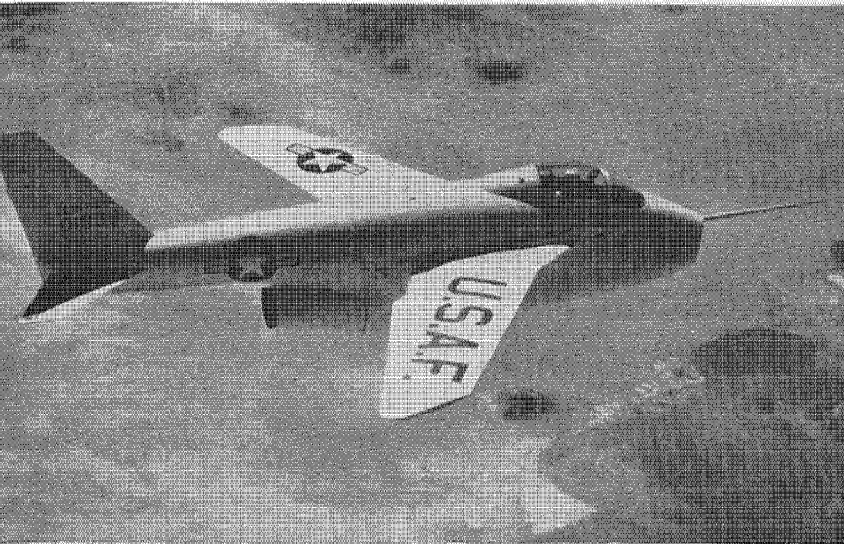
This "Drivmatic" machine when equipped with MDL tool, as shown in close-up below, automatically drills the holes, inserts rivets and expands them.

THE JET AGE

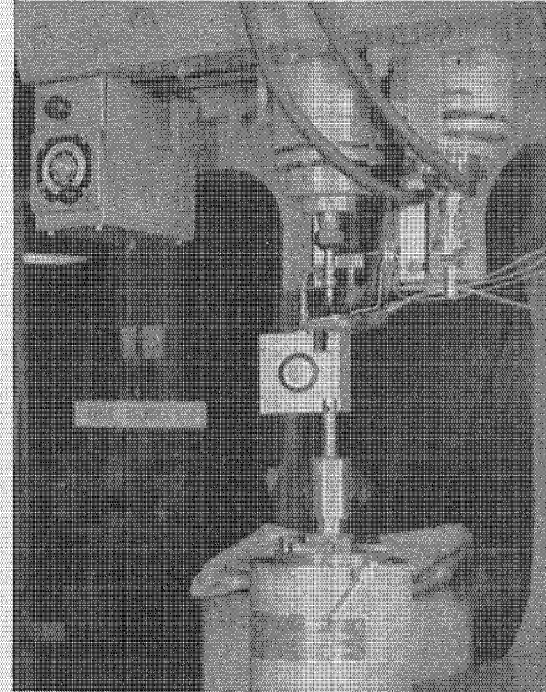


charge to set the rivet, all in one-half second.

Working with the General Riveters Co. of Buffalo, Du Pont has adapted the MDL tool to the "Drivmatic", automatic riveting machine of General Riveters. The "Drivmatic" automatically drills the rivet holes, inserts the rivets and fires them. This new method of installation is



The Bell X-5 features advanced designs for high-speed, high-altitude flight, including use of Du Pont rivets.



especially advantageous for sizable assemblies.

Another advance is the development of a special, blast-free Du Pont rivet for certain guided missile assemblies. Here, industry's problem entailed riveting together two aluminum skins that are separated by and glued to honeycomb structures. The job of holding this sandwich and its filling together was more than two conventional rivets could do. The new rivets, by expanding between the skins and on the outside, as shown in the photograph at the lower left, met the difficult requirement.

Riveting of other honeycomb structures, such as those for trailers housing radar equipment, was also a puzzler for the manufacturer. Conventional riveting could not be used in instances where damage to the delicate honeycomb would occur. Again, the answer was a Du Pont rivet, of the blast-free type.

Because jet age aircraft and guided missiles are no stronger than the tiny fastenings that hold their structures together, quickly installed rivets that withstand high temperatures and stresses will be increasingly important in building the faster aircraft of the future.

MDL hand tool expands Du Pont rivets in aircraft panel accurately and rapidly. Results are neat, structurally sound.



Woodland paratroopers

... hit the nylon to save us money

By ROBERT H. FORBES

The August morning is hot as Wayne Starr, Les Johnson and Bill Trail step into the forest sky from the old Ford trimotor. One of the jumpers is an Army paratroop veteran; the other two are college boys. All have been hired for their youth and ruggedness as smokejumpers in the northern Rocky Mountains.

The boys have been flown on a few minutes' notice from Missoula, Montana to this spot in the Lolo National Forest where a small blaze set by lightning burns among the pines above Fish Creek. Speed is essential, and the fire is six hours by ground travel from the nearest Forest Service fire station.

As each man jumps, his white nylon parachute blossoms against the blue sky. Steering their chutes with an eye on the thin plume of smoke that marks the blaze, the three land safely in a mountain meadow.

Now the jumpers signal the circling plane. Equipment



Wearing football helmets and masks, their suits padded at strategic points, smokejumpers on the way to a fire get set to hit the nylon.

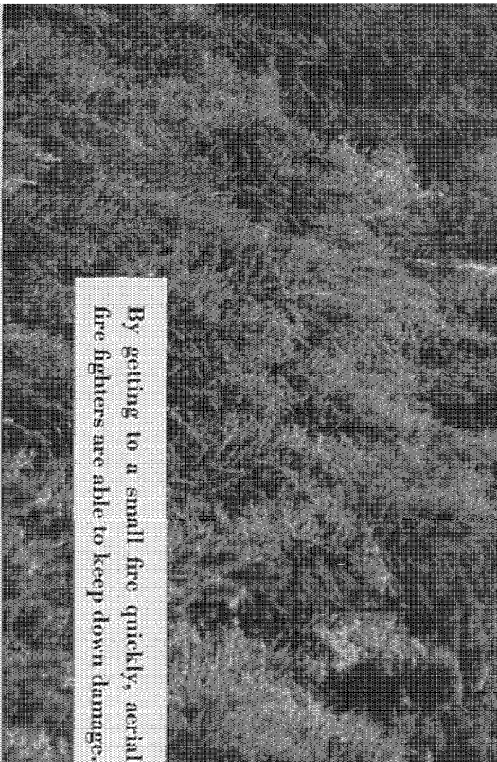
floats down on old parachutes—shovels, grub hoes, rations, sleeping bags and other supplies in canvas bundles. Slipping out of their bulky jump suits, the trio quickly retrieves the tools and attacks the fire—less than an hour after it was first seen. So quickly have they reached the scene that the flames are not yet in the trees. The fire is still on the ground, fed by small bushes and partly decayed needles.

First, the jumpers dig a shallow trench around the blaze to prevent its spread. Flames lick across the fire line from time to time and have to be quelled. Then comes a tedious 20 hours of mopping up. No water is available, so earth must be shoveled on and mixed with the embers. On the afternoon of the second day, after hiking 16 rough miles, the men are picked up by a truck.

95% MAKE NO HEADLINES

The Fish Creek fire, like 95 per cent of those smothered by smokejumpers, made no headlines. In fact, no one outside the Forest Service knew about it. Starr, Johnson and Trail kept Fish Creek in the "A" class of fires—smaller than a fourth of an acre—because all down the line things clicked for prompt suppression.

Yet that tiny fire could have become one of the holocausts which flares through whole townships, kills wildlife in its path, burns millions of dollars' worth of timber and bares the land to help create floods. A thick forest for fuel was present, and later in the day of dis-



By getting to a small fire quickly, aerial fire fighters are able to keep down damage.

covery conditions were ideal for such a spread.

To keep little fires from becoming big ones, Forest Service bases with from 50 to 150 woodland paratroopers have been established on the fringes of our last tracts of roadless forest. There are four principal bases—at McCall, Idaho; Winthrop, Wash.; Cave Junction, Ore. and Missoula, Mont.

Uncle Sam's smokejumpers all ride to earth on Du Pont nylon. The canopies, cords and webbing of their parachutes—in fact, every part except the back pack cover—are made of the fiber. The switch to nylon came about because the synthetic fiber is strong, doesn't deteriorate in storage, and resists damage by water and insects. Du Pont supplies the yarn to weavers of special parachute fabric, who sell it to parachute manufacturers, who in turn bid for Government business.

Each time the airborne fire fighters hit the nylon they save us irreplaceable timber.

"More than a dozen years of aerial fire fighting in our forests have convinced us that our present rate of getting to forest fires pays off in a smaller area burned," says James K. Vessey, assistant regional forester in Missoula.

Last year in the Nez Perce Forest of Idaho, jumpers held seven fires to Class A, the forest supervisor reported. In addition, 15 other fires which might have grown much larger were held to less than five acres.

The jumpers save tax money, too, by cutting the cost of fire fighting. In the Nez Perce last year they saved an

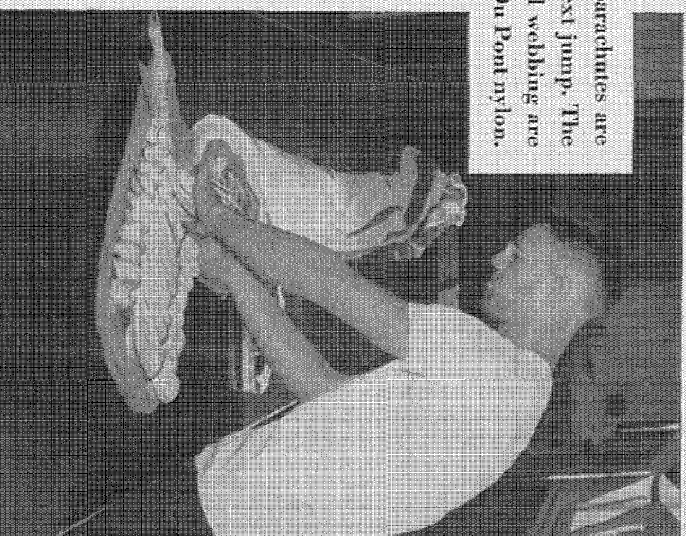
When the last ember has been smothered, smokejumpers become hikers. Here they begin the long trek to a highway, where a truck will meet them.



estimated \$50,000 on fire suppression costs. A study of 20 years of fires in the 17 federal forests of the Missoula region indicate that on 5,070 blazes a net saving of \$2,870,000 could have been made by full use of aerial attack forces.

At a time when conservation of natural resources is high on the national agenda, woodland paratroopers are helping preserve our timber for future generations and saving money for the present generation at the same time.

Back at the base, parachutes are repacked for the next jump. The canopies, cords and webbing are all made of strong Du Pont nylon.



"Dacron" joins the fire fighters

The man-made fiber pairs up with neoprene rubber to increase fire-fighting efficiency in the chemical and oil industries

"Dacron", now enjoying a bright career in both fashion and industry, has launched on a safety campaign. A new heavy-duty use of "Dacron" polyester fiber is in industrial fire hose. The Quaker Rubber Corp., Division of H. K. Porter Co., Inc. of Philadelphia, has developed a fire hose trade-marked "Petrochem" for the oil and chemical industries, where oils, acids, strong alkalis, extreme temperatures and abrasives wage a winning battle against natural fibers.

This new fire-fighting tool is made of an extruded neoprene tube or core and a jacket of woven "Dacron" which is impregnated with neoprene cement. It weighs little more than half as much as conventional rubber-covered fire hose, yet withstands higher pressures (500 pounds) and temperatures up to 300°F.

The combination of "Dacron" and neoprene increases the fire-fighting efficiency of hose around chemical and oil plants. Neoprene chemical rubber has excellent resistance

to acids, oils and alkalis encountered in these locations. The jacket of "Dacron" resists attack by alcohols, bleaching agents, dry-cleaning solvents, halogenated hydrocarbons, ketones, sea water and the like. Constant inspections and replacements should be reduced because "Dacron" resists mildew and deterioration from dampness and heat.

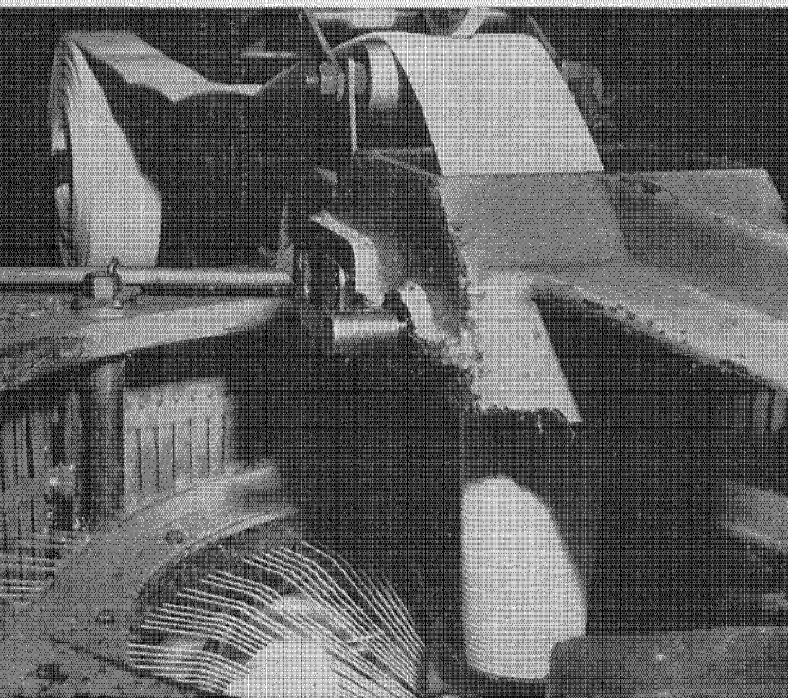
It is so flexible it can be coiled or folded to take up a minimum storage space. Flexibility and lightness speed fire fighting, thus saving countless dollars in damage and perhaps lives as well.

The new hose is being used at such plants as oil refineries in Oklahoma and Texas and at a chemical company on the Delaware River.

Since "Petrochem" has been on the market only a few months, details on its life span are lacking. However, industries which have bought it have made repeat orders for similar needs. Used by municipal fire companies for the past two years, a nonindustrial fire hose covered with "Dacron" shows "no sign of wear" in two cities where a check has been maintained.

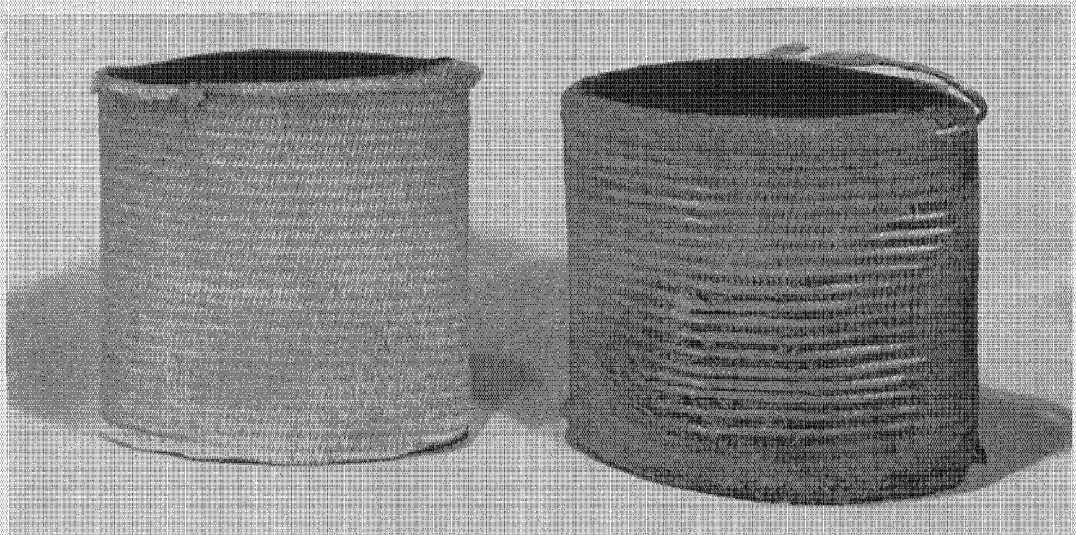
Quaker pioneered this application for "Dacron" with a hose only six inches long. It was called on to do a man-sized job, however. A division of a large automotive manufacturer discovered that their diesel engines were no sturdier than the hose connecting the radiator and engine. Heat and oil worked havoc on the hose. So the partnership of "Dacron" and neoprene was tried, with remarkable success. Now a Canadian diesel motor company, as well as several railroads, uses coolant hose of this type. It gives five times the wear of the conventional product.

"Dacron" will next hit the road as a covering for Quaker's "Dieselite" hose, which is being developed especially for controlling fires on railroads. Stored on the undercarriage, this railroad hose gets one bath after another. Here natural fibers soon deteriorate; "Dacron" doesn't.



Machine at Quaker Rubber weaves a jacket of "Dacron" that covers neoprene tube for fire hose.

After immersion in 10% H_2SO_4 for 24 hours, hose of "Dacron", left, was undamaged. Acid ate cotton yarn in hose of cotton and "Dacron" shown on the right.



The following article is a condensation.
Courtesy True, The Man's Magazine.
Copyright 1954 by Fawcett Publications, Inc.



Finished parts are assembled speedily. No filing to fit snugly, no fooling around.

a matter of switchable parts

Ever since the 1790s when Eli Whitney first got people interested in his theory of interchangeable parts, gunmakers have been trying to get the hang of it. At last they have truly succeeded

By LUCIAN CARY

Remington, the oldest name in American sporting firearms, is now carrying out the newest idea. This idea is to produce a series of guns so similar in design that many of the parts are the same, or nearly the same, in all of them. It might seem impossible to make a high-powered rifle with many of the same parts used in a shotgun. But Remington is doing it.

In producing this family of guns Remington is carrying to its logical conclusion an idea that is more than 150 years old. In the late 1790s Eli Whitney, the man who invented the cotton gin, persuaded President Jefferson that our armed forces needed standardized equipment. Up to that time most of the guns made in this country were the product of small one- or two-man shops. A man who made a Kentucky rifle for such as Daniel Boone often did the whole job, from butt plate to front sight. It was rare for two of these custom-made rifles to be alike in outward form and

dimensions. And because the parts were made and fitted by hand, no part of one was interchangeable with a part of another—unless by accident.

Eli Whitney stood up and said he could make muskets so nearly alike that if you took a dozen of them apart and mixed up the parts you could reassemble the dozen guns without either selection or hand fitting of the parts. And Whitney knew what he was doing.

He took a government contract to make muskets with interchangeable parts. He had the parts forged or cast to approximate dimensions and then finished to close dimensions. In order to keep the standard dimensions he made master parts and used them as gauges. None of his workmen needed to know how to make a whole gun. All any one man needed to know was how to make one part.

Whitney's ideas—the division of labor and interchangeable parts—are the basis of present day mass



Roll out the barrels: a battery of vertical barrel-boring machines, a production wizard operated by only one man.



Induction brazing of the front sight, Model 760 pump rifle; the process is entirely electric, clean and simple.

production. Thanks to Whitney, and Eliphalet Remington, who began making guns in 1816, and to Richard Lawrence of Windsor, Vt., who invented a number of machines for making guns, the arms industry is the supreme example.

The arms makers tried to produce interchangeable parts, but actually doing it was a fond hope rather than a resounding success. What the arms makers actually got into was selective assembly. There would be several sizes of each part in bins on the assembler's bench. The assembler chose the parts that went together best after a bit of hand fitting—meaning the use of files and maybe an oilstone. The makers felt they could not afford the big, expensive machines that produce parts to close tolerances. It would take too many years and too many guns to pay back the cost of the machines.

That attitude was changed by the war. Remington is not the only arms company to spend millions of dollars on machine tools. Remington is, however, first with the idea of producing a family of guns. The idea really took shape when Remington decided to produce a new shotgun.

HUNTERS ASKED WHAT THEY WANTED

What Remington—and the American shooter—wanted was a semiautomatic gun. Remington had for years been making a semiautomatic shotgun invented by John Browning, and known as the Model 11. This was a rather heavy and bulky gun with a receiver less than beautiful. Before designing a gun to take the place of the Model 11, Remington did research to find out what the customers wanted. They consulted their salesmen and sent out questionnaires. The customers said they wanted a streamlined gun, lighter in weight, less bulky, and made in all gauges.

There were two problems, closely related, from then on. One was the design of the new gun, and the other was

how to make it at less cost than the old model. Gunmaking overhead was doubling and even tripling. It was no good making the kind of gun the customers wanted at a price they couldn't or wouldn't pay.

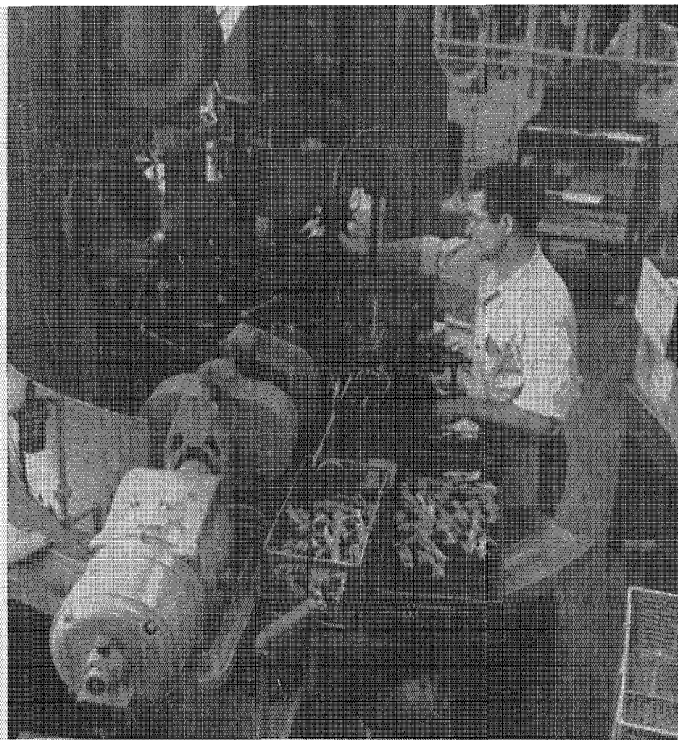
When the design seemed satisfactory, models of the gun were made up and tested. As usual, bugs appeared. These were corrected. It was only when the gun met exacting tests that the factory tooling up. Testing meant firing about a million rounds of ammunition.

The new gun, called the Model 11-48, was originally produced in 12 gauge. It was later produced in 16, 20, 28, and finally last spring, in .410 gauge. It became, for the present at least, the parent of the Remington family of guns. The next in the series is a pump-action shotgun, and the third gun is a pump-action rifle using the same receiver forging as the 28 gauge shotgun, the same trigger guard and much of the same fire-control mechanism, the same stock as the shotguns, except it is cut off a half inch shorter.

The rifle is a successor to Remington's older Model 141 pump rifle. The new rifle, of entirely different construction, is smoother in operation. And, unlike the Model 141, it is made for high-velocity cartridges—the .257, the .270, the .300 Savage, the .30-06 and the .35 Remington.

This rifle, better and more powerful, sells at retail for \$104.40. Remington engineers estimate that under present conditions the old rifle could not be made to sell for less than \$145. The new rifle has proved extremely popular, partly because so many American hunters use pump shotguns and find a pump-action rifle fast to handle. It makes no difference whether the shooter is left or right handed. And because the stock is the same in design as that of a shotgun the feel of the rifle is pretty much the same.

The Model 11-48 shotgun, being made in gauges from 12 down to .410, requires three sizes of receiver forgings.



The Kingsbury, genius machine of gunmaking; tell it to produce a part, it'll make a thousand without deviation.

The pump shotgun and the pump rifle use one or the other of these forgings. And all three types use basically the same trigger guard and quite similar assemblies inside the guard for fire control.

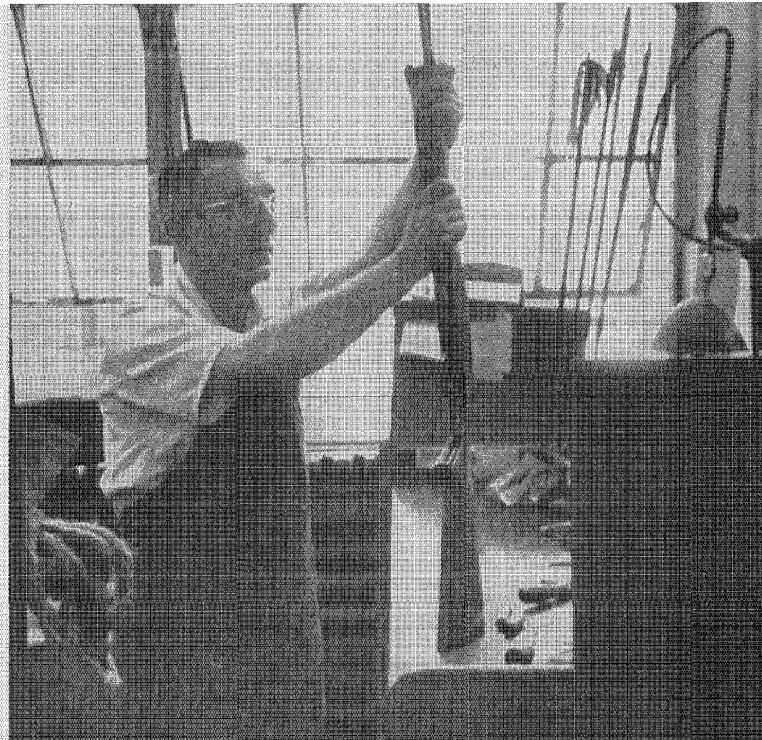
The trigger guard is made from an aluminum-alloy casting. The castings are put in a machine, big enough to fill the average living room, called a Kingsbury. In the center of the machine is a revolving table containing many fixtures on its rim. Outside the table are spindles driven by individual motors mounted horizontally, vertically and at an angle. As the revolving table pauses for a few seconds, the casting is drilled and the hole reamed to close dimensions. The table then moves on to present the work for another operation. The machine is tended by one man. As a finished piece comes around he takes it out of its fixture and clamps a fresh casting in place. Otherwise the machine is completely automatic.

The trigger guard that comes off the Kingsbury is ready for one of Remington's family of guns. They require one or two more operations to be ready for another member of the family.

MACHINE AND ONE MAN BORE BARRELS

Remington uses a battery of Kingsbury machines for other operations. Barrels are bored from solid steel bars in a battery of boring machines tended by one man whose job is to put the stock in the machine and take out the pieces that have been bored. The use of modern automatic and semiautomatic machines working to close dimensions means that the work is done with great speed. It also means that finished parts require no hand fitting.

The assembler of a gun was formerly equipped with files as well as parts of various sizes. I once counted over 200 files on the workbench of a skilled workman in the London factory of a famous maker of the kind of shotguns



Final inspection, Model 11-43 shotgun. The checker is one of the few besides the consumer who sees the whole gun.

that sell for from \$1,400 to \$2,200 in this country.

The man who assembles the fire-control mechanism of a Remington gun does not have 200 files. He doesn't have one file. He has a fixture on his bench to hold the guard. In front of him are small bins containing the pins, springs and levers. There is only one size of each part. The parts are truly interchangeable. The prime result of this system of manufacture is lower cost—first to the manufacturer, second to the man who wants a gun. It is made possible by the fact that there are about 15 million men in the country who take out hunting licenses and must have guns—a market far greater than that in any other country.

It is easy to see that Remington's family of guns can be extended—and that is Remington's intention. Its bolt-action big-game rifles, the new Model 722 and Model 721, however, can hardly be adopted as blood relations in the Remington family. And I would guess that the great variety of .22 rifles Remington makes could be adopted only as second cousins, once removed.

One of the peculiarities of sporting-arms manufacture is that guns last so long. The automobile makers, by advertising a new model every year, have persuaded most customers to buy a new car every few years. If it were properly taken care of, a modern car would last much longer. But at best cars wear out. Guns will last a lifetime unless they are neglected or shot twenty times as much as the average man shoots.

The arms makers can't introduce a new model of a shotgun every year. There isn't as much room for change as there is in a car. But arms makers would like to keep coming up with important improvements at a rate of a new model in each gun category every six or eight years. If they succeed in this they would prosper and we customers would see some exciting guns.

In both private cafeterias and public restaurants,

Du Pont's cellulose sponge yarn has been...

Passing the mop test

By LOUISE J. GRUBER

When a company decides to use cellulose sponge yarn mops instead of the cotton yarn variety in all of its more than 200 operating divisions, there must be a good reason.

This happened recently at Slater System, Inc., a 23-state food service management company.

To find the reason we went to see Leo J. Coughlin, who sets standards for the hundreds of items required to run the giant enterprise.

Slater employees, we learned, are encouraged to suggest changes which will improve operations or effect savings. The manager of a Slater cafeteria which serves 18,000 people had suggested the switch to sponge yarn mops.

One of the main points in favor of the change appeared to be the resistance of cellulose sponge yarn to souring, a major headache in cafeteria and restaurant maintenance. This, in itself, warranted further investigation, and a year ago Slater set up a testing program in its cafeterias at three large manufacturing plants. Performance of the sponge yarn mops was compared with that of the long-staple, bleached, natural fiber yarn mops then used in Slater cafeterias.

Both types of mops were tested on floor surfaces ranging from linoleum, asphalt or quarry tile to a rough concrete which wore out the natural fiber ones in four days. All mops were of the heavy, industrial type (20- and 32-ounce sizes). At the end of the ten-week test period, the results reported by Slater managers at the three plants were overwhelmingly in favor of the change.

Cellulose sponge yarn *did* resist souring—the reports proved this. Hasty mopping up of spilled liquids or foods, improper rinsing of the mop, storage in closed closets—these brought a sour end to the life of most mops, but not to their sponge yarn counterparts.

In addition, Slater found that the wear life of the sponge mops was three and a half times longer.



Slater System specifies sponge yarn mops for all of its 200 operating divisions.

The pieces of yarn often left on the floor around chair and table legs from other mops were conspicuous by their absence when cellulose sponge mops were used. Also, the sponge mops didn't mat or tangle, but held their original shape after use. From the standpoint of the clean-up man, the sponge yarn mops were work-savers because their greater absorption enabled him to cover an area with fewer strokes.

In the face of this evidence a change-over was obvious, and early this year mops made of Du Pont cellulose sponge yarn became the standard throughout the Slater System.

Just as Slater is an authority in the field of institutional feeding, so Howard Johnson knows the ins and outs of the restaurant business.

At Howard Johnson restaurants on the New Jersey Turnpike, the mop made of Du Pont cellulose sponge yarn is a ubiquitous character. Not one, but seven or eight such mops can be found in every restaurant. Each mop has its own particular area of use, and at any given time as many as three or four may be at work. Because of the heavy traffic through these round-the-clock Howard Johnsons, all floors are mopped four or five times a day.

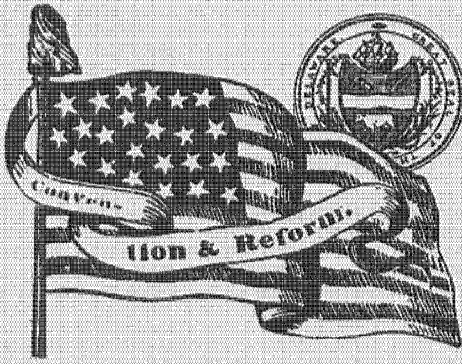
According to Benton Caldon, superintendent of the 11 Turnpike units operated by Howard Johnson, Inc. of N. J., this constant, hard usage made it necessary to find a mop which combined the maximum of both cleanliness and long wear. The 16-ounce sponge yarn mop filled the bill. They have been supplied continuously by the Howard Johnson commissary in Mt. Holly, N. J. since mid-1952, shortly after the permanent restaurant units were completed on the Turnpike.

As with any operation of this size, economy, even in the little things, is important, and Caldon says that sponge yarn mops are economical. He certainly should know; he buys 35 dozen of them every month.



FOR HOME FLOORS, TOO

The same attributes of the sponge yarn mop that won Slater and Howard Johnson are attracting the housewife's attention. Stanley Home Products Co., sponsors of those selling parties in homes around the country, make their "Amazo" mop (left) of Du Pont cellulose sponge yarn. The "Amazo" has been Stanley's top seller for a number of years. Another sponge yarn mop for home use, the "Swabit", is made by the Kalin Brush Co. of Philadelphia.



FOR A CONVENTION

The Delaware Courier has a Circulation twice as great as any other Semi-Weekly Paper in the State.

Faithful and Fearless.

WILMINGTON.

FRIDAY, DECEMBER 15, 1854

HOW THE RUSSIANS FIGHT

From the following extract of a letter, written by an Englishman from the seat of war, and published in the *London Times*, it appears that the Redcoats have had their eyes opened, and are paying dearly for underrating the bravery and discipline of the Russian soldiers. They begin to realize the truth of Napoleon's remark that the Russians were the most stubborn and hardest soldiers to put to flight in Europe:

"And now commenced the bloodiest struggle ever witnessed since War cursed the earth. It has been doubted by military historians if any enemy could stand our charge with the bayonet; but here the bayonet was often the only weapon employed in conflicts of the most obstinate and deadly character. We have been prone to believe that no foe could withstand the British soldier wielding his favorite weapon and that at Maida alone did the enemy ever cross bayonets with him; but, at the battle of Inkermann, not only did we charge in vain, not only were desperate encounters between masses of men maintained with the bayonet alone—but we were obliged to resist bayonet to bayonet the Russian infantry again and again as they charged us with fury and incredible determination.

"The battle of Inkermann admits of no description. It was a scene of dreadful deeds of daring, of sanguinary hand to hand fights, or desperate assaults—in glens and valleys, in brushwood glades and remote dells, hidden from all human eyes and from which the conquerors, Russian or British, issued only to engage fresh foes, till our old supremacy, so rudely assailed, was triumphantly asserted, and the battalions of the Czar gave away before our steady courage and the chivalrous fire of France."

POWDER MAGAZINES PROJECTED

Messrs. Henry du Pont and Alexis du Pont have taken title to a piece of property in Knoxville, in Tennessee for construction of a storage magazine for powder. The building will be of stone foundation, with a cross wall for supporting the floor; there will be double walls, pierced with air holes for ventilation, and the roof will be spouted.

It is also rumored that E. I. du Pont has taken title to a property in San Francisco for the same

Delaware

Devoted to News, Politics, Literature, Science

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FRIDAY, DECEMBER 15, 1854



Battle of Inkermann—N

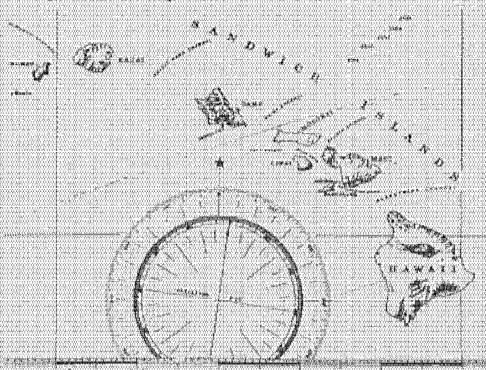
THE CRIMEA

Anxiety for news from the Crimea is increasing day by day. And speculation as to the news is on everyone's tongue. The exciting condition of the belligerents at the last intelligence has awakened the curiosity of every reflecting reader and although the

views entertained as to the result of the struggle various, it is generally thought the Allied army will fail in their efforts to destroy Sebastopol before Spring, if they should escape utter annihilation during the Winter.

HIGHLY IMPORTANT FROM SANDWICH ISLANDS: TREATY SIGNED

By the arrival of the United States steam frigate *Susquehanna*, Capt. F. Buchanan, at San Francisco



we have Honolulu dates to the 28th October, days later than previous advices. The news is of the highest importance.

The treaty of annexation has been signed by Kamehameha and the principal nobility, but majesty had made a formal promise to Prince Alexander that he would wait his return from a neighboring island before the treaty should be definitely sealed. The officers of the *Susquehanna* are of the opinion that annexation is rather popular than otherwise among the natives. It appears, however, that Liliuokalani, who was at the head of the opposition to this measure, gave his consent a few days before the sailing of the *Susquehanna*. The only difficulty that now remains the complete settlement of this object, is whether the islands should be admitted to the Union as a State or Territory.

Courier

Agriculture, Morality, and General Intelligence.

WILMINGTON, DELAWARE.

5, 1854

Whole Number 2833.

LATEST NEWS BY TELEGRAPH

NEW YORK—There is a run on the Savings Bank. Colonel Benton will be home this week.

Dispatches from the West state that the rivers are all of ice.

There is no tidings yet of European steamers.

PHILADELPHIA—A young lady named Weaver died this week from the effects of ether, which had been administered to enable her to undergo an operation.

NEW ORLEANS—There are fears entertained for the safety of the steamship Nautilus, which left Brazos on the 4th inst., and has not since been heard of. It is feared she foundered in the heavy gale that raged on the night of the 4th.

E. I. du Pont Co. reports the loss of a cargo of powder carried on the deck of the schooner "Wonder" while sailing from Philadelphia to Providence. Damage was caused by water due to the terrible wind and mountainous seas of a recent storm. The company's agents have been directed to use more care in hiring the services of coasters which carry cargo on deck.

CONGRESS

This body will get scarcely to work before the Christmas and New Year Holidays are past. The members require a little time to mature their propositions and exchange opinions. There is, however, little loss of time by this. Were they more careful in this particular and to get their bills in a proper shape before presenting them to the Houses there would be much less discussion and much more harmony of action beside the trouble the committees would be relieved of.

We regret to see that Mr. Clingman of North Carolina has thought proper to bring forth a proposition extending, by the United States, mediation between Russia and the Allied Powers now at war in Europe. In the present posture of affairs any intermeddling on the part of the United States (no matter how philanthropic the movement may appear) might result in serious consequences to the Republic. The quarrel is European altogether and it is our business to keep our fingers out of the fire. He who succeeds in entangling us in the fight will incur the displeasure of the people of the Union.

HANDSOME—Some one sends us a handsome engraving of our friend, Wm. M. Swain of the *Ledger*. The plate is engraved by Sartain after a daguerreotype by Root. The work is well done and the picture made as handsome as the homely "Phiz" will bear. Swain was immortalized his name by means of the *Ledger*, and had the star which appears distinctly on his men the cabalistic '76 on its center, we might suppose the present distribution of his picture was preparatory to the presentation of his name to the Know-Nothing Councils for the Presidency.

THE TERRITORY OF KANSAS

Last week Col. Benton delivered a lecture in New York descriptive of that comparatively unknown region of our country which extends from the western line of the Missouri to the eastern base of the Rocky Mountains. This section of our Republic is demonstrated to be capable of sustaining populous communities and exalting them to wealth and power; while the line of great states which now stretches half way across our continent in the same latitude (Pennsylvania, Ohio, Indiana, Illinois, and Missouri) may be matched by an equal number of States, equally great, between Missouri and California. All this country is perfectly adapted to the construction of a railroad and all other kinds of roads travelable at all seasons.

TREES FOR THE U.S. NAVY

Crosby P. Morton, now of Philadelphia, has purchased a number of large White Oak trees from Richard White, the present owner of the woodland on the Brandywine in East Bradford, formerly belonging to the heirs of William Gibbons, dec'd. The timber is intended for shipbuilding and is to be delivered to the Navy Yard at Philadelphia. The trees are contracted to be delivered not less than 35 feet in length and some of them already cut are 40 feet long. They are to be taken to the city by railroad.

D. Bidwell, of Pittsburgh, agents for E. I. du Pont Co. reports an exceedingly heavy freeze has halted a number of boats in the canal, and that if the Ohio River freezes at its present low stages it will be a calamity for the city. E. I. du Pont reports that the necessity for wagoning the powder frozen on the canal has disappointed their calculations, and there are fears that ice may close off navigation to the Brandywine wharfs.

WHERE IS OUR CITY ALDERMAN?

This is a question that was asked yesterday. Why is he absent from the City where his presence is so necessary to allay the existing excitement for news from the Crimea? We shall await an answer, hoping to receive it before the arrival of the next steamer.

News of bank failures and monetary panic in Cincinnati and other places in the West has been relayed here through correspondence just arriving at the Du Pont powder mills.

New Castle & Wilmington



ON and after MONDAY, JUNE 19, 1854, Passenger Trains will run on this Road as follows:—Connecting with all the Passenger Trains on the Philadelphia, Wilmington and Baltimore Railroad, and with the Steamboats touching at New Castle.

Leave New Castle	Leave Wilmington
9 45 o'clock, A.M.	9 30 o'clock, A.M.
10 45 " "	12 30 " P.M.
11 30 " A.M.	2 30 " "
4 o'clock, P.M.	6 o'clock, P.M.
8 40 " "	9 30 " P.M.

BUSINESS MATTERS

New Styles—Winter Clothing—A splendid stock now on hand comprising superfine black French cloth Dress and Frock Coats, trimmed in the most fashionable manner. Business and Promenade Coats of Black, Blue, Brown, Olive Green, cloths and plain and figured Cassimeres, Light over Sacks, and Bangups for Winter wear, Linen Dusters, Plain Black and French Doeskin and fancy Cassimere pants at Thomas McCoy's, No. 44 Market St.

Coats from \$2.00 to \$20.00

Vests do. \$1.00 to \$5.00

Pants do. \$2.50 to \$7.00

THE PLANK ROAD

The cost of the five miles planked on the West Chester and Wilmington Road will be in the vicinity of \$15,000—a little more than \$3,000 per mile. This exceeds the estimates slightly.

The road has been viewed by the committee appointed by the Governor, who reported that the terms of incorporation have been complied with and toll is now charged upon the finished portions of the road as follows:

	1 horse or horse and sleigh	1 horse and wheeled vehicle
Toll House	½ cent	1 cent
Hannums	2 cents	3 cents
Dilworthtown	4 cents	5 cents
Termination	5 cents	6 cents

Same rates for every additional horse. For an ox and mule the same rates as a horse.

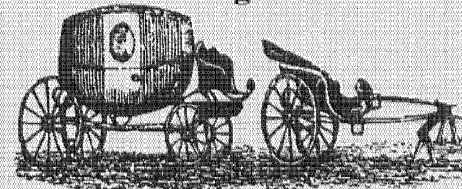
For every score of hogs at the rate of 1 cent a mile

" " " sheep " " " 1 cent "

" " " cattle " " " 2 cents "

Same in proportion for greater or less number

Carriages! Carriages!! Carriages!!!



HENRY PRETZSCHNER, corner of Fourth & French Streets, has always on hand a large assortment Carriages, finished in the best manner. Persons will find it to their interest to give him a call as he is determined to sell LOW for cash or approved paper. All work guaranteed.

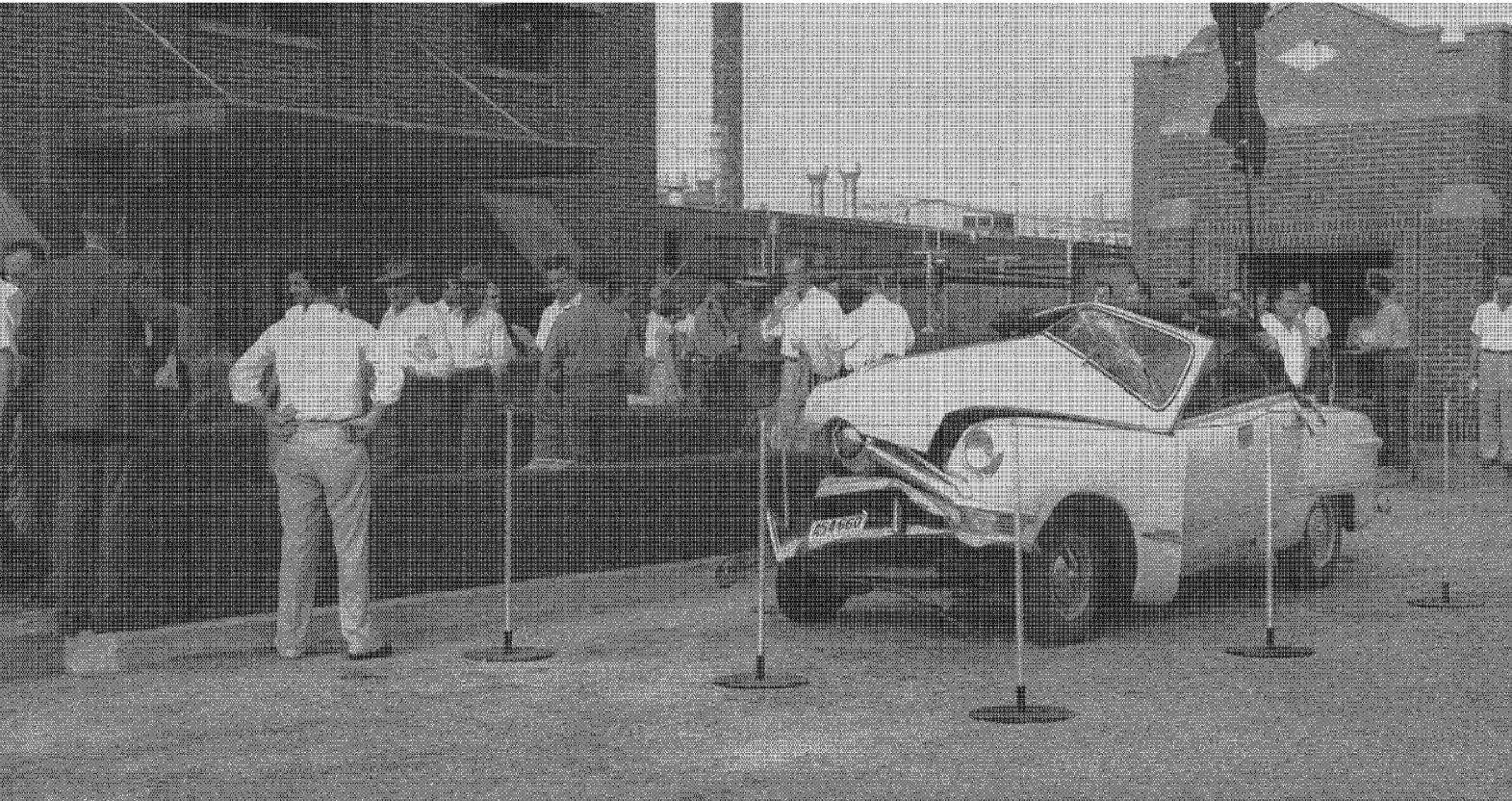
CARRIAGES repaired, painted and varnished in the best style, and at short notice.

CARRIAGES taken in exchange for new ones or

What were the hopes and fears of the young and vigorous United States of 100 years ago? Why, there was worry about the storm clouds over Europe. People were talking about statehood for Hawaii (then called the Sandwich Islands) and there was some unemployment; there was a bad winter, and communications were slowed. All in all, the worries and hopes of a century ago were no greater, no smaller, than our own. This issue of the Delaware Courier, a front page of our own devising, based on old Delaware newspapers and Du Pont Company records, shows how keen is the edge of the saying: The more it changes, the more it's the same thing.

upon the same principle.

ELANIGANS 10 w 2nd st.



Smashed car "talks" about safe driving as Spruance rayon plant employees leave for holiday.

Driver education cuts traffic accidents

Du Pont employees, 15 times safer at work than off the job, participate in varied programs to reduce tragedy on the highway

By MARY ELLEN EVANS

He wasn't conscious of speed as he pushed the accelerator to the floor. Suddenly the green light ahead glared red. He hit the brake as fast as he could. The car...

Fortunately, there was no crash. For this car had no engine, no wheels, and there was no intersection. The driver was a Du Pont chemist taking a driver evaluation test. A Company safety engineer had pushed a button for the red light and clocked the chemist's reaction rate.

"If you were traveling 60 miles an hour when you saw that light or an obstruction, you would go 251 feet before you could bring your car to a stop," the engineer explained. "And your reaction time is about average."

This test is only a small part of the Du Pont educational program to help reduce the mounting toll of deaths, injuries and property damage caused by motor vehicle accidents. Last year, deaths across the country totaled 38,300 and disabling injuries numbered 1,350,000 with

costs estimated at \$4,300,000,000. Traffic accounted for a major share of lost-time accidents off the job. Such a national problem affects Du Pont directly, for Du Pont employees are now much safer at work than behind the wheel of the family car.

"I went through on the yellow light" may be last words of driver, "graveyard" at Spruance points out.



Lost-time accidents—whether on the job, at home, during a vacation or driving to the plant—in addition to causing pain and suffering, cost money, disrupt production and impair efficiency. Du Pont management believes that a widespread program emphasizing driver education and good highway manners and attitudes will pay off in a reduction of tragedy and cost to families and the Company.

They have good reason to believe that education will bring results. Last year the Company had less than one lost-time injury (.55) per million man-hours worked. Of Du Pont's 119 plants, laboratories and construction projects, 82 completed the year without a single time-losing injury. Two of these 82 have gone 24 years or more with a perfect record. In 1953 the Old Hickory rayon plant set a world record with 28,743,768 man-hours without a disabling injury. For ten consecutive years the Company has received the highest award of the National Safety Council. These accomplishments reflect one company's success in making jobs safe.

What are Du Pont employees doing in their effort to cut injuries on highways and streets? The program is flexible to fit hundreds of situations at plants, offices and laboratories. Participation of employees is encouraged but is voluntary. The program is spark-plugged by the Safety & Fire Protection Division of the Employee Relations Dept., who work with the central safety committees of plants and laboratories and with sales managers and district managers of sales offices across the country.

RAYON PLANT CUTS DRIVING ACCIDENTS

One of the safety committees at Spruance rayon plant in Richmond, Va., for example, started a concentrated highway safety program just prior to Labor Day 1952. Displays at each plant entrance pointed out safe driving practices and the results if drivers were careless. As employees filed out on Friday afternoon before the holiday, plant guards and Virginia state police handed them attractive pamphlets on safe driving and road courtesy with a verbal reminder to take it easy over the week end.

From this quiet start, the program spread out through the groups that make up the rayon plant. Richmond's city traffic engineer spoke on his work and problems to 130 maintenance employees at a safety meeting. The 3,000-Day Club of the Works Engineering Section, made up of employees who had gone 3,000 days without even a minor injury, appointed a highway safety committee. The new highway safety committee sent a letter and materials on traffic to all members, sponsored a movie and assisted in stimulating general plant interest in traffic safety.

Red Cross courses in first aid got under way in May 1953. Eighteen of the employee-instructors then got together to form a county rescue squad. Of particular interest to this group is highway safety. The members even furnish free ambulance service.

The Spruance safety committee borrowed a Reactometer from an insurance company to test driver reaction time. Employees took the test if they liked and learned from a safety engineer whether they should compensate for slow reaction time.

Among the effective constant reminders to plant people have been displays in the cafeterias, "Burma-Shave" type signs along driveways, luminous signs at entrances and exits of the parking area and regular distribution of timely pamphlets before holidays and the winter season.

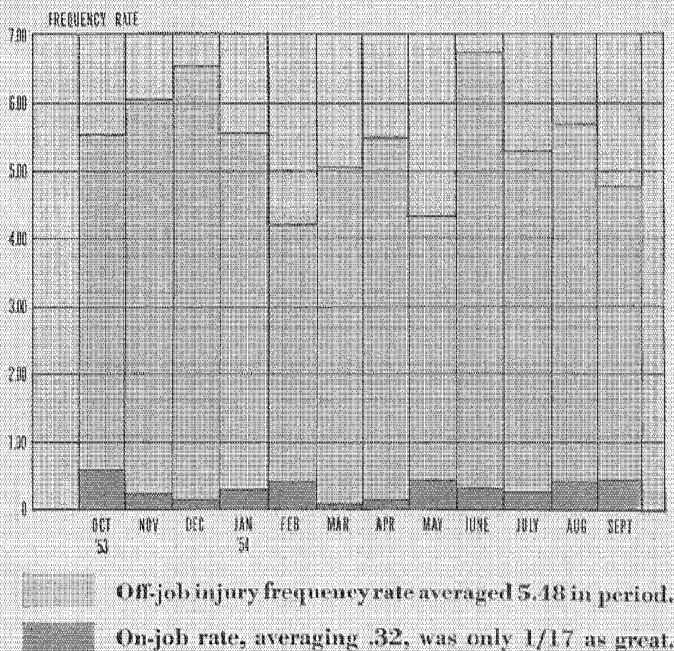
The device that probably attracts most attention is a badly smashed automobile strategically placed at main

entrances and prior to holidays. The car "speaks" through a hidden tape recording, to the passers-by about avoiding tragic accidents such as befell it.

Throughout its two-year program, the plant has had the complete cooperation of the Virginia state police and the Richmond Area Safety Council. Hundreds of employees have joined the popular Code of the Road Club sponsored by this Council. They sign a pledge to drive carefully and courteously, and after a year with no accidents receive a safe driver certificate.

Has this emphasis on highway safety paid off at Spruance? Company safety men think so. For the first eight months of 1953, the off-the-job injury frequency rate (based on injuries per exposure hours) was 6.6 for Spruance while the rate for the Company was 6.5. The similar period for 1954 shows the frequency rate at Spruance dropped to 2.7 as the Company rate came down to 5.3. During 1953, highway accidents killed three employees and accounted for 17 major injuries at Spruance. Through September of 1954 there had been only two major traffic injuries. The plant and the Company are convinced that education pays off behind the wheel as well as at a plant machine.

An example of a successful driver improvement program at a Du Pont laboratory is the one sponsored by the safety section at the Experimental Station, Wilmington. Started last December, this program is largely responsible,



Auto accidents cause 30% of off-job injuries among Du Pont plant and lab people. Driver education aims to cut toll.

the safety engineers believe, for an 88 per cent decrease in off-the-job traffic injuries.

Here the serious-minded safety men will tell you frankly they put more faith in education and action than in safe driving pledges and clubs. Not that they discount the value of constant reminders; they make use of pamphlets, match books, bulletin boards, posters and signs. But they do think that most drivers cannot know their inadequacies until they learn the rules of the road and take some tests.

To diagnose psychophysical driving inadequacies, the

safety section bought three pieces of equipment to evaluate drivers. They assigned two men to the job of lecturing on highway safety and publicized their availability to all departments at the Station. Taking the tests was a voluntary proposition, but almost all of the 2,800 persons at the Station took them.

Part of the reasons for the good response is the organization for safety here. Every employee has the opportunity to serve on some safety committee and during the year to participate actively in at least one monthly program. Safety consciousness is at a high level. Still the safety men found some interesting sidelights to their traffic job.

Some people couldn't believe their reaction time was as slow as the test indicated. "Must be the high heels; let me take the test barefoot," some women insisted. "Something wrong with your machine; I could stop on a dime," one man said. Another discovered the reason he had smashed into the rear of three cars. He couldn't judge

distance well and consequently drove too close to the car ahead. Several people found their night vision poor, others had their glasses changed.

In general, men rated better on reaction time and women were superior in field of vision. "Women have eyes in the backs of their heads," one safety engineer said. "We tell them they've developed this ability so they can see who whistled at them without turning their heads."

EMPLOYEES HANDLE OWN TRAFFIC PROBLEM

One bit of action that has not only cut accidents but proves interesting to watch is the alternating system of entering and leaving the Experimental Station gates in rush hours. With 1,400 cars parking within the fence, a guard is needed to direct traffic. The safety men hit upon the idea of voluntary alternation of cars from three drives into the public roads. A guard directed traffic in this manner for two or three days, the idea was publicized, then employees were left on their own. The system moves like clockwork, and even visitors fall into line with a sportsmanlike air.

Perhaps no one except professional drivers gets more exposure to traffic hazards than Company salesmen. Sales managers and district sales offices have long emphasized safe driving. For example, emphasis on highway safety for the past three years by Explosives Dept. salesmen has helped put them on top among the sales divisions: they average 360,000 miles per preventable accident.

With salesmen, the job of safety education is quite different from that at a plant. Salesmen are scattered from Miami to Seattle. They are almost entirely responsible for their own safety. Explosives salesmen especially have hard driving to quarry operations and mining and construction areas. Across the country, they drive in every weather and road condition possible. Average yearly mileage is more than 30,000 for each man.

Sales management in Wilmington keeps up a lively flow of suggestions to district offices. At meetings with these district office groups, safe driving is an important topic. "Years ago the safe handling of explosives was the chief concern. Now, we have in addition, an even more difficult safety problem—cars and trucks on the highway," said the assistant sales director.

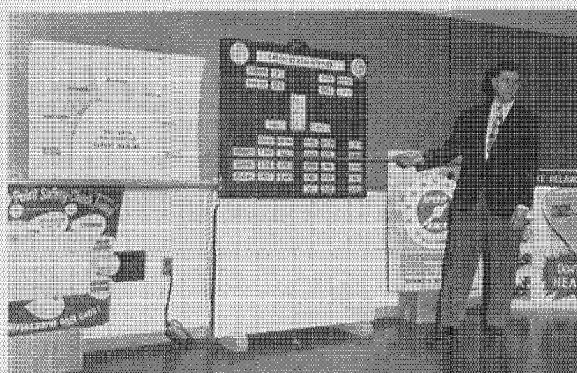
KEY: DEFENSIVE DRIVING

The heart of the safety program among salesmen is the creation of defensive drivers, those who make allowances for the lack of skill and knowledge on the part of others. Defensive driving is being emphasized in the Seattle district, for example, where management is stressing night and bad weather driving. Cars are equipped with first-aid kits, first-aid manuals and red reflectors. Films are shown at safety meetings; pamphlets and calendars on driving are distributed to all salesmen. Management is trying to cut exposure time by improved scheduling of salesmen.

In plants, laboratories and sales offices, employees are encouraged to participate in community and state traffic safety programs. For Du Pont, like all other industries and businesses, has a stake in community well-being.

Driving a car or truck, say Du Pont safety engineers, is a serious responsibility. If taken lightly, all the mechanical devices of the automotive engineer may not save you from becoming a statistic. Their faith that education plus action will go far towards creating good, responsible drivers is already helping to check the avalanche of accidents.

Safety education at Experimental Station, Wilmington, includes illustrated talks on safe driving practices.

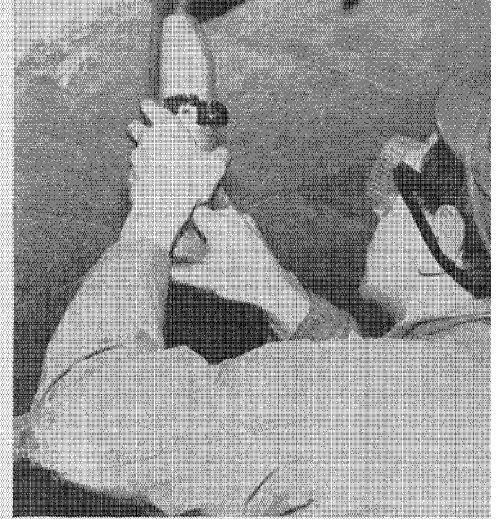
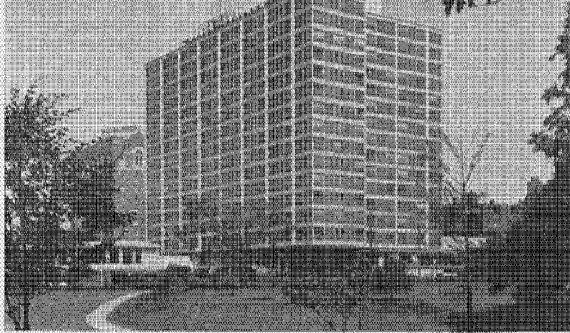


Company personnel take driver-evaluation tests to see if they need to correct driving habits.



Safety engineer checks reaction time and stopping distance of employee.





Remington Stud Drivers helped speed the job of

Building the newest Statler

The new 450-room Statler Hotel at Hartford, Conn., recently opened as the newest member of the Statler chain, was erected with the aid of some of the most modern tools yet developed in the construction industry.

Among them are Model 450 Stud Drivers, designed and manufactured by the Remington Arms Co., Inc. of Bridgeport, Conn. Four subcontractors on the Statler job saved thousands of dollars and hours of time by using the powder-actuated stud drivers for a variety of fastening applications in this new concrete and steel structure.

The complicated electrical wiring contract on the building was awarded the Lord Electric Co., Inc., a veteran user of Remington Stud Drivers. Lord Electric has found the Model 450, with nail-type studs and Remington cartridges, ideal for fast, in-to-stay fastening of conduit, pipe hangers and electrical outlet boxes.

"We have used the Remington Stud Driver ever since it has been on the market," says H. R. Priestley, assistant to the manager of Lord Electric, "and found it most effective and dependable. As a timesaving device, it has proved exceedingly satisfactory."

The installation of anchors for metal lath in plaster application is a difficult task in which the tool was employed by another contractor. Again using headed studs and cartridges, stud driver operators made these steel-to-concrete fastenings without the tedious matching of holes in the steel to hand-set bolts in the concrete.

The versatility of the Remington tool was again demonstrated by the Alvord and Swift Co. in the installation

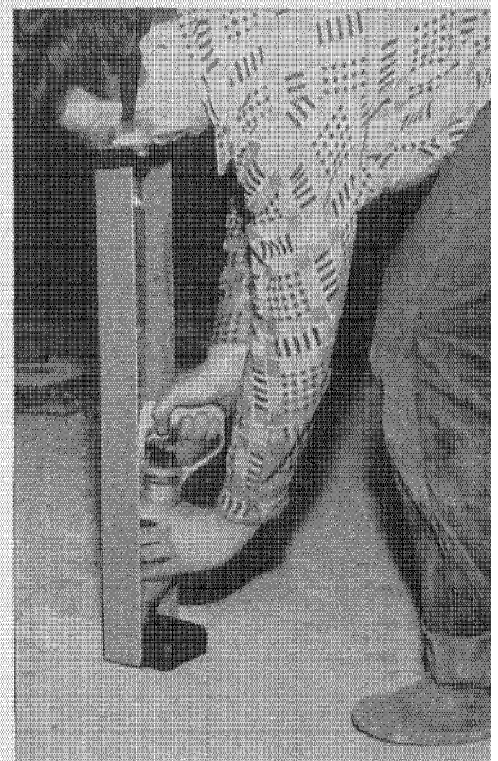
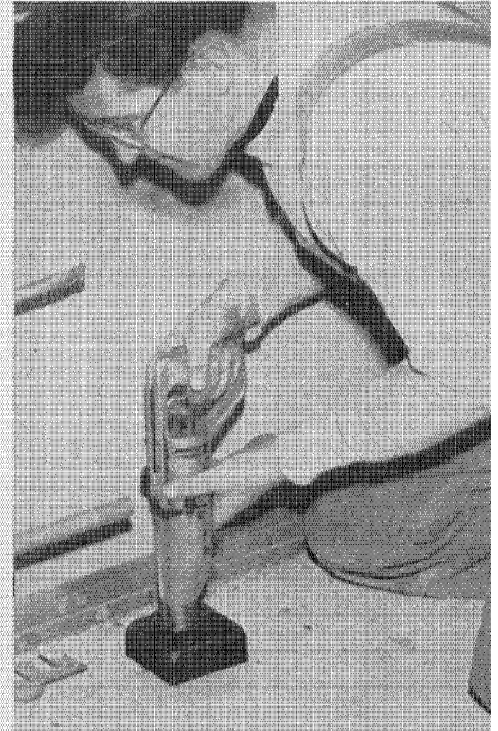
of the heating and air-conditioning units. These units require precision fastening so that the connecting pipes of the heating and cooling systems will position accurately. With easy-to-see, easy-to-use quadrant guides on the Remington Stud Driver standard guard, externally threaded studs were quickly set into concrete flooring exactly where and when wanted.

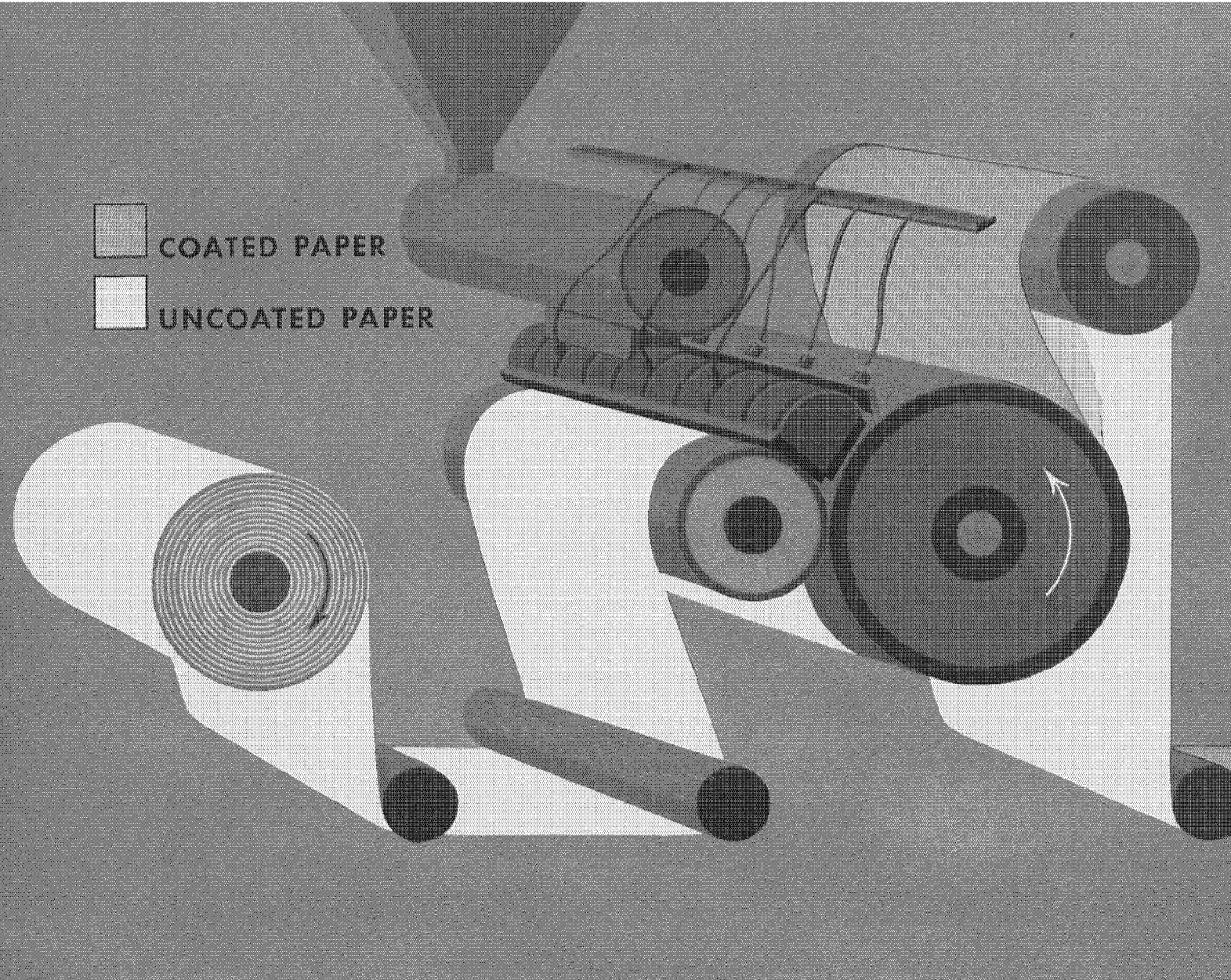
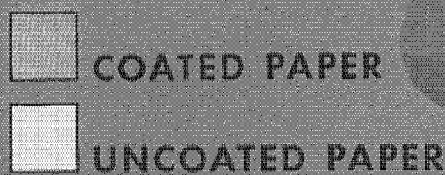
There is a lot of repetitive work on a job like the 14-story Statler Hotel, and it is here that such industrial tools as the Remington Stud Driver graphically demonstrate their efficiency. Operators of these drivers can easily make a half-dozen fastenings a minute, allowing the men to concentrate on actual installation of heating and ventilating equipment, rather than waste valuable time in getting ready to set it up. Most heating duct applicators find the Model 450 ideal for anchoring duct straps, since its light weight and minimum recoil make the tool especially applicable for overhead work.

Large window liners were installed throughout the new hotel by a subcontractor who depended on the speed of the powder-actuated stud driver to save precious contract schedule hours. For this work he used break-off head studs and Remington cartridges.

The many jobs tackled by Remington Stud Drivers in building the newest Statler point up the growing use of cartridge-powered tools in the building industry.

In building hotel, Stud Driver speeded jobs like these: installation of ceiling hangers, radiator heating units and steel door bucks.





Coating paper with "Alathon" produces a packaging medium that has the properties of both materials.

Carry *water* in a paper bag?

You can if the bag has a coated lining of "Alathon"

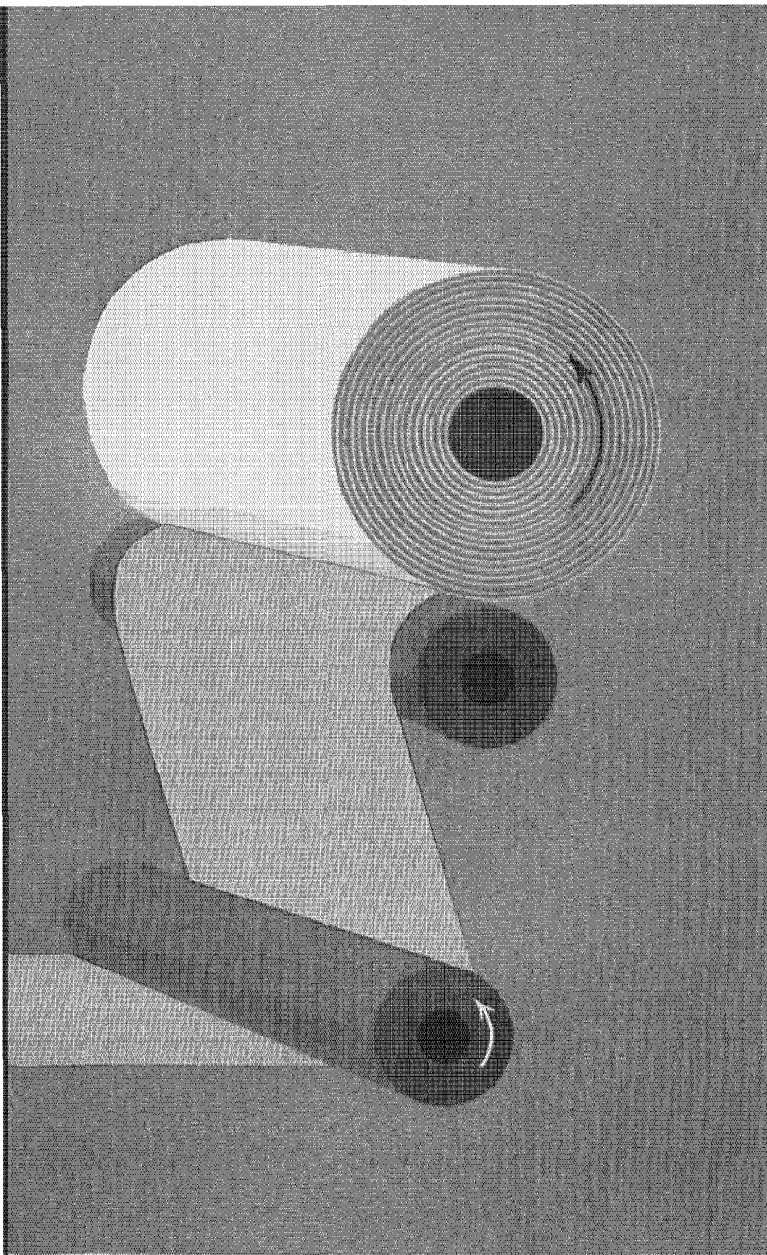
By R. S. WIGGINS

If, in your younger days, you tried to transport water in a paper bag to the scene of a first-class prank, you moved fast. For paper bags full of liquids could be counted on to burst quickly with a big splash.

Recently something has been happening to paper that will take the joy out of practical jokes. But it has brought good news to manufacturers, packagers and consumers. Paper and other flexible packaging materials are being coated with thin films of Du Pont "Alathon" polyethylene

resin and used to package such thoroughly wet products as syrups, sauces, citrus juice concentrates and brine-packed olives, fish and pickles.

"Alathon" resin, already well established in the packaging field as polyethylene film for wrapping fresh vegetables and as molded squeeze bottles for drugs and cosmetics, became important as a coating material because of its intrinsic properties. It is tough, flexible, non-tacky and resistant to grease and moisture. At room temperature



Soy sauce for take-home Chinese dinners is now packaged in single-service bags of glassine paper coated with "Alathon".



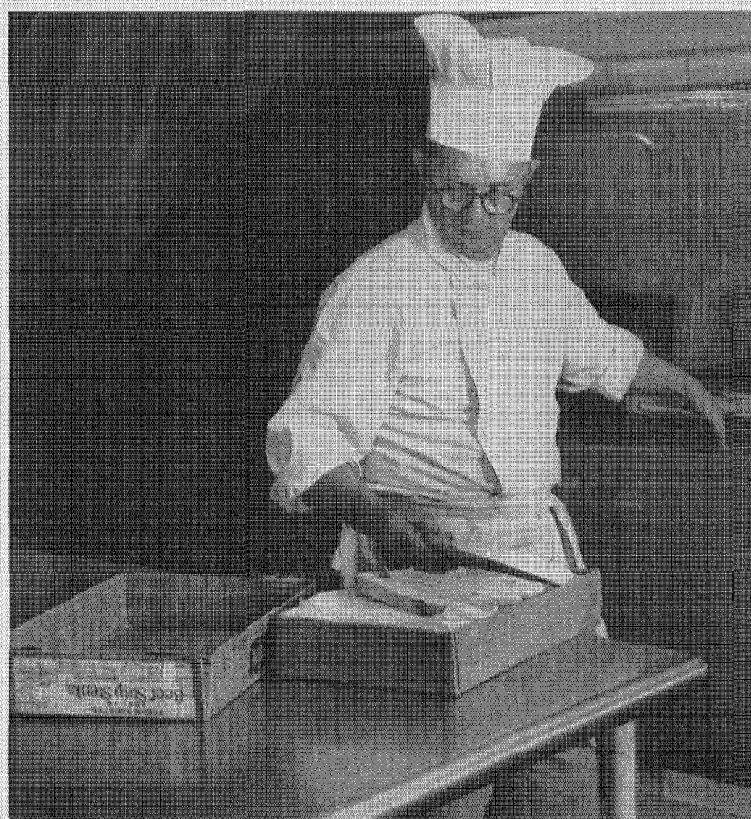
Cookies remain crisp and fresh when packed in a boxboard carton that has an inner coating of grease-resistant "Alathon".

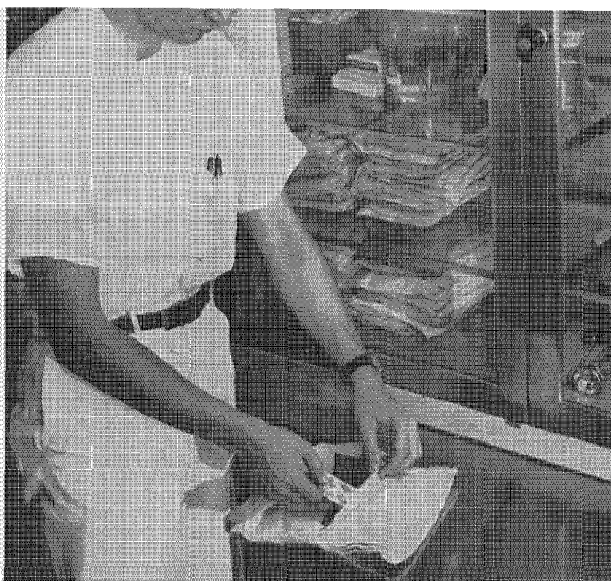
it is unaffected by most chemicals. In addition to being odorless, tasteless and nontoxic, coatings of "Alathon" make it possible to close single-ply packages with a strong heat seal, actually a weld, that prevents leakage.

These properties, plus the low cost of "Alathon"—one pound will cover 30,000 square inches with a one-mil coating—aroused the interest of paper coaters. They began to experiment with methods of applying "Alathon" to paper.

The most common method now used is the extrusion-coating process developed in Du Pont laboratories. By this method, the polyethylene resin, supplied by Du Pont in the form of molding powder, is poured into a hopper which feeds the heated barrel of the extruder. Under heat, and pressure created by a turning screw inside the barrel, the resin melts. It leaves the extruder as a hot, unsupported film that is drawn out to the desired thickness and im-

Meat juices and quick-freezing temperatures do not affect coated box liner of wet-strength kraft paper.





Fine powder for surgeons' gloves won't sift out of paper pouch with heat-sealed coating.

mediately bonded to the base material between two rolls. One roll exerts pressure against the base material; the other contacts the polyethylene side and cools and sets the resin.

By the proper selection of a base material for coating, a manufacturer will find that the finished package offers the combined properties of both polyethylene and the base. For example, heavy, unbleached kraft paper coated with "Alathon" is used principally for multiwall bags and single-ply packages, but it is also a liner for cartons and is used to make corrugated and solid fiberboard containers.

Bleached kraft paper, with its better printing surface and more sanitary appearance, is coated with "Alathon" and used for retail wraps, packaging frozen food and as liners for food packages for restaurants, hotels and hospitals. Glassine paper, made more grease-resistant with polyethylene, packages products ranging from soy sauce to oiled metal bearings.

Even tissue paper is getting a coating to make it moisture-resistant and puncture-resistant for such jobs as wrapping sharp metal parts and making a protective wadding for packing furniture and appliances. Because "Alathon" contains no plasticizer, there is no danger of it staining or blemishing the furniture.

"Alathon" on paperboard is a new development that looks good for packaging baked goods, frozen foods, powders, liquids and sticky items like dried fruit, sugar-coated cereals and confections. For manufacturers who need a superior moisture-vapor barrier material, aluminum foil-and-"Alathon" is meeting the requirements. The extremely thin foil may have or develop tiny holes which the coating seals effectively. "Alathon" also supports the foil against fracture and makes a strong heat seal. Dried milk, dried soup and cake mixes are packaged in this lamination.

TOP TEAM: "ALATHON" AND CELLOPHANE

Cellophane coated with "Alathon", or laminated to polyethylene film made of "Alathon", is another new material that has gained acceptance for packaging such foodstuffs as fruit juices, cured meats and cheese. It has the sales appeal of transparency and is excellent for component packages of a product. Here is a good example of two packaging materials that complement each other when combined. Once notched, cellophane tears easily; polyethylene does not. Polyethylene allows transmission of air at room temperature; cellophane does not. At temperatures below freezing, cellophane becomes less durable; polyethylene remains flexible even at -100°F . Both films are transparent, moisture-resistant and can be heat sealed. By combining them, the disadvantages of each for certain applications are offset and desirable properties enhanced.

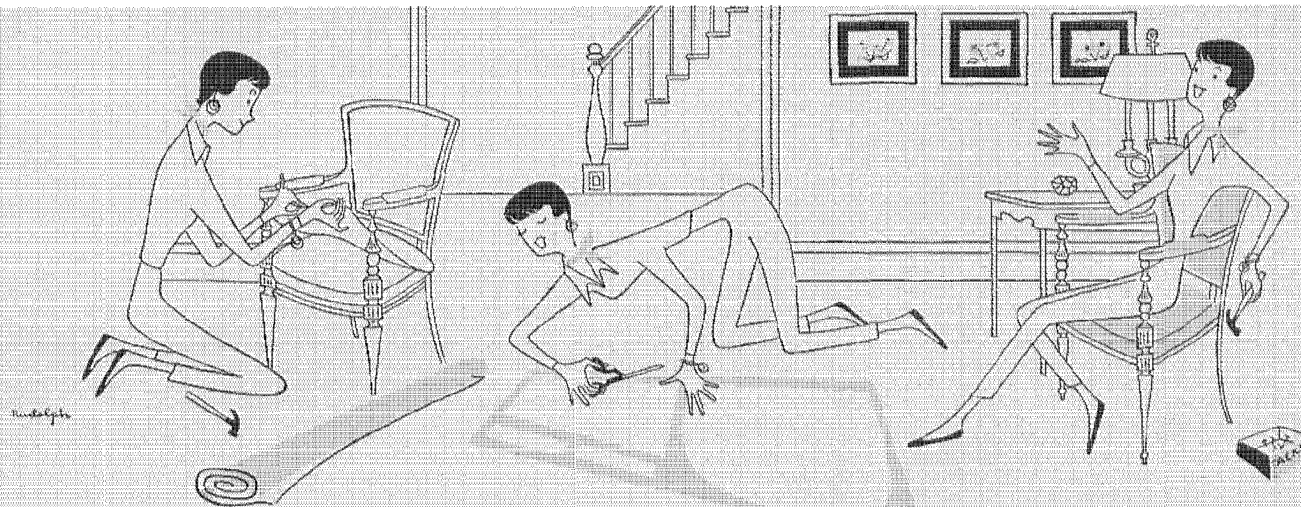
New packaging materials have helped to increase the production, distribution and merchandising of many products. They have helped to make available to the consumer more goods in more places at less cost. Flexible materials coated with Du Pont "Alathon" polyethylene resin are another contribution to the progress of modern packaging.

Wraps of coated paper retain moisture and flavor of all kinds of quick-frozen foods.



Moist, bacteria-laden humus will not rot bag of kraft paper coated with "Alathon".





Upholster it yourself

Hammer, tacks, scissors and Du Pont "Fabrilit" supported vinyl plastic upholstery are all you need to redo a chair and thereby join the do-it-yourself enthusiasts who are mastering everything from refinishing antiques to remodeling whole houses.

Upholstering can be completed in a short time, far less than it takes to make a slip cover. And, say the homemakers and their helpmates who've taken to redoing furniture, showing off the finished product is about as much fun as doing the job.

This brief article is not intended as an instruction sheet for upholstery. Complete step-by-step procedures are given in a booklet available at the department stores selling "Fabrilit". You may apply these instructions to divans, porch furniture, dining chairs, and den or recreation room furnishings.

The gist of the job is to remove the old upholstery, and, using it as a pattern, cut out the necessary pieces of "Fabrilit", allowing an edge for turning under. Then fit the new fabric tightly enough to remove surface wrinkles. Tack the pieces in place, using plenty of No. 4 upholsterers' tacks. By following the instructions in the pamphlet, you should have a professional-looking job, without a single sag or wrinkle.

"Fabrilit" has plenty of stretch for hard-to-tailor curves and shapes. The by-the-yard design available is called Granada Antique, a burnished leatherlike material, 54 inches wide, that comes in ten different colors.

What may you expect of your "Fabrilit" upholstery? Careful manufacture and much testing under rigorous conditions are back of all "Fabrilit". You can be sure your newly covered chair will lighten your housework. Slow to soil, even from small feet, "Fabrilit" can be sponged off with soapy water and rubbed quickly to its original luster. It will resist scuffing, cracking and peeling.

Along with easy care, you can expect your upholstery

to last and to keep its rich appearance, as it is especially engineered for the job of covering spring-filled furniture. "Fabrilit" is supple and pleasant to the touch.

If you've wanted to join the growing league of do-it-yourself people, but thought it took a workshop to get in the swing, you might try upholstering that middle-aged chair. The next time your power-saw-and-electric-drill friend comes by, offer him a seat in the "new" chair.



Even if you are not a do-it-yourself expert, you can upholster a chair quickly with Du Pont "Fabrilit".

Duplicates unlimited

That's what photographic copies can give you. Here are the whys and wherefores of Du Pont's line of industrial reproduction papers

By MERRITT HULBURD

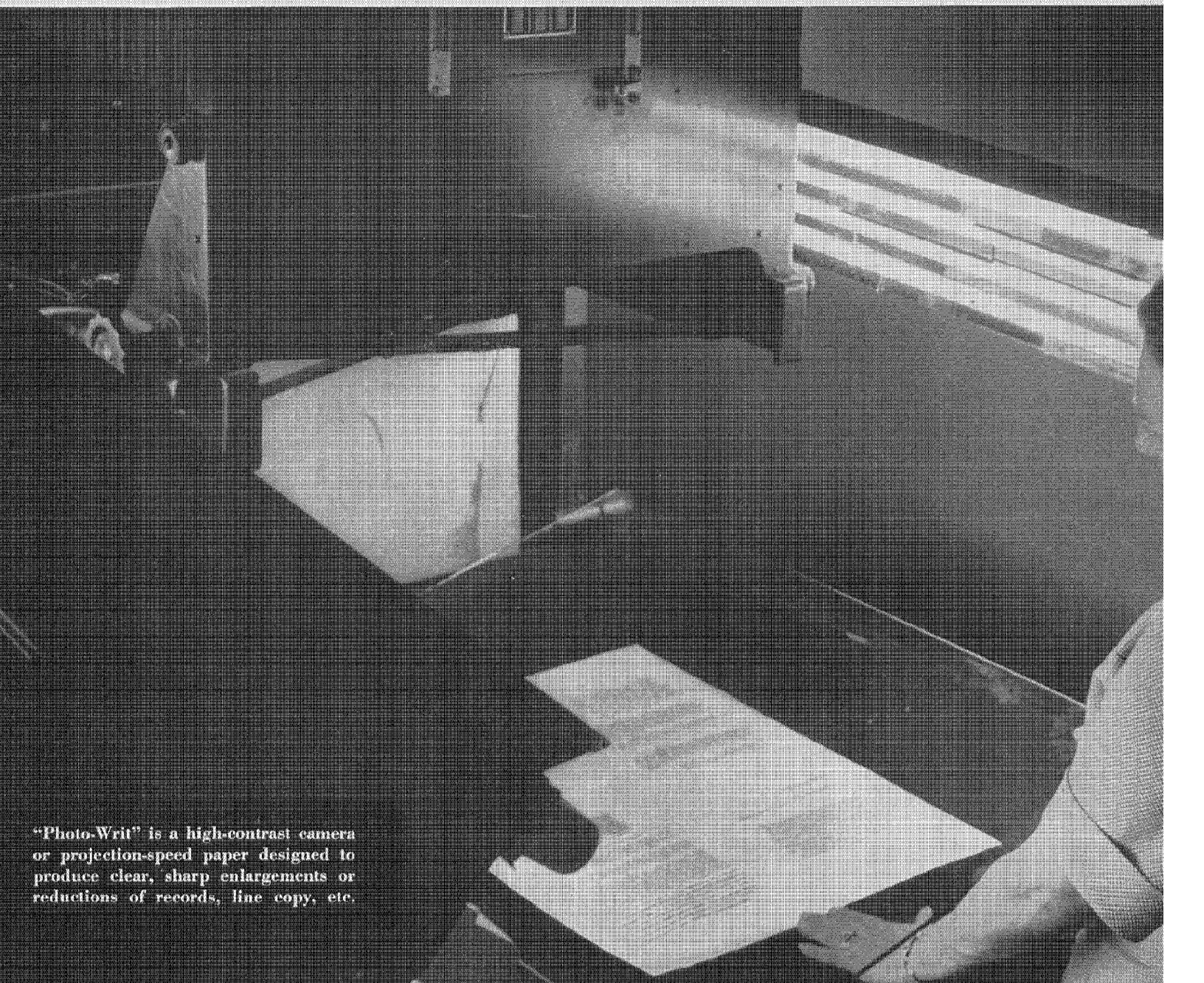
You are the exception to the rule if you never have had a photocopy made of either a personal or business document. It might have been a wallet-sized copy of your Armed Forces discharge or an intricate architectural design. Whatever the document, you had a photocopy made because you wanted an exact reproduction of material either difficult to replace or unavailable for handling in its original form.

Good photocopies are so faithful to the originals they are both legally acceptable in the courts and technically acceptable to the engineer. Insurance companies make photocopies to safeguard original applications and policies.

Aircraft manufacturers often work from precise photocopies of engineering drawings. Advertising agencies use photo reproductions of art or photography when ads are in the planning stage.

Photocopying is used for so many different purposes that no single photographic reproduction paper can give best results for all. For example, high contrast between black and white for maximum legibility is of paramount importance in the reproduction of letters and similar line copy, while tones and shadings must be brought out to reproduce art or photographic work accurately.

Du Pont makes four different types of industrial

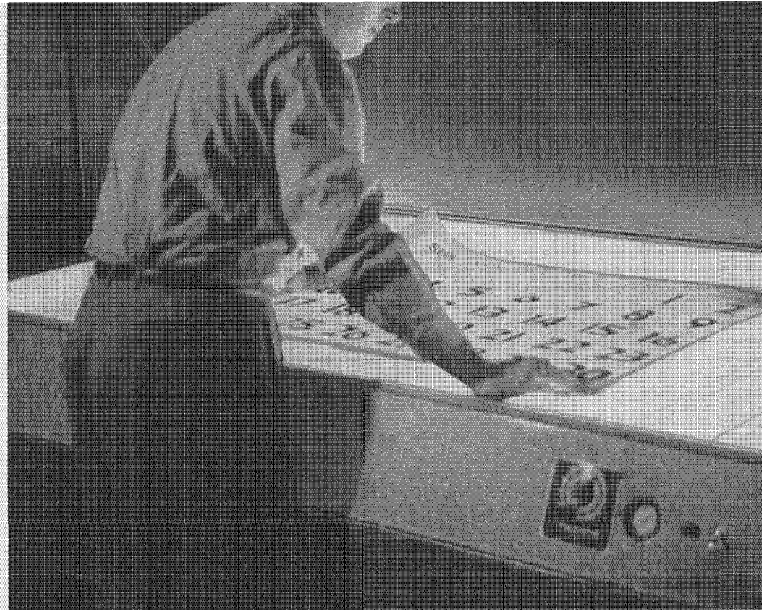


"Photo-Writ" is a high-contrast camera or projection-speed paper designed to produce clear, sharp enlargements or reductions of records, line copy, etc.

reproduction papers to suit these needs. By far the most widely used is Du Pont "Photo-Writ" photocopy paper. This high-contrast camera or projection-speed paper, "Photo-Writ", is designed to produce clear, sharp reproductions or enlargements of records, checks, line drawings, and the like. "Photo-Writ" can be exposed in conventional enlargers and cameras as well as in "Photostat" and "Rectigraph" photocopying machines.

"Photo-Writ" is manufactured in six surfaces that differ in weight, stock type and surface sheen. Designed to save storage space as well as reduce shipping costs, "Photo-Writ" W is the newest surface to be put on the market. It is made of tough, extra thin 100 per cent rag stock that takes up 60 per cent less storage space than ordinary papers and is only half as heavy. Not only does its semi-matte surface take pencil and ink corrections easily, but it is so translucent it can be used either as a negative or as a master positive when clear, sharp duplicates are needed in a hurry.

Du Pont Copytone variable contrast paper gives outstanding results in the reproduction of continuous tone and half-tone art or photography, as well as of line work.



Du Pont Reflex copy paper reproduces from either side of printed sheet without revealing printing on obverse.

Like "Photo-Writ", Copytone is geared for fast camera speed. When used to make black-and-white reductions or enlargements of color work, it reproduces the tonal qualities of the colors in shades of gray. An unusual feature of Copytone is that its contrast may be increased or decreased at will by changing the color of the exposing light.

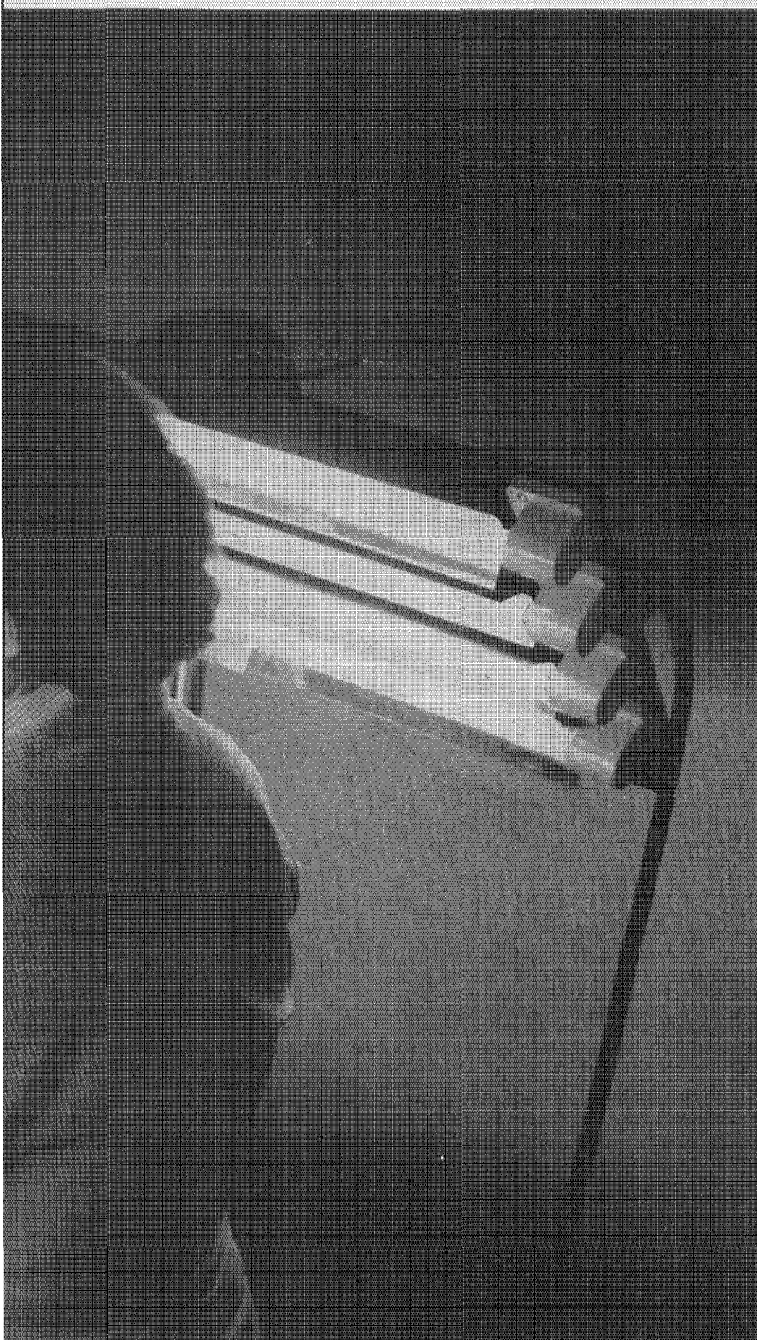
Merit Studios, Inc. of New York City uses Copytone extensively for their advertising and architectural accounts, often with unusual results. A large New York architectural firm asked Merit Studios to make duplicates of finished drawings of a proposed central city office building on which they were bidding. To make sure the reproductions would be faithful in tone and contrast, Merit used Copytone. The results were more than satisfactory. The architect had Merit make more copies, bound them into a large turnover display and used the display to present his design to the building group. The deal was closed.

Du Pont Reflex copy paper is of contact speed and is designed for a unique purpose. It can reproduce the copy from either side of a printed page without revealing the printing on the other side. Reflex copy is ideal for reproducing pages from catalogs, technical manuals and books. It can be used at low levels of ordinary room illumination, an important point to those without photographic darkrooms.

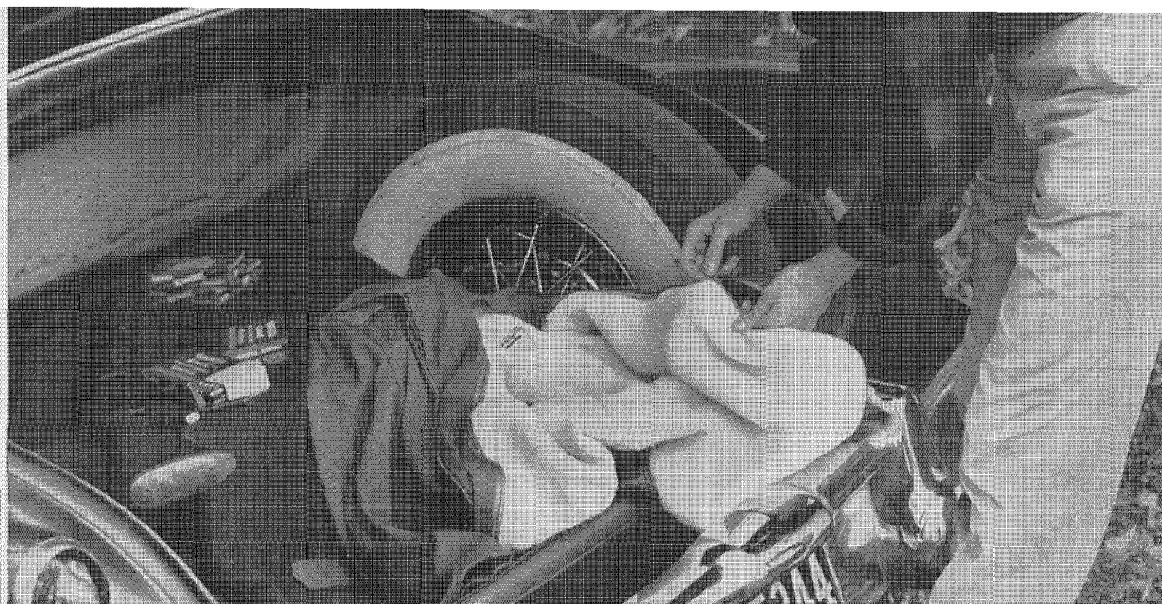
"Cap Solar" photographic paper, also used for contact work, has exceptionally rapid developing speed. This factor assures crystal-clear, fine line reproduction, with a minimum of fog. Many engineering and surveying companies use large amounts of "Cap Solar" for duplicating maps, charts and graphs.

Each of these papers, "Photo-Writ", Copytone, Reflex copy and "Cap Solar", is carefully manufactured and tested to assure highest quality results when the right paper is used to do the job. However, the final determining factor of quality in any photographic process is the skill and care with which the materials are used.

If you need information on photographic reproduction for your business, this *Magazine* will forward to you, on request, a detailed technical booklet on Du Pont industrial reproduction papers.



Jacket lining of new Type C acetate has outstanding warmth yet is light weight.



Acetate with a difference

Du Pont recently announced the development of a new yarn, Type C acetate, combining the qualities of fine fleece and regular acetate. It goes to textile manufacturers as an uncrimped, continuous filament yarn that develops an enduring crimp when properly treated with boiling water. The fiber is now commercially available in ten deniers, ranging from 55 to 900.

Products woven of the new fiber have already reached many stores. The O.K.O. Plush Co. is offering upholstery fabrics using Type C, and several weavers, including E. F. Timme & Son, Collins & Aikman Corp., Sidney Blumenthal & Co., Inc., and Baxter, Kelly & Faust, are now supplying soft, fleecy linings of Type C acetate to such jacket makers as Lustberg Nast & Co.

Consumers will find many superior qualities in garments and other fabrics made of Type C acetate. The yarn has the richness, pleasing hand, and eye appeal of regular acetate. Moths are not attracted by it, it is resistant to mildew, and it retains its original look after dry cleaning. Lint-free Type C acetate can be dyed in either bright colors or pastels. After crimping, the yarn has outstanding warmth with very light weight.

Textile mills and finishers receive additional advantages from Du Pont's newest fiber. The product is uniform, batch to batch and day to day, so uniformity of dyeing is easy to achieve. The new acetate's adaptability makes it a versatile tool for the designers of novelty yarns. Garment makers find it unnecessary to treat fleece linings of Type C to prevent flash burning. No feature, however,

is more important in this portrait of the new fiber than the ease and economy with which it is crimped. The continuous filament yarn, shipped from the Company's Waynesboro, Va. plant, is woven, knitted or tufted in the usual manner. Then the cloth is immersed in boiling water, either before or during the dyeing process. This boiling water bath is quick—10 to 30 minutes—the crimp increasing with immersion during this period. This ability to crimp was engineered into the yarn by special production techniques.

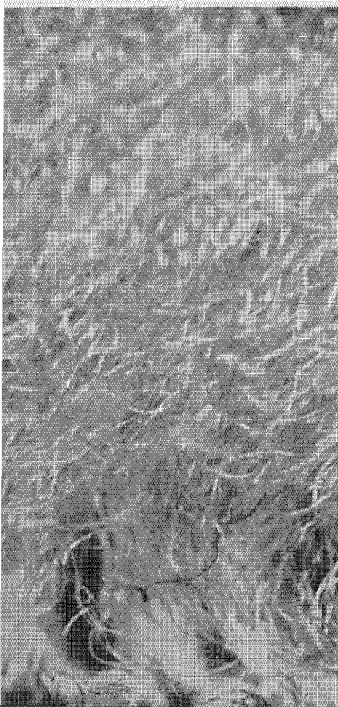
MANY USES INVESTIGATED

Particularly because of this crimping feature, Type C is being investigated for rugs and carpets, draperies, bedspreads, knitted garments and corduroy fabric. Anticipated uses also include boot and slipper linings, paint-roller covers, and coats.

Before the war, the Company began research on modifications of acetate to broaden and increase its utility. Out of this came a continuous fiber which, when boiled in a chemical solution, had a wool-like crimp.

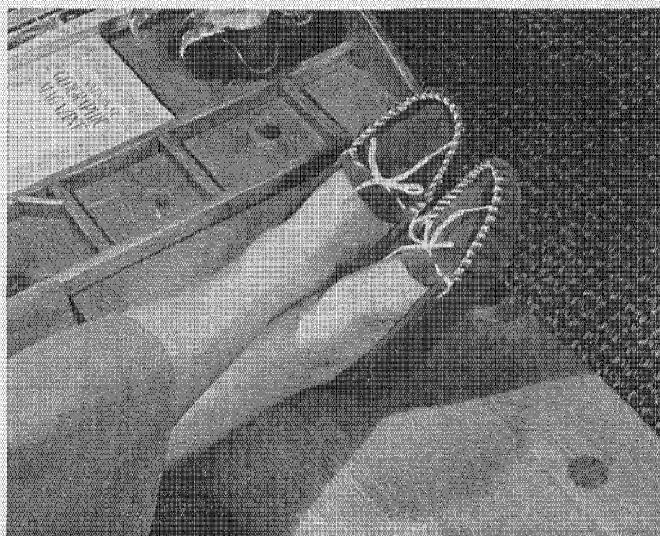
Postwar engineering improved the yarn and especially helped the textile middleman; he could get the fleecy crimp by treating with boiling water instead of a flammable chemical mixture. By 1952 the trade had received samples of the new fiber to evaluate. It is fitting that the new Type C acetate should be formally introduced in 1954, the 25th anniversary of Du Pont's entry into acetate manufacture.

Top: Type C pile fabric before crimping. Bottom: same fabric after it is crimped and wire brushed.



What's New

• **TWO NEW PRODUCTS** of "Alathon" polyethylene resin are designed to improve containers. A plastic screw top with a polyethylene cone liner is made by The Poly-Seal Corp., 405 Lexington Ave., New York. The new closure is engineered to eliminate leakage, evaporation, contamination and binding. Berkshire Plastics Co., Inc., East Longmeadow, Mass., is marketing a colorful snap-on top for canned beverages. The re-usable tops are made with a spout for pouring from an open can.



• **A GIFT IDEA** is the new Alco-Ranch moccasin in a suede-like fabric that is waterproof, soft and washable. Du Pont neoprene bonds a suede finish to the fabric backing. Moccasins are hand-laced and have foam rubber inner-soles. Made by Alco of Texas, Inc., San Angelo, Texas.

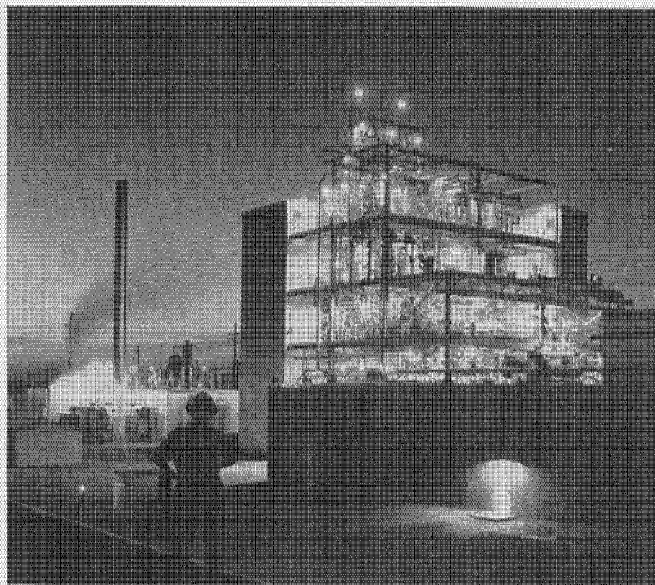
• **ALONGITUDINAL NYLON CORD BREAKER**, patented by B. F. Goodrich Co. and used in a new conveyor belt, is said to increase belt life up to 50 per cent. The cord breakers are used with high tensile steel ribbon inserts to prevent accidental rips from running the length of the belt.

• **NEW FORMULATION** of "Zytel" nylon resin, resistant to ultraviolet degradation, opens fields for applications involving prolonged outdoor exposure. With good weatherability added to its other properties, "Zytel" is expected to be useful in molded parts for agricultural machinery, sporting goods, toys, electrical equipment and automobiles.



• **TOY ANIMALS** that are soft, cuddly and practical, are made of a plush fabric containing "Orlon" acrylic fiber. The whimsical animals, including all trims on the toys, may be machine washed and dried. Pup and monkey made by Elka Toy & Novelty Mfg. Corp.; teddy bear by Clare Creations, both of New York.

• **"ADIPRENE" B URETHANE RUBBER**, Du Pont's new experimental rubber which stems from isocyanate chemistry, has reached the field-testing stage. The new rubber is believed to have excellent abrasion resistance. It has displayed high tensile strength and resistance to oxygen and ozone degradation, but at present it is difficult to process. Samples for evaluation will not be available until the material has undergone further field tests.

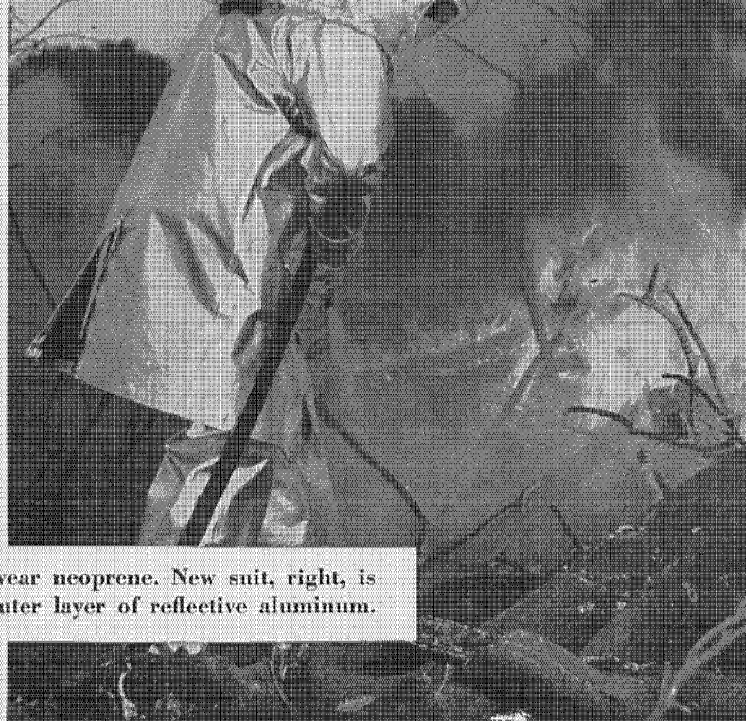
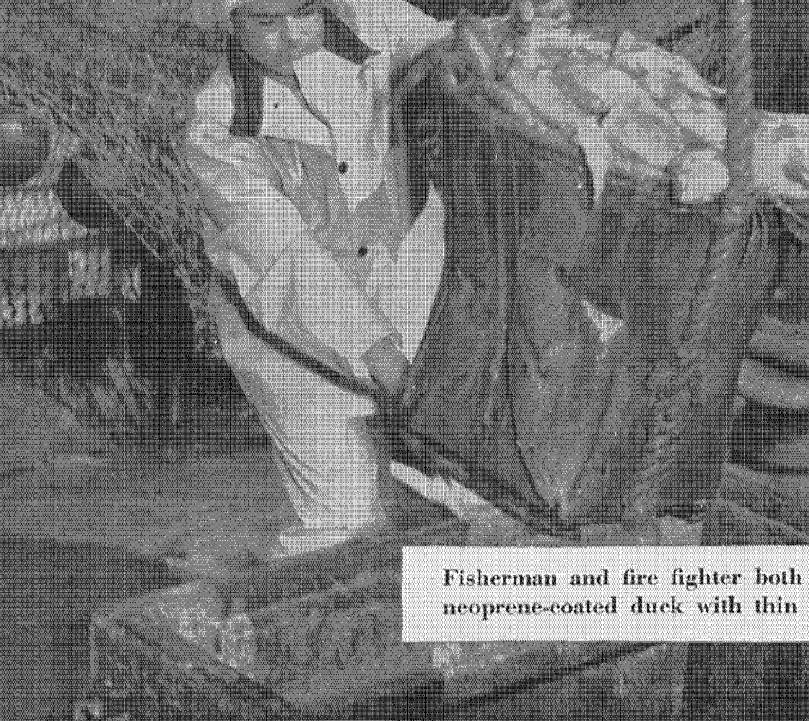


• **NEW PLANT** for the manufacture of "Mylar" polyester film at Circleville, Ohio, is now in commercial production. The five-story building operates around the clock to produce the polymer for the industrial film.

PHOTO CREDITS: Page 7, right: Courtesy A. & M. Karagheusian, Inc.; Page 9, left: Courtesy Eel Aircraft Corp.; Page 10 and Page 11, top and center: Courtesy U. S. Forest Service; Pages 13, 14 and 15: Courtesy True Magazine, Sept. '54; Page 18: Bettmann Archive; Page 29, top: Courtesy

Merit Studios; Page 32, top right: Courtesy U. S. Army; bottom right: Courtesy U. S. Air Force; Page 33, bottom right: Courtesy Engineering Development Corp.; Page 34, top: Courtesy McCall's Magazine, July '54; Page 36: Courtesy National Tank Co.

pg. 33, top left: Courtesy U.S. Navy



Fisherman and fire fighter both wear neoprene. New suit, right, is neoprene-coated duck with thin outer layer of reflective aluminum.

Protective clothing

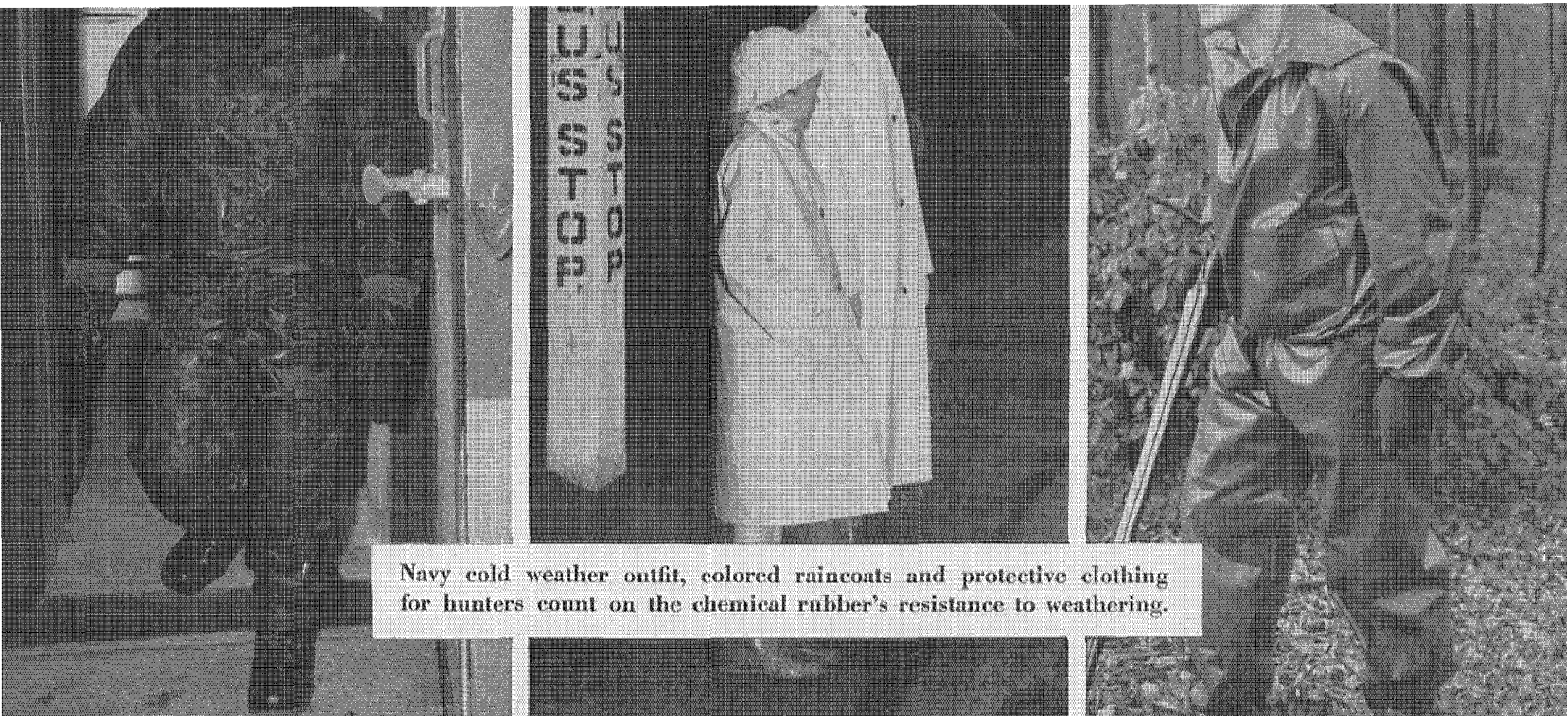
Widely diversified in use, it has one thing in common: a dependence on the special properties of neoprene

From the fire fighter in the shiny suit to the shapely young skin diver, the people wearing protective clothing on these two pages depend in one way or another on the combination of physical properties that characterize Du Pont neoprene, America's first (1932) commercial synthetic rubber.

The commercial fisherman with his neoprene-coated pants and jacket? He relies on the rubber's resistance to oil and abrasion. The surf fisherman and the hunter? Neoprene's ability to endure outdoor exposure is important to them. The fellow with the two pipe wrenches? That line he's taking apart ordinarily carries acid, and the neoprene



Chemical-resistant neoprene protects acid worker. It also goes into high altitude suit that inflates if cabin pressure should be lost.



Navy cold weather outfit, colored raincoats and protective clothing for hunters count on the chemical rubber's resistance to weathering.

suit he's wearing is resistant to the corrosive liquid.

To get back to the young lady on the rocks, her suit and helmet are made of unicellular sponge neoprene. The tiny cells of sponge are sealed off from one another so that the material does not soak up water. Instead, the tiny pockets of air trapped inside the cells insulate the wearer against underwater cold. (If water temperature is below 55°, long pants of the material are also recommended.)

The same closed-cell sponge, only an eighth of an inch thick, is used in diving suits for men. Equipped with an air supply and flippers, West Coast geologists have been

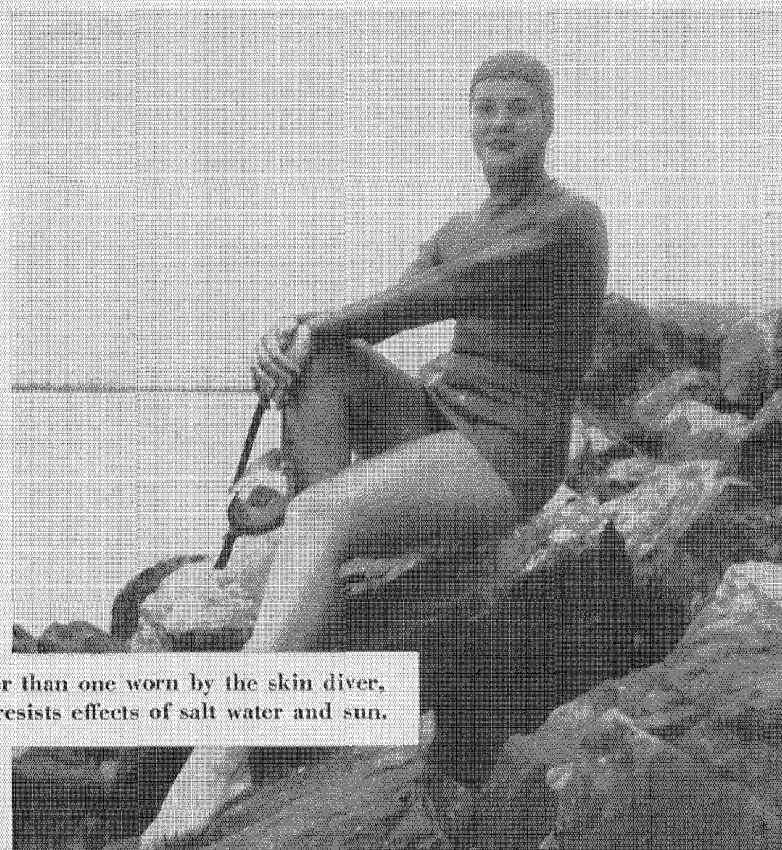
wearing the suits in their search for signs of oil deposits below the ocean floor. One user reports that his divers consider the suit the best on the market.

The maker of both suits, Engineering Development Corp. of Berkeley, Calif., says, "Neoprene is especially practical as a material for diving suits because the chemical rubber is resistant to the effects of sun, salt water and grease."

With a little change in emphasis the same thing could just as readily be said about the qualifications of neoprene for any of the suits shown here.



Surf caster's outfit is a little bulkier than one worn by the skin diver, but both use neoprene because it resists effects of salt water and sun.



Quality companions

A short story on America's finest china . . . and how cellophane helps keep it that way

Since Du Pont produced America's first cellophane 30 years ago, the imaginative American mind has developed almost limitless packaging uses for it. Cigarettes, bakery products, nylon stockings, candy, drugs, meats, vegetables

—these are just a few of the thousands of items now wrapped in cellophane.

Among the Company's customers with an important but lesser known use for the film is Lenox, Inc. of Trenton, N. J., which packages chinaware in cellophane for shipping and storing.

Lenox, over its 65-year history, has achieved a name for fine china ranking with Wedgwood or Haviland-Limoges. A tribute was paid to the character of the Lenox product in 1917 when it became the first American china ever used in the White House. Woodrow Wilson ordered a 1,700-piece set, and Lenox has provided the Presidential dinnerware ever since.

The company demands perfection in every piece of dinnerware or artware it turns out, and there is no such thing as a "second" made by Lenox. Each piece must pass rigid tests and inspections during production and the most minute flaw will relegate it to the junk heap.

The pride of the meticulous craftsmen who make Lenox china extends also to those who must see that it reaches customers in its original perfect condition and that it is packaged to reflect its quality. In seeking something to insure this they looked for a kind of wrapping that would prevent scratching, keep the dishes clean and, at the same time, enhance the beauty of the lustrous ware. It sounded like a large order until they considered what cellophane had to offer.

Specialists from the Du Pont Film Dept. were called in and, working closely with Lenox, selected the type of film with the right properties, including strength, ease of heat sealing, and moistureproof-

ness. For the past ten years, almost every piece of Lenox china has been placed in its own cellophane envelope for storing or shipping. The use of the Du Pont product has greatly simplified the filling of orders in the Lenox plants as patterns are easily identified through the transparent film.

"We consider Du Pont's cellophane and its 24-carat ceramic gold that we use for decorating china," say Lenox officials, "to be worthy companions for our traditionally fine quality china."



▲ The pride of craftsmen who make Lenox china extends also to seeing that product reaches customers in perfect condition.



For ten years almost every piece of Lenox china has been placed in its own cellophane bag for shipping and storing.

"THE MAN WITH THE BIG IDEA"

Our complicated society is dependent on group effort, but it is still the uncommon individual who spurs it forward. Progress comes only when someone, impatient with things as they are, has the initiative to make his dreams come alive. Maintaining incentive for the individual, then, is a necessity if America is to move ahead.

These were the main points made in a recent talk by Du Pont President Crawford H. Greenewalt before the National Safety Council in Chicago.

No group effort is more than the combined sum of individual efforts, he said. There is danger in the assumption that quantity will ever beget quality, or that conformity to the group is a satisfactory substitute for personal achievement.

"Our problem is to keep alive the powerful stimulant of individual thought at all levels and in every phase of our effort. We cannot afford to make a displaced person out of the man with the big idea."



Crawford H. Greenewalt

"...The merging of individual into group effort was perhaps inevitable—and, in a sense, is a measure of our progress, for the team exerts a leverage upon human effort that enables us to do together things far beyond the range of any of us working alone. It is a trademark of our times and, I am sure, a hallmark of our future."

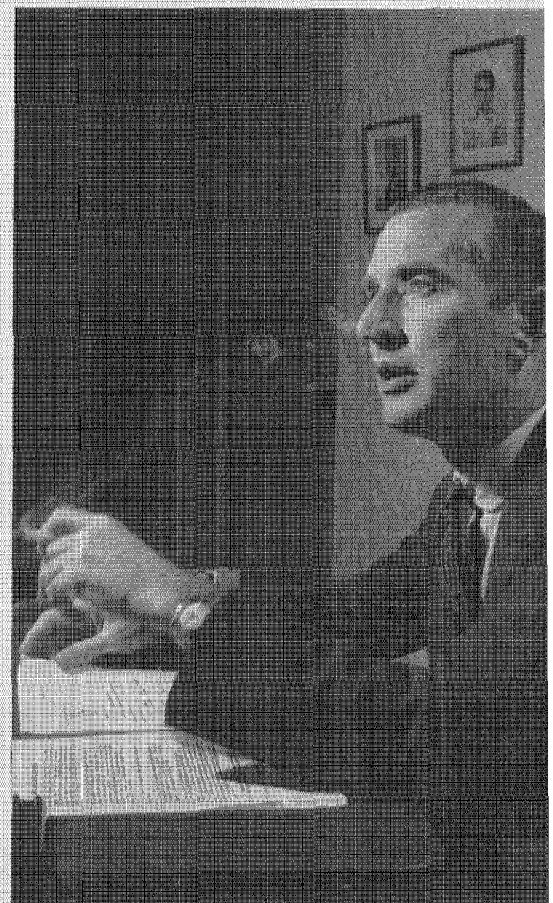
"... We must not obscure the essential uniqueness of the individual by permitting the composite of the many to become a standard... Too many of our research establishments... measure their stature in terms of staffs, buildings, equipment and budget... Too many of our schools seem to be teaching us that man's highest pedestal can be reached through harmonious conformity rather than original personal achievement."

"... Individuals cannot be classified into neat little bundles... The other day I took one of the standard psychological testing sheets used so widely now in personnel work and applied it to a rare and highly individualistic American—Benjamin Franklin... I could only conclude that he would have had bad luck winning a place for himself today..."

"... By giving one individual a mortgage on the efforts of another, we execute a twin injustice. One we deprive of the fruits of his labors and the rightful rewards of his industry and thrift, the other we deprive of his sense of responsibility. In the long run, I am not sure who suffers the greater loss."

"I will make one prediction—the scientific miracles of the future, like those of the past, will be wrought by men and women with courage, with the pioneering instinct to plunge ahead and to take a bold chance."

"Our whole American heritage is a profession of faith in the individual—in the individual's sacred right to think, to plan, to create and to dream. That was the faith of our fathers. Therein lies the hope and the safety of our future."





Intermediates: Chemical industry workhorses

The story of intermediates is the story of the chemical industry today. These compounds are of all types—simple and complex, acid and alkaline, costly and inexpensive, well-known and almost unheard of. But around chemical plants they are the doers, the chemicals that make reactions go. Para-aminobenzoic acid is typical. It is used to make drugs, agricultural chemicals, dyes and sun tan lotions. A really busy intermediate, such as aniline, will wind up in the manufacture of dyes, pharmaceuticals, rubber chemicals, photographic chemicals, plastics, and agricultural chemicals in addition to many specialized products. Still other Du Pont intermediates are so new that only a few commercial uses have been developed.

Intermediates serve all branches of chemical manufacture. For instance, additives said to be antienzymatic that are found in some of the newer toothpastes are chemicals built with the organic intermediate, sar-

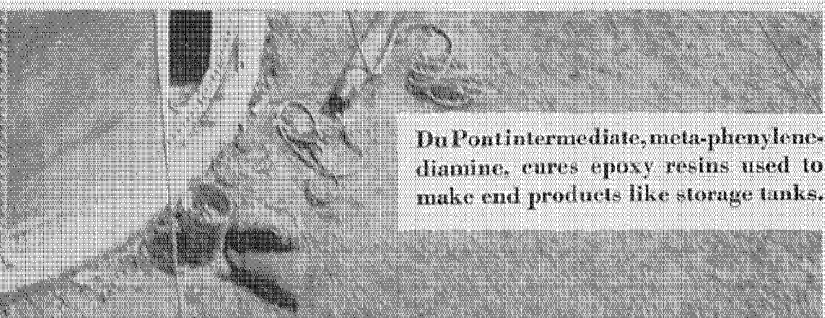
cosine, which is also sold as a dye stabilizer.

Para-aminophenol (PAP), another of the Company's newsworthy intermediates, is used in synthesizing photo developers, pain-killing drugs and antioxidants for petroleum, essential oils and animal fats. PAP also helps prepare antioxidants to keep rubber from deteriorating rapidly during exposure to air and sunlight.

Meta-phenylenediamine is slated for heavy-duty chores. This intermediate cures epoxy resins, helping to make such end products as structural sheets for storage tanks, and parts for aircraft and automobiles.

Still another of our organic compounds, meta-chloroaniline, is a promising intermediate for synthesizing weed-killers for cotton growers. It also helps form several complex drugs, including one pharmaceutical house's new antimalarial drug.

This is merely a random sampling of Du Pont organic intermediates, for the list of more than 150 and their properties fills a book. Our Organic Chemicals Dept. works closely with companies seeking intermediates for a new synthesis or to improve an old manufacturing process. "If we don't have the best candidate," explained a department spokesman, "it's ten to one we'll make it if there's sufficient demand. After all, without intermediates there would be no modern chemical industry."



Du Pont intermediate, meta-phenylenediamine, cures epoxy resins used to make end products like storage tanks.

Here they come....

YOU watch the beating wings approach. There's a quickening of your heart. Forgotten are icy feet, cramped limbs, the sting of sleet. Here now is the great thrill of hunting. This is the payoff!

You're glad now you chose Remington "Express"—your best insurance that this great moment will not be followed by the disappointment of a miss or a cripple.

Remington "Express" shells are loaded to the limit for power—not to encourage the extreme long-range shots conservationists and good sportsmen advise against—but to reduce the number of birds lost through honest errors in range estimation.

Thanks to the Flat-Top Crimp originated by Remington, these great green shells insure a perfect pattern every shot. The strong corrugated body is completely wetproof.

And famous "Kleanbore" priming protects your gun barrel. Your own dealer has a full supply.



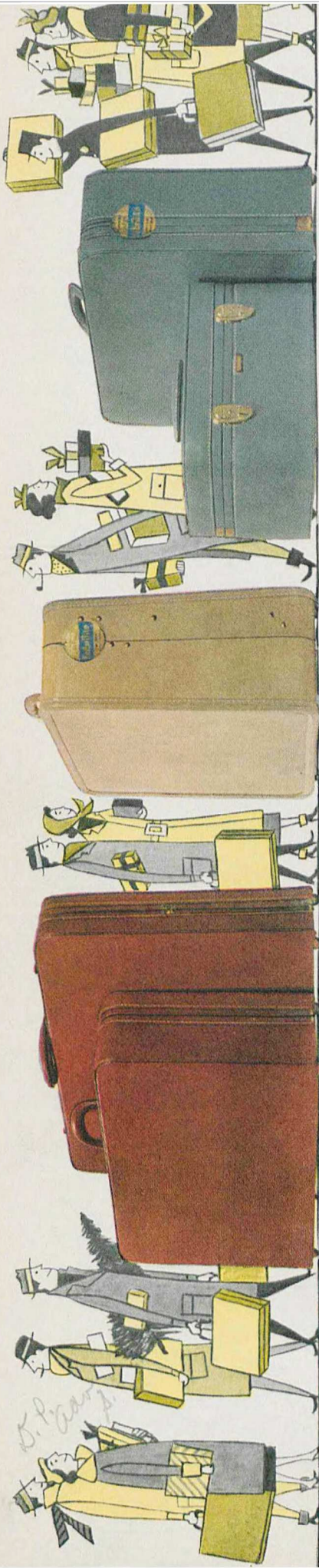
REMINGTON "EXPRESS" SHELLS

Remington **DU PONT**

"Express" and "Kleanbore" are Reg. U.S. Pat. Off. by Remington Arms Company, Inc., Bridgeport 2, Conn.

Above is an interpretation of a scene by famous illustrator Stevan Dohanos from the award-winning Remington film, "Gunning the Flyways."

WATCH "CAVALCADE OF AMERICA" ON TELEVISION



"Fabrilitte" is Du Pont's registered trade-mark for its vinyl plastic luggage material.

A GIFT THAT DOES YOU CREDIT... LUGGAGE OF

Fabrilitte®

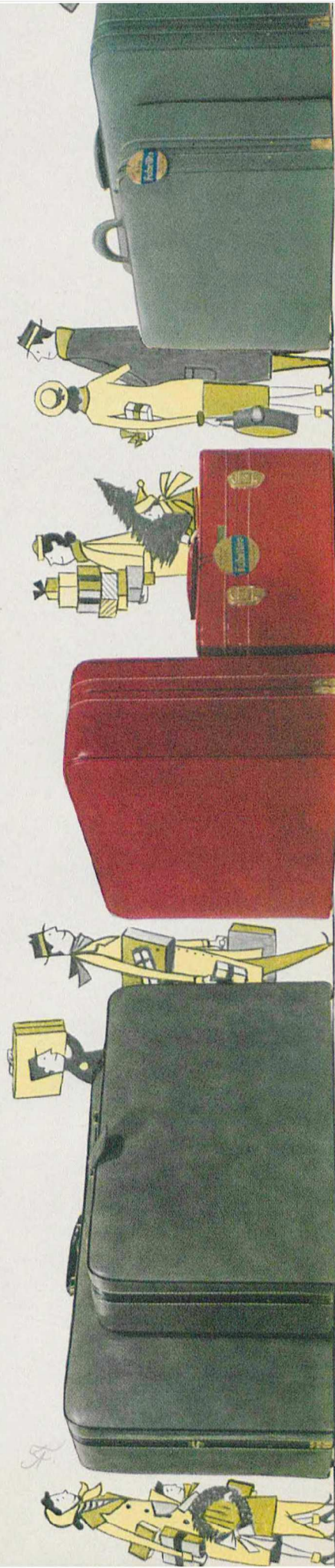
VINYL PLASTIC LUGGAGE MATERIAL

You can be proud to give a magnificent set of fine luggage covered with Du Pont's "Fabrilitte". Smartly styled in authentic productions of leather and stunning effects, "Fabrilitte" stands up to the grind so well that it will be supple and looking for many Christmases to come. It is no problem, either—a once-over with soap and water, and grime vanishes for the "Fabrilitte" tag on luggage at your favorite travel shop.



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BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY



WATCH "CAVALCADE OF AMERICA" ON TELEVISION