

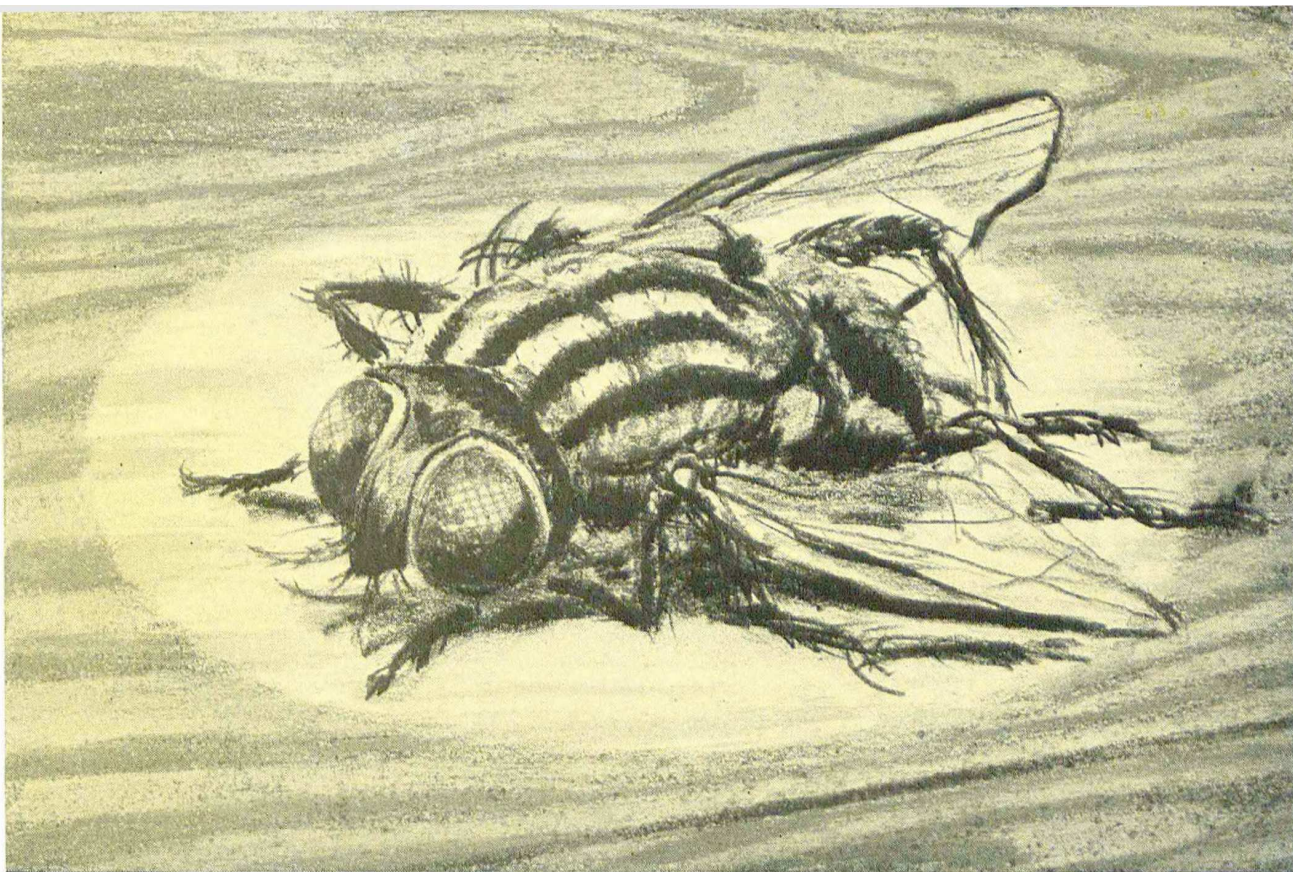
August • September, 1949

AROMATICS



Better Things for Better Living
...through Chemistry





Now MARLATE tags him OUT

There's no one perfect material to kill insects today—without danger to humans or animals or crops. But Du Pont has now come closer to the ideal with "Marlate" methoxychlor insecticide. It has many of the cardinal virtues for such a product.

First, "Marlate" has an unusually high factor of safety to sensitive plants . . . it doesn't burn cucurbits, beans or tomatoes, for example. Likewise, tests thus far show that residues of this chemical are remarkably low in toxicity to warm-blooded animals.

Second, "Marlate" controls many insects

... on fruit, on vegetables, on livestock and on forage crops. In fact, it has an unusual range of effectiveness.

And third, "Marlate" is both quick-acting and long-lasting. It knocks down many insects on the wing, and for many uses, one application remains effective for several weeks.

★ ★ ★

"Marlate" is one of many outstanding products of Du Pont research. You can get full information on Du Pont chemicals for the farm from your Du Pont technical service representative. Or write to Du Pont, Grasselli Chemicals Department, Wilmington 98, Delaware.

DU PONT CHEMICALS FOR THE FARM INCLUDE:

Fungicides: PARZATE® (Liquid and Dry), FERMATE®, ZERLATE®, Copper-A (Fixed Copper), SULFORON® and SULFORON®-X Wettable Sulfurs—Insecticides: DEENATE® DDT, MARLATE® (Methoxychlor), LEXONE® (Benzene Hexachloride), KRENITE® Dinitro Spray—Weed Killers: AMMATE®, 2,4-D, TCA and Dinitro Weed Killers—Also: Du Pont Cotton Dusts, Du Pont Spreader Sticker, PARMONE® Fruit Drop Inhibitor and many others.

*REG. U. S. PAT. OFF.

[On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.]



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

DU PONT

MAGAZINE Vol. 43 No. 4



BETTER THINGS FOR BETTER LIVING...
THROUGH CHEMISTRY

E. R. Manchester, Editor

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COVER: When our cover artists brought in their sketch for an aromatics issue, only one thing seemed to be missing... a tropical background of swaying palms and dancing girls that goes with such vivid blossoms.

The flask, we knew, symbolized the hundreds of Du Pont aromatic compounds that add "odor appeal" to many products and mask out disagreeable smells in others. A few of the products made more acceptable to us because they contain aromatics were shown on the cover. We noted only one lack of realism in their drawing—no bugs on the flowers.

Printed in U.S.A.



How big is big?

Americans like bigness. Most towns hope to grow larger. When a man starts out in business, it goes without saying that he hopes his business will grow. We agree pretty generally in the United States that this is a healthy viewpoint. And some little towns do grow, do become big towns. In the United States many a small business does grow. Now and then it makes so many friends, it climbs to such a position of leadership that it crosses an imaginary line and becomes "big" business.

But then a strange thing happens. Some of the very people who agree that growing bigger is a good thing, turn around, once a business crosses this imaginary line, and say it is *too* big. A century and a half ago the Du Pont Company began as a very small company. We have grown with America. Today Du Pont is a big company.

So we ask this... Just when does "big" become "too big?" Just who is to decide when the imaginary line is crossed? Just when ought a company stop growing?

Would anyone really be better off if the people who owned the Du Pont Company in the year 1900—or 1910, or 1920—had said: "We are too big. We refuse to grow bigger." In that case you would have no Cellophane, no "Duco" finishes, no nylon, no neoprene rubber. Shall we stop growing today? Shall we tell our research teams to stop improving old things, stop looking for new ones? Shall we refuse to hire any new people and lock our laboratory doors? Then there will be no Du Pont developments tomorrow.

The answer is really pretty simple. Any company should be just as big as it needs to be to manufacture goods economically and efficiently. After all a big business is just a business in which a number of people have joined together to do a job too big for a lesser number of persons. By the same token small businesses perform many services more efficiently than big businesses. Each does the thing it does best. And *you* actually decide how big *any* company shall be, because you cast a vote every time you buy a product.

For our part we feel proud that the Du Pont Company is big enough to bring you an ever-increasing number of "better things for better living."

Meet Mr. Nose

*... a witness to the influence that
aromatics have on our lives*

By PEG MINER

He was short, dark and energetic—the aromatics expert. For an hour or so he was putting that energy to work giving us an enthusiastic and informal survey of his field.

Never having met an aromatics expert before, we found that our stereotype picture wasn't worth much. He didn't have long hair, tapered fingers or a Rathbone nose, and least of all did he have the faraway look of one peering into the heart of a lotus blossom. He was, first of all, a business man, one whose life has been dedicated to the proposition that we're all led around by our noses, and like it.

"An idea has gotten around that all aromatics are perfumes," he began, "but the truth is, perfumes are just one type. Others are the 'reodorizing agents' that offset disagreeable odors by using them as building blocks in rounding out a harmonious scheme. Still others are frankly bad smells like those used to warn of gas leaks, or repel insects. They run the whole gamut from sweet to obnoxious, and are found in more applications than you'd imagine.

"Even the flavorings in your soda pop, ice cream, candy and gelatin desserts are aromatics," he added, "which goes to prove that taste is influenced largely by smell. Remember how grandma held your nose when she gave you cod liver oil?"

AROMATICS IN INDUSTRY

"One thing that many people aren't aware of," he continued, "is that a lot of aromatics go into industry. Sometimes they're used to give a distinctive odor, but more often they're added to squelch an unpleasant one." He paused for a moment, summoning a few examples. Then, "Here's what I mean . . . I'm sure in the past you have run across bad-smelling plastic shower curtains, aprons or handbags. The culprit here is usually the plasticizer, a compound used to soften the material and make it more flexible.

"I remember one case particularly. A manufacturer of plastic handbags had trouble selling his product because of its lingering bad odor. He appealed to the plastics manufacturer, who in turn sought out Du Pont. 'Can you give us an odor that smells like leather?' he asked. Well, we filled the order, and ladies liked the handbags much better."

ELEMENTARY . . .

It seems that aromatics used in industry have been known to play Sherlock Holmes. "Take the case of the manufacturer of elastic yarn," he said, explaining that the rubber in that company's product was high-quality, virgin stock. The competition came along with an inferior product, using reclaimed rubber. To look at the two, you couldn't tell them apart. In the resulting confusion, customers were returning inferior yarn to the first company, saying it was no good.

"Without telling anyone," he said, "the company started putting a special perfume into their product. After that, when complaints came in, the salesman could take a whiff and say with assurance, 'This isn't ours'. It saved them a lot of money."

AROMATICS BOOST WORKERS' MORALE

After mentioning a few other cases where odor was used for identification, such as in distinguishing among various buffing compounds, he branched off into the personnel field.

"In these days of improved human relationships in industry," he began, "management knows that everybody is happier and work is more efficient when the surroundings are pleasant.

"But take a poor manufacturer with a foul-smelling process, like the application of composition soles to shoes. The offender here is the cement. For years we have been supplying adhesive manufacturers with aromatics that keep men in the shoe factories happy."

He brought out another example, from the war years. At that time women were going into many industrial jobs that were once the exclusive province of men.

Not flour, but perfumed face powder being sifted by aromatics worker. Powder sample is next aged, then tested.





At the New Brunswick, N. J. laboratory, the aromatics expert blends odors into a new and distinctive scent for a customer.

The case in point was a company that conducted machining operations, with the aid of certain cutting oils.

"Under the heat of high-speed drills, those animal oils got pretty animal-smelling," he remarked. "To a man, that was part of the job. He expected to go home smelling like freshly slaughtered hogs. But the girls couldn't take it, and there was a serious turnover. The remedy was found when we supplied certain aromatics to the company selling the oils, so that something agreeable covered up the normal odor. By the way," he added, "the men who have gone back to those jobs don't seem to mind the change."

"IF IT SMELLS BETTER, IT SELLS BETTER"

Given two products that look alike, a customer will almost always pick the one with the pleasant odor. According to the expert, this has set manufacturers of everything from sun-tan oil to floor wax on the scent of the appealing aroma.

Of course, you'd expect such an effort from makers of cosmetics. Who ever heard of a woman buying toilet soap without wafting it past her nose?

"But," said the expert, "things we don't think of as being 'perfumed' now often are, including rubber,

linoleum, oil cloth, paint, pipe tobacco, aerosols, shoe polish and typewriter ribbons. I recall one man who asked: 'How can we get the fish oil smell out of our printing inks so people will buy our Sunday comics?' There's even the far-fetched case of the Chicago World's Fair mining exhibit that was shown in a room saturated with the synthetic aroma of fresh earth.

"Just to prove how your nose can influence you," he said, "I must tell you about a survey of preferences in carbon papers. We passed out two sets of carbon paper to each of a number of stenographers. The sets were identical, except that one contained special aromatics. After the girls had tried both, we asked which they liked better. Almost unanimously, it was the scented one.

"But," he smiled . . . "they didn't realize that they liked it because of the odor. They said the scented paper made more copies, smudged less, and didn't rub off on their fingers."

SHAKESPEARE WAS WRONG

"You can talk all you want to about the rose that smells as sweet by any other name," commented the expert. "But not if the other name is phenyl ethyl alcohol or benzophenone. A woman at the cosmetics

counter would much rather think of a flower-carpeted French landscape.

"It's easy to understand why such a mental picture is glamorous," he went on. "Still, it leads to the error of assuming that anything that has a foreign label is automatically better than something made right here at home. Of course, that just isn't so. The biggest factor in the perfume industry today is the American chemist-perfumer.

"At Du Pont, for instance, chemists are reproducing the odors of carnation, rose, gardenia, pine needle, orange blossom and many more. They have created aromas that never existed in nature, and produced some that can't be extracted from plants—such as cyclamen, heliotrope, lilac and lily-of-the-valley."

SPECIAL AROMATICS

"Sometimes a complete perfume goes directly to makers of soap and other products. Or we may supply synthetic bases to other people who make their own perfumes. Often we are asked for special formulations by somebody who might want, say, an apple blossom odor with just a touch of jasmine in it.

"It's important for us to know exactly what our

customers will use our aromatics for," he added.

"For instance, a scent used in a fly spray must dissolve in the spray's other ingredients. If a perfume is going into a face powder, we have to be sure that none of its ingredients will irritate the skin. Aromatics for lipstick must taste as well as smell good . . .

"In fact, we have equipment for making and testing samples of soap, cosmetics and toilet preparations. After we've given our aromatics a whole battery of tests in such products, we try them out on juries of Company employees, and then send them on to our customers.

"It's mighty convenient," he observed, "that Du Pont serves so many industries. For example, take the Rubber Chemicals Division. If we want to work out something to improve the odor of rubber, its laboratory facilities are always available to us."

Then Mr. Nose had to leave for a meeting of The American Society of Perfumers, Inc. After he was gone, we had a much better idea of what man-made aromatic products do to make life more pleasant—even though it meant revising our impression that the whole industry revolves around "Our Indiscretion" and "Madness No. 7."



● Better Brush Co. operator adds aromatic to shampoo ingredients in mixing kettle.



● On the filling line, these workers tag bottles of the scented "lemon shampoo."



● Before going to the consumer, the product is tested under conditions of use.



● At Stanley Home Products Co., dyed aromatic is added to deodorizing formula.



● Deodorant, which has been pressed into blocks, is being weighed by the operator.



● Before shipping, finished article gets quality control test by plant chemist.



America's first Zoo

*A Du Pont photo product helps modernize
the oldest zoo in America*

By STEPHEN DAVIS

Keeping pace with an age of television and supersonic speeds, despite a history that goes back to a yesterday of horse-drawn trolleys and high-button shoes—that's the story of America's oldest zoo, the Philadelphia Zoological Garden.

Although 1949 marks the Diamond Jubilee of this famous institution, it has not been allowed to fall behind the times. There are more than 1500 specimens here today, in contrast with the 282 animals exhibited on the opening day, July 1, 1874. Besides boasting many modern buildings and some of the newest meth-

ods of exhibiting animals, it is one of two zoological parks in the country that has its own staff photographer. And, as far as we know, the Philadelphia Zoo is the only one employing a woman staff photographer.

When this institution first came into being, its guide books and cage signs were illustrated with old-fashioned drawings. But with the manufacture of modern photographic products, the Garden's publications were filled with pictures, and many of its cage signs were embellished with colored photos of the animals.

Isabelle dePeyster Hunt began her work as staff photographer in September 1942. Since then many fine animal shots have won her a respected place in her field. The problems she encounters in "shooting"

the mammals, birds and reptiles are very unusual, for they require patience and understanding demanded by few other jobs. Monkeys, hippos and tigers are not easy subjects; they won't sit still and pose for their portraits. However, Du Pont products—"Defender" photographic films and papers—help make her "shooting" and darkroom work easier.

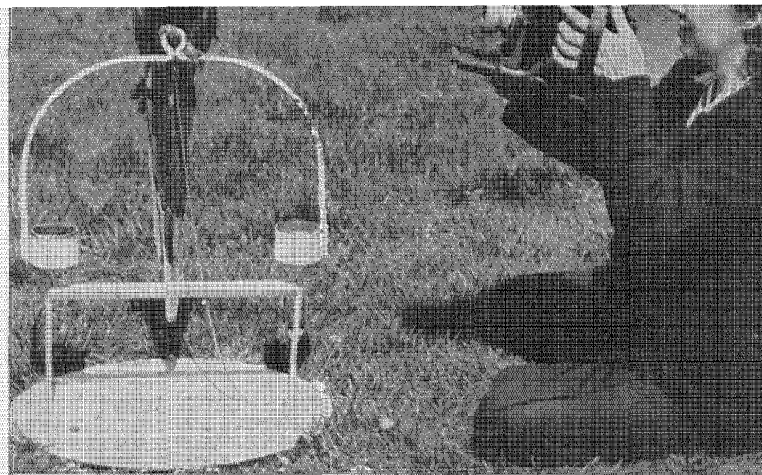
When the modern Tropical Room in the Reptile House was designed, it presented a new problem. An entirely different type of sign was needed—one that could be easily illuminated from the rear, could be easily read, and would show in natural colors the reptiles in each cage. This would be helpful in distinguishing one species from another when several were in the same pen. Du Pont solved this problem for Miss Hunt with "Adlux" photographic film for transparencies. She printed her negatives on this material, then colored the pictures with photographic oil paint. The descriptive text was printed by the Zoo's hand press, and a new and distinctive sign style had been created.

In the Tropical Room the snakes, frogs, turtles and lizards are displayed in well-lighted cages, behind glass, with backgrounds simulating natural habitats. The "Adlux" signs, illuminated from the rear, are set above each exhibit. The public corridor is dimly lighted, and the result is one of the most spectacular displays in the Garden.

A ZOO OF "FIRSTS"

During its 75 years, the Philadelphia Zoo has pioneered in many fields beside photography. It is literally a zoo of "firsts." Perhaps the most significant innovation was the establishment in 1903 of a well-equipped research laboratory to maintain the health of the entire collection of animals. Diets are prescribed, occasional illnesses treated, and valuable data from post-mortem examination are gathered.

Here orangoutangs were first successfully raised in America, and this zoo was first to erect glass partitions between spectators and primates in the Monkey House. This reduced the number of tuberculosis cases



Isabelle Hunt, only woman staff photographer at a U. S. zoo, "shoots" a macaw. Most subjects won't stand still.

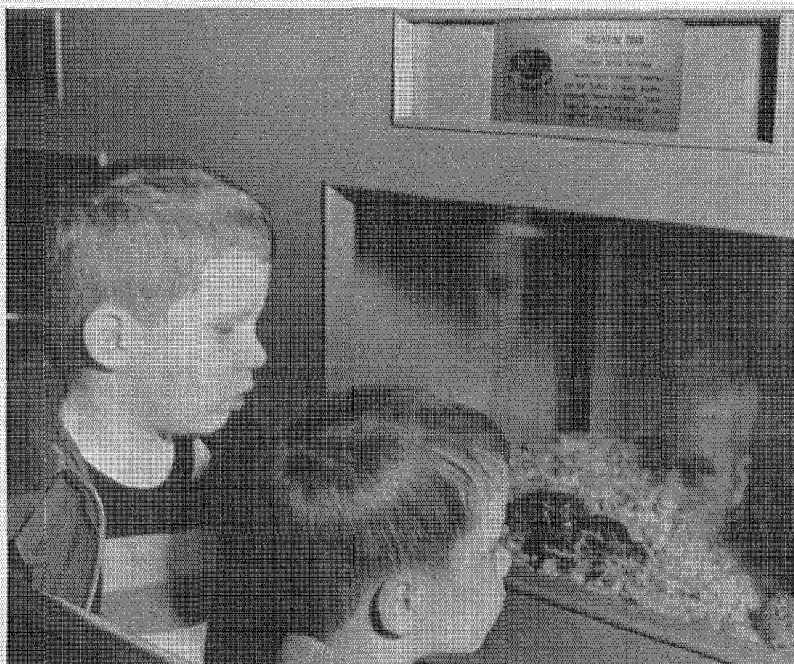
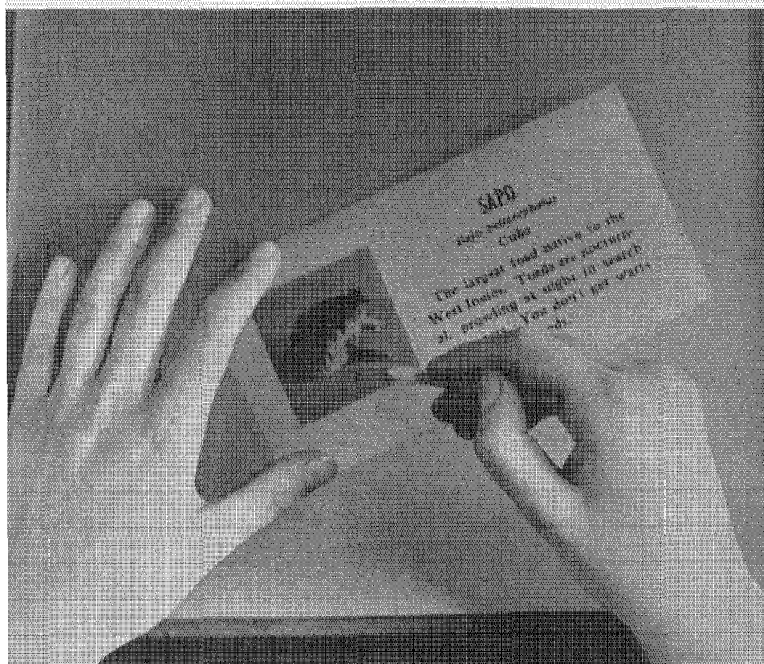
among the monkeys and apes. And the institution was first to keep a gorilla alive in the United States for any length of time. Bamboo, the gargantuan ape, celebrates his 23rd birthday this summer.

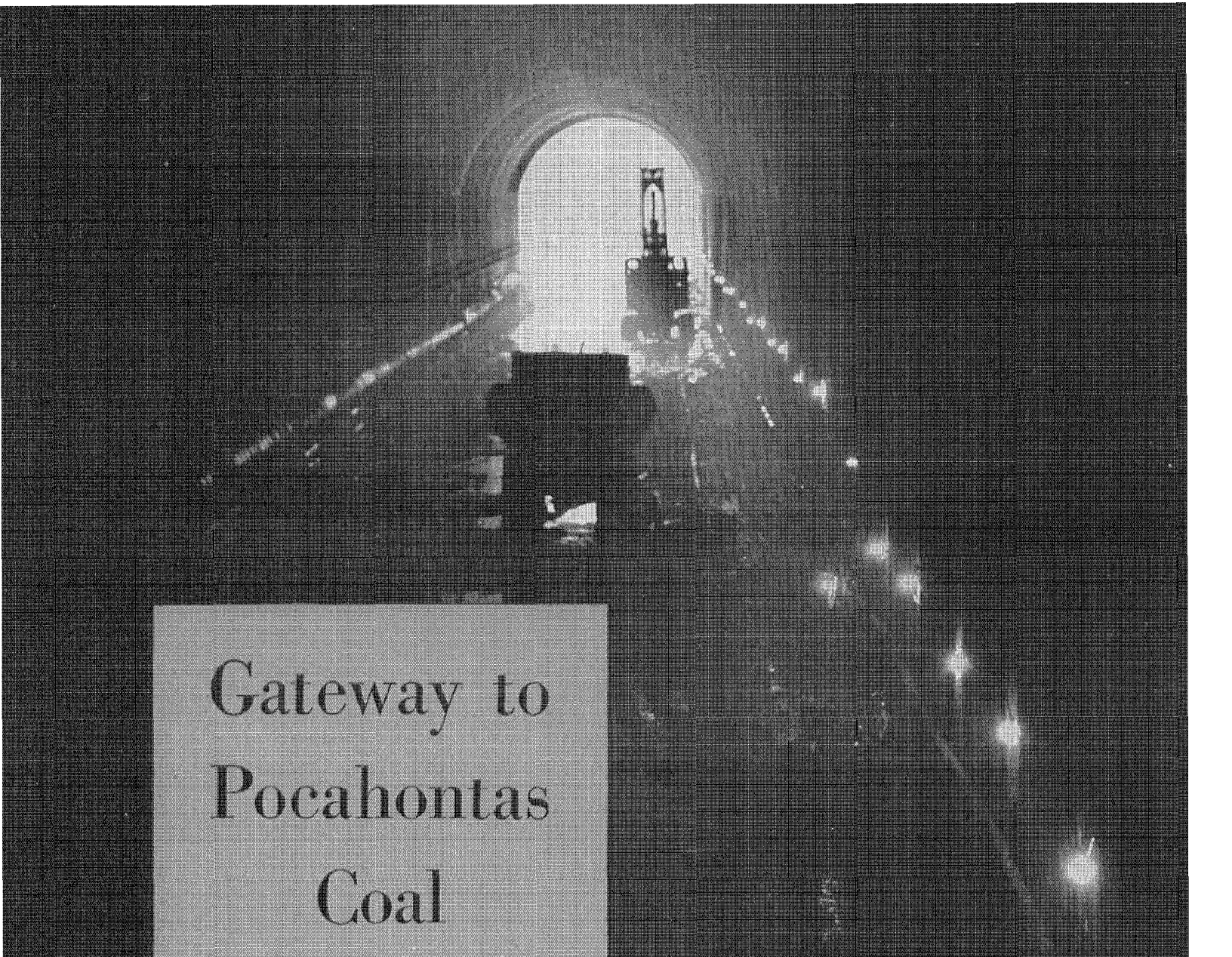
More than 21 million Americans have visited the Philadelphia Zoo in the past 75 years. In 1876, the year of the Centennial Exposition in the Quaker City, 677,630 persons crowded into the Garden—an all-time record. It is expected that well over half a million will flock there during the Diamond Jubilee. They will come to feed loads of peanuts to the bears, elephants and monkeys, and to stand in awe before the cages of the great tigers and lions. They will come to laugh at the lively antics of the denizens of Monkey Island. And they will come to watch the expressions of delight and amazement on the faces of happy youngsters.

But the visitors will also learn something of value about the animals from the interesting legends on the cage signs. Nowhere in the Garden are the signs so attractive as in the Reptile House, where Du Pont "Adlux" is still another feature of this modern zoo.

- Oil paint adds a finishing touch of color to a modern Du Pont "Adlux" sign for Reptile House, Philadelphia Zoo.

- Young visitors look at unusual exhibit of rare Argentine toads. Legend on "Adlux" sign tells about them.





Gateway to Pocahontas Coal

*Du Pont explosives are opening a
huge tunnel to serve the rich
deposits of West Virginia*

When workmen began to drive a single-track tunnel for the Norfolk and Western Railway near Coaldale, West Virginia, in 1882, the contractor got a pleasant and profitable surprise. His crew drilled and blasted their way right into a 12-foot seam of bituminous coal.

Following the principle of "waste not, want not," the builder mined the coal and sold it, thus making a nice additional profit for the job.

Contractors now working on the new \$5,000,000 Elkhorn Tunnel, between Coopers and Maybeury, don't expect to strike much coal, but as a part of their

pay-off they will have the satisfaction of completing one of the largest double-track railroad tunnels in the world.

Why was this record-breaking project undertaken? Because a new and larger tunnel will speed up the transportation system in the Pocahontas field with its 5,000,000,000-ton reserve of high-carbon, slow-burning semibituminous fuel.

Over a broad, straightened right of way, of which the new Elkhorn Tunnel will form a vital link, the Norfolk and Western tracks will follow a route through the 7,000-foot passageway at an easy grade. Long trains of heavily-loaded cars will roll behind a kind of motive power that many people think is old fashioned — the coal-burning locomotive. But the powerful new units which will be operated over the line and through the new gateway will doubtless prove to be economical.

The double-track tunnel will do more than just permit the use of larger, more efficient rolling stock. It will eliminate a two per cent grade and a lot of twisting roadbed, and it will bypass entirely the narrow, single-track, 67-year-old Coaldale Tunnel.

Unlike its predecessor, the big bore under Elkhorn mountain is being advanced by the most modern methods and tools. Two crews are now drilling and blasting their way toward each other from portals on east and west sides. A huge four-deck drill carriage, called a jumbo, is rolled into position against the rock face, and more than 200 holes are bored into it at one time. When the drilling is done, nearly a ton of Du Pont 60% Special Gelatin dynamite is packed into the holes.

Each blast bites out and demolishes a slab about 16 feet thick from the west side and about 18 feet thick from the east heading of the tunnel. By the time the two crews meet, they will have set off about 1,000,000 pounds of dynamite. Also necessary for the Elkhorn project are more than 110,000 delay electric blasting caps. They are used to set off the charges loaded in each of the 200-odd holes. After the blast, the shattered rock, commonly called "muck," is carried off in enormous trucks and used outside as fill

for the tunnel approaches and elsewhere along the line.

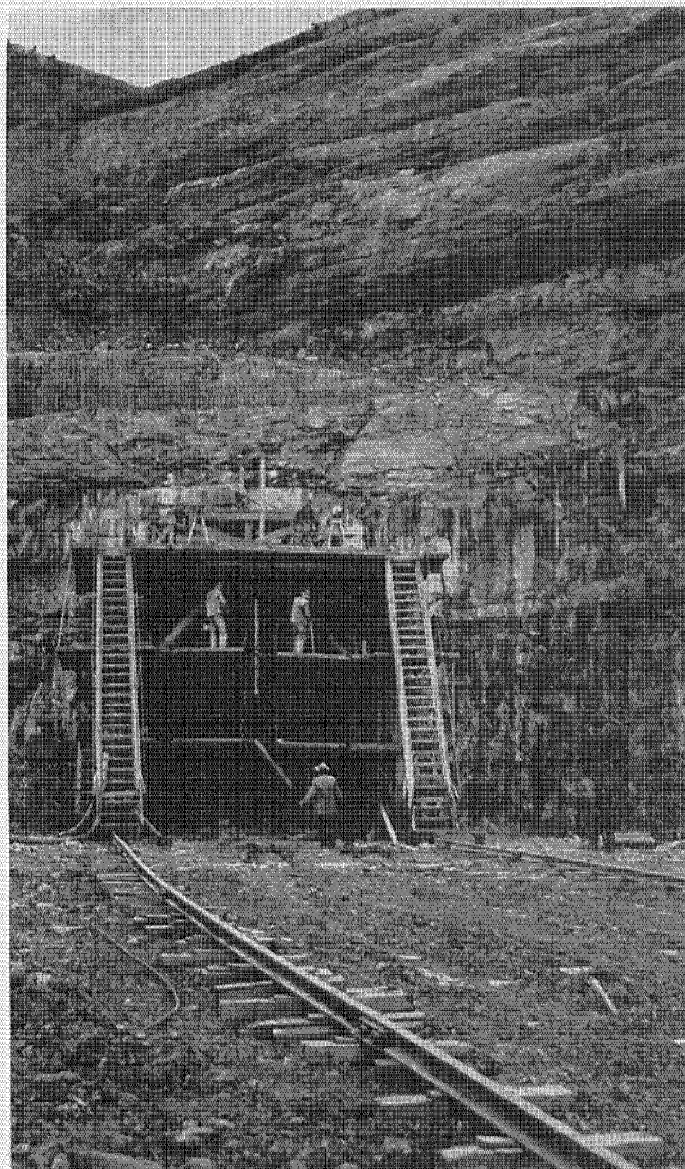
The semibituminous coal, which the railroad will haul with increased efficiency when the tunnel is completed in 1950, has qualities that make it unusually valuable to metallurgists and homeowners, too. In fact, this fuel combines so many outstandingly desirable features that the local mine owners' association has obtained a court injunction to prevent the sale, under the "Pocahontas" name, of any coal not mined in this particular region.

It won't be long now before a large part of the 30,000,000-ton annual output of Pocahontas' 80-odd mines will flow through the new Elkhorn Tunnel, down from the West Virginia mountains, and to the hearths and factories of the nation.

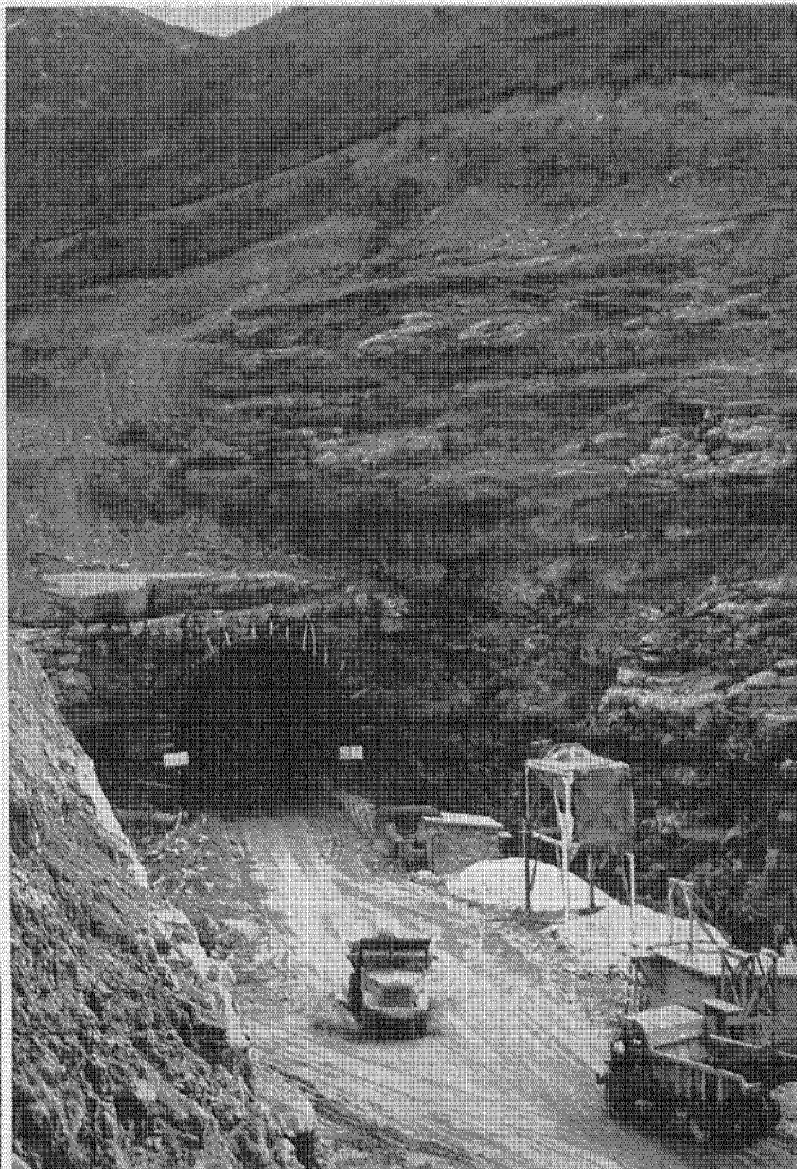
ELKHORN TUNNEL STATISTICS

Length of Tunnel 7052 ft.—Blasted Width 35' 4"—Blasted Height 34' 8"—Finished Width 30'—Finished Height 32' 6"—Excavation 42.5 neat cu. yds. per foot—Cut Holes 15' long, starting bits 2½", finishing 1⅞"—Other Holes 13' long, starting bits 2½", finishing 2"—Average No. holes per round 206—Dynamite Du Pont 60% Special Gelatin 1½ x 8.

An early view, with a jumbo starting the big bore at the west side. There's plenty of work ahead for the drillers.



This more distant view, snapped last winter, shows the tunnel portal better, but unfortunately dwarfs its huge size.





Hose that laughs at the sun

*Its serviceability is assured by the use of
Du Pont neoprene*

That thirsty lawn or garden of yours probably needs frequent watering these hot summer days. Have you enough good hose to reach the far corners? If you need more or want to replace some, you'll be glad to know that dealers now have garden hose that carries a statement from the manufacturer on the length of service it will give you. The life expectancy will depend, of course, on the grade you select. For all hose is not alike, and, like everything else, its life will depend on the workmanship and materials that go into it.

Garden hose is more than just a rubber tube. So, let's see how it is put together. Suppose you took a knife, cut a length in two, then examined the end of one of the sections you have just cut. On the inside you'll see a hollow rubber tube or carrier. Its only purpose is to carry the water from the faucet connection at one end to the nozzle at the other. Over the tube you'll notice one, two or possibly three layers of fibers or cords. These are called braids. The strength of the fibers making up the braid, the manner in which they are laid and the number of layers used determine how much pressure the hose will stand. The braid also reinforces the hose if it is crushed and keeps it from kinking.

Finally, you'll see an outer layer of rubber over the braid. This is called the cover. It's the first line of defense for the hose and must stand most of the abuse. If it fails at any point, the hose will eventually develop a leak, especially if the braid is exposed.

One of the principal reasons you can now buy longer-lasting garden hose is that manufacturers have found in neoprene, the chemical rubber made by Du Pont, a material for hose covers that resists sunlight, heat, weathering, oil, grease and rough wear. You can leave a neoprene-covered garden hose out in the sun day after day, year after year, and it won't become brittle and crack. Drag it through oil on your garage floor and this hose won't soften. You already may have found by experience that you can't treat ordinary hose this way.

Another reason for today's improved garden hose is better braid. Du Pont "Cordura" rayon yarn, and nylon, too, have proved far stronger than the natural fibers. In fact, these synthetic fibers are so much stronger that fewer layers of braid are needed to give the hose adequate bursting strength.

Yes, you'll find that this better garden hose is not only stronger but also lighter in weight, easier to handle, requires less care and is really fit for a long, hard life.

PORTLAND EVENING EXPRESS

THURSDAY, MARCH 10, 1948
Guy Cannett Publishing Co.
Telephone 2-1911

All the ways of a man are clean in his own eyes; but the Lord weigheth the spirits.—Proverbs 16:2.

Capitalism And All Of Us

Greetings, fellow capitalists!
Capitalists?

Why, sure. In this Country, even those who yell loudest about their hatred of capitalism are pretty apt to be capitalists themselves.

That is to say, almost every American owns a piece, however small, of this Country's vast, capitalistic, economic structure. Do you have a life insurance policy? Greetings, brother capitalist! Or is your labor union dickering to win group insurance for you and your fellow dues-payers? Then you'll be, when you get it, capitalists like almost everyone else.

How do we figure that?

Well, here's the annual report of E. I. du Pont de Nemours and Company, a huge, capitalistic (naturally!) corporation. The report carries a tabulation giving interesting information on the ownership of the company as of the end of 1948.

And who owns du Pont? Why, it seems, you do — or a great many thousands of people just like you. For example:

Common stock in this company was owned, at the end of last year, by 77,347 persons. A total of 23,608 investors held preferred stock in the company. Call these investors "Wall Street," if you like. But there were an awful lot of them—of such capitalists.

These owners of the du Pont Company are scattered throughout the 48 States, the District of Columbia, several territorial possessions and 40 foreign countries, the statement shows. (So they do not all go to mahogany-paneled offices in Wall Street, there to clip coupons the live-long day and to "grind down the faces of the poor," after all!)

Let's continue this story:

Of the total number of du Pont stockholders, individuals comprised 81 per cent, and held 31 per cent of the shares outstanding at the end of 1948. Groups, comprising 19 per cent of the total number of owners, held 69 per cent of the shares outstanding.

These stockholding groups consist-

ed of estates and trusts; banks, bank nominees, and brokers; charitable, educational and fraternal organizations, insurance companies, and other companies and organizations. (Could be that the company insuring your life is one of those co-owners, stockholders, of this corporation; and that could make you something of a capitalist, couldn't it?)

The du Pont statement presents a breakdown of these groups holding 69 per cent of its outstanding shares. It shows that the group stockholders of record include 14,000 estates and trusts; 1,100 banks, bank nominees and brokers; 1,300 charitable, educational and fraternal organizations; 400 insurance companies, and 1,500 other companies and organizations.

The du Pont corporation finds that more than 200,000 persons have a beneficial interest in dividends paid by the corporation to the 16,000 stockholders in the estates, banks, and "other companies" classifications listed above.

It points out that the number of persons benefiting from du Pont Company dividends received by the 1,300 stockholders in the charitable, educational and fraternal organization classification, while very large indeed, cannot readily be determined. (But perhaps your lodge, or the college which is your alma mater, or some charitable organization which your donations help to support is one of those 1,300 stockholders. Could be!)

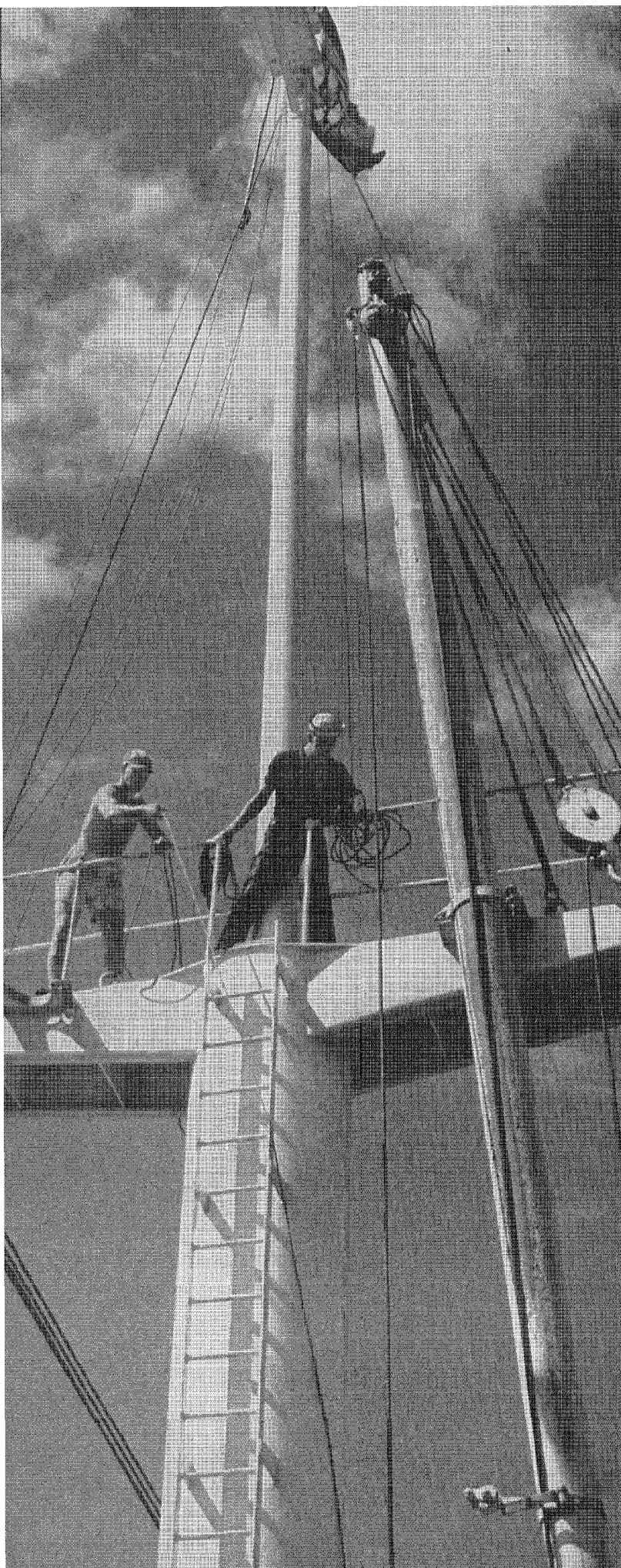
Finally, there are the 400 insurance companies with some of their funds invested in the stock of this great corporation. Undoubtedly the company which issued your policy is one of these 400. In that case, you are one of millions of "little people," as the Russia-firsters designate us—one of the millions of persons all over this Country (and all over the world) with a beneficial interest in the earnings, made possible by sound and profitable operation, of this one great corporation.

As we were saying—Greetings, fellow capitalists! What multitudes, of us there are!

When we saw this editorial recently we thought that it would be of interest to our readers, and should be presented in the Magazine. The article, we believe, speaks for itself.

—The Editors.





Southward ho!

By SEVERIN A. NORSTRAND

For more than 20 years ships of the International Freighting Corporation, Inc. have plied Atlantic waters between North and South American ports. They have carried automobiles, agricultural implements, newsprint, machinery, steel, tin plate, chemicals, and a thousand other products on this southward run. On the return trip I.F.C. has freighted products as diverse as coffee, cocoa, castor beans, wool, quebracho, bones and oils.

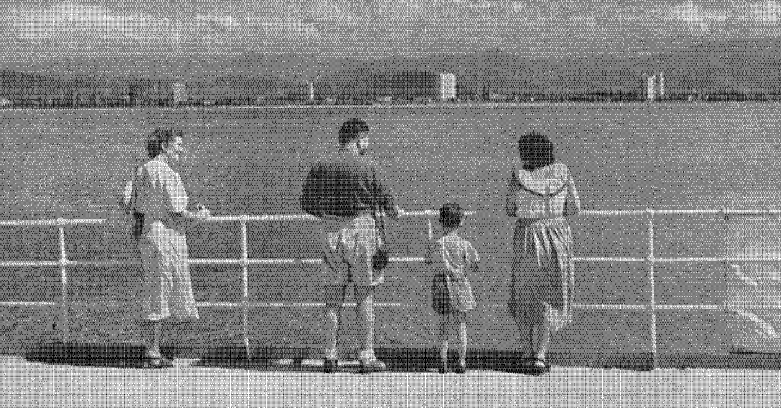
The corporation, now two-thirds owned by Du Pont and one-third by General Motors, operates from its terminal at Pier 2, Erie Basin in Brooklyn, N. Y. Depending on the time of year, calls are made at Montreal, Quebec and Halifax. Boston, New York, Philadelphia and Baltimore are also regular stops. At the South American end, the principal ports of call are Rio de Janeiro, Santos, Montevideo and Buenos Aires.

The five Diesel-propelled ships engaged for this service, known as the "Bow Fleet," are equipped with deep tanks for handling liquid cargoes, such as vegetable oils. Four of the vessels were built by the United States Government during World War II, and the fifth, built in Scotland, entered service in 1947. These 8,000-ton ships have a cruising speed in excess of 14 knots, and have been operating continuously since they were launched.

ACCOMMODATIONS FOR PASSENGERS

While carrying cargo is the backbone of the service, each I.F.C. ship has accommodations for 12 passengers. For those who can afford to take a comfortable, leisurely trip to Rio or Buenos Aires, there is no better way to travel. The round trip to Buenos Aires takes about two months. Passengers have privileges which are not ordinarily enjoyed on the large passenger liners, such as access to the bridge, all decks, and a visit to the engine room. Layovers? At Rio there is time enough for passengers to see this Paris of South America and at Santos to visit the modern industrial city of São Paulo, over 2,000 feet above sea level. At all ports except Buenos Aires, those who wish to do so may use the ship as their hotel and go ashore during the day for sightseeing.

In addition to their South American service, a



• Passengers on "M/V Bowplate" enjoy the trip to South America. Each week an I.F.C. ship crosses the Equator.

chartering department arranges for the transportation of cargoes world-wide, as well as between the Gulf and United States coastwise ports.

I.F.C. is one of the oldest lines in the South American trade but has been little publicized. Its record has been a varied and enviable one. Originally formed in 1919, it operated ships for the old U. S. Shipping Board for seven years. Then I.F.C. chartered commercial vessels for its own account until 1928, when Du Pont caused a new company to be formed to which the assets were transferred. An additional service was inaugurated from North Atlantic ports direct to Ecuador, Peru and Chile on the west coast of South America. Northbound, full cargoes of nitrate of soda were carried. Due to the development of synthetic nitrate, this service was discontinued in 1932.

At the outbreak of hostilities in World War II, when our Government requisitioned all U. S. vessels, 25 per cent of those operating in the Atlantic between United States and South America were assigned to the I.F.C. In addition, the corporation acted as gen-



• Coffee is an important northbound cargo, as are corned beef, vegetable oils, wool, skins, hides, castor beans.

eral agents for the government and operated 60 vessels to various parts of the world, carrying war material for our armed forces and lend-lease cargo. At one time over 2,000 people, ashore and afloat, were employed to operate these ships. Over the years, the staff personnel has accumulated a great store of valuable know-how and experience.

The I.F.C. prewar queen, the *Irene Du Pont*, was torpedoed and sunk in 1943 less than two years after she had been launched. And the *Lamot Du Pont* met the same fate a year earlier while returning from Buenos Aires with a cargo of linseed. Eighteen of the merchant crew and one member of the U. S. Navy gun crew were lost; 36 survivors spent more than three weeks in a lifeboat before they were rescued.

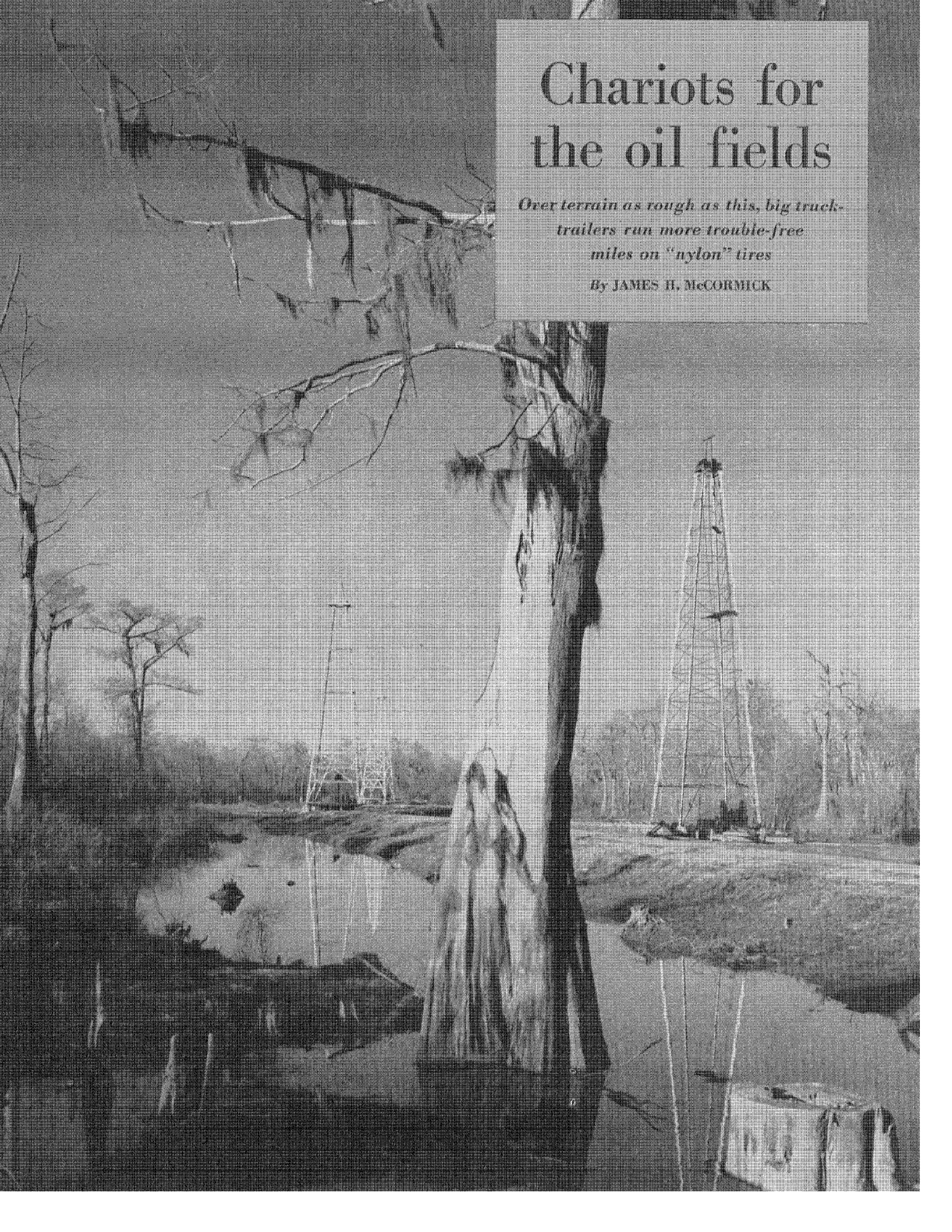
Whether you are interested in moving cargoes or in booking a restful vacation trip, you can expect dependable service from this line. It has behind it 30 years of shipping experience—long enough to give weight to the suggestion made in the slogan: "When You Ship By Sea, Consult I.F.C."

• Loading wool. Cargo booms of International Freighting Corp. ships can handle loads many times this weight.



• Canadian newsprint, from areas of the Saguenay and St. Lawrence, is an important cargo on the southbound run.





Chariots for the oil fields

*Over terrain as rough as this, big truck-
trailers run more trouble-free
miles on "nylon" tires*

By JAMES H. McCORMICK

How much do you know about drilling oil wells? First you bore a hole, you might say, but as you probably know, that is only part of the operation. More often than not, roads first must be "bulldozed," or cleared, from highways to the well site. Slush pits are dug to hold the mud and water used to "lubricate" the drilling. Sometimes land must be leveled for the drilling platform and derrick, or ditched for drainage.

Equipment for such construction work is hauled from one oil well site to another on massive truck-trailers. In this way America's oil resources have been developed quickly and economically.

Oil well construction work has been going on in the Cajun country of Louisiana since 1901 when the first producing well was brought in. Brown & Root Inc., with local headquarters in Morgan City, has been making oil field roads and doing other construction work in this region—the rice-growing center of America—for more than 15 years. Each year its trucks haul heavy rigs thousands of miles. Most of this is tough work. In 1948, for instance, they hauled a 19-ton dragline from Crowley to Grand Isle to build a levee around an oil field campsite. The trip was about 170 miles, part of the way over the roughest of shell roads.

What's so noteworthy about this incident? Construction outfits make such hauls every day and they go unnoticed. The remarkable thing is that the tires used for the Crowley-to-Grand Isle haul about a year ago are still rolling right along. They are taking the gouging, bruising impact of tons of dead weight at every bump and jolt. Here's a closeup of this case history.

Goodyear first manufactured commercial truck tires with nylon cords about two years ago, and a set for Brown & Root Inc. was put on its "lowboy," a type of trailer used to carry extremely heavy loads, such as construction equipment. The company's foreman in Louisiana figures the four rear tires of the lowboy have run 75,000 miles in the last 18 months or so. The trailer's front end, when unloaded, is usually hoisted up on the bed of the truck pulling the rig. That puts the mileage on the front tires of the lowboy at about 45,000 or 50,000 miles.

Here's the job nylon tires have done for us," the foreman said: "In piling up those 75,000 miles, we've made trips in the roughest spots within a couple hundred miles. Sometimes we had private roads to go on; sometimes not even a trail. We always haul big, heavy 'cat' tractors, draglines, 'dozers' and the like on the lowboy. There're no springs on it to take some of the shock of bumps off the tires. Several tons rest on each and every tire.

"Why, the Goodyear people tell me the temperature of the tires may build up to as high as 200°F. after traveling less than 50 miles," he said, "and, boy, that's almost as hot as boiling water!"

"Before we got nylon tires we had blowouts from bruises, cuts, and especially from heat built up by loads ranging up to almost 40,000 pounds. The weight of the lowboy pushed that total up to 70,000 pounds. Furthermore, tires lasted only about a year. Louisiana's gumbo mud stays mighty wet much of the time, and a cut in a tire lets water get to the fabric carcass. Nylon tires are the only ones we've found that don't weaken much when this happens," the foreman emphasized.

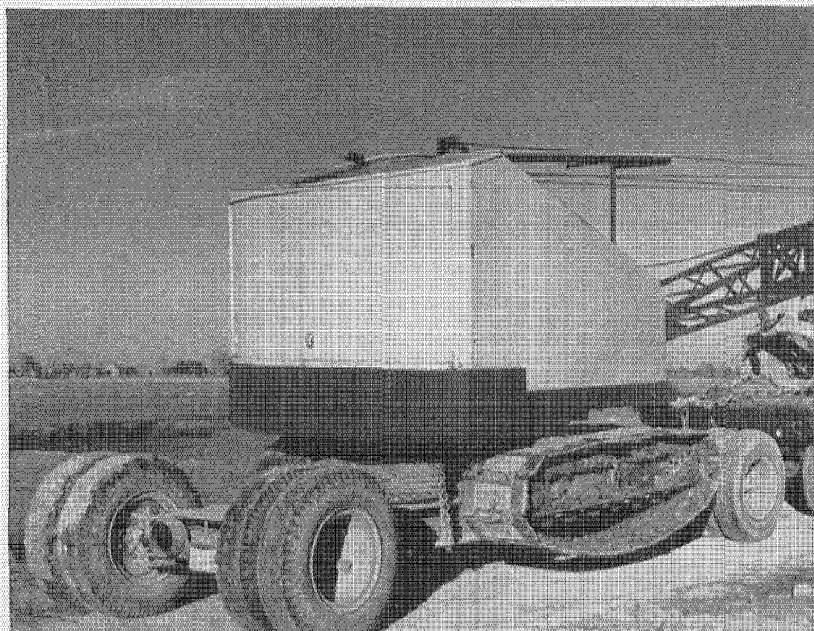
"Another advantage," he added, "is that nylon tires are no trouble for our truck drivers. Why, we haven't had even a blowout."

Other outfits report similar experiences. A Winooksi, Vermont, trucker used to average 15,000 miles on his tires before they blew out from bruises and impact. Now he has tires with nylon carcasses; has used them for 24,000 trouble-free miles, and they are only a third worn.

Six nylon tires used in Alma, Michigan, by a company transporting heavy refinery by-products have run 35,000 miles with no trouble, and have worn off only half of the tread.

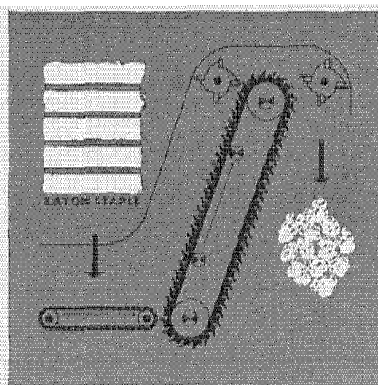
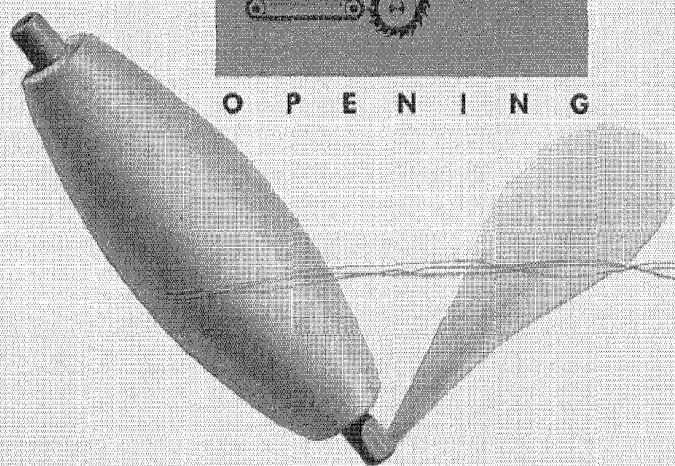
In checking over these reports, we found no record of a nylon tire carcass failure caused by heat or bruise. One Fresno, California man trucking general freight has already put his fourth recap on his nylons—and they're still running O.K. After all, what more can you expect of a tire?

• The "nylon" tires you see on the back of this trailer have run all of 75,000 miles without a blowout. Loads range up to 40,000 pounds.

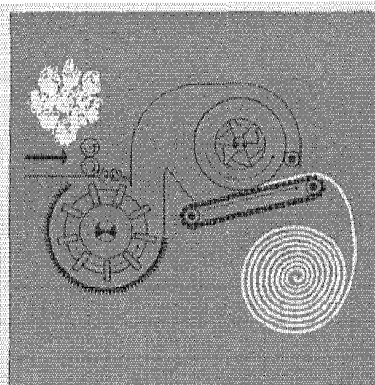


• Loading dragline on the trailer. Nylon truck tires easily take punishing loads like this.

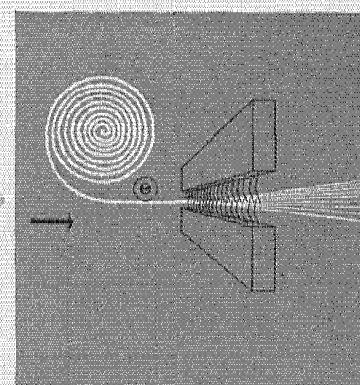




O P E N I N G



P I C K I N G



C A R D I N

Direct spinning

... a modern shortcut for producing spun rayon yarn. It is relatively new, and it has many advantages

Given the clue that it has to do with textile processing, we might say that our subject—direct spinning—is a pretty fair description in itself. You can catch the drift without too much preliminary scene-setting on our part.

Direct spinning, as the name implies, is a process that gets straight to the point, short cutting several other processes. To be specific, it makes spun rayon yarn of an unusual type in a single operation, and on a single machine. It replaces entirely the opening, picking, carding, drawing, roving and conventional spinning steps.

Let's draw a homely analogy. If the principle of direct spinning could be applied to laundering your shirt, it would in one move put a shirt from the soiled clothes pile into your chest drawer ready for wearing again. This without benefit of all the interim steps of preparation, such as washing, rinsing, drying, ironing and the like. In its way, direct spinning is just as unconventional.

In terms of the history of the textile industry, direct spinning is an upstart. A mere 10 years of research and development lie behind it, but its future seems interesting enough to talk about now in terms of what it may mean to the textile industry, the customer and Du Pont.

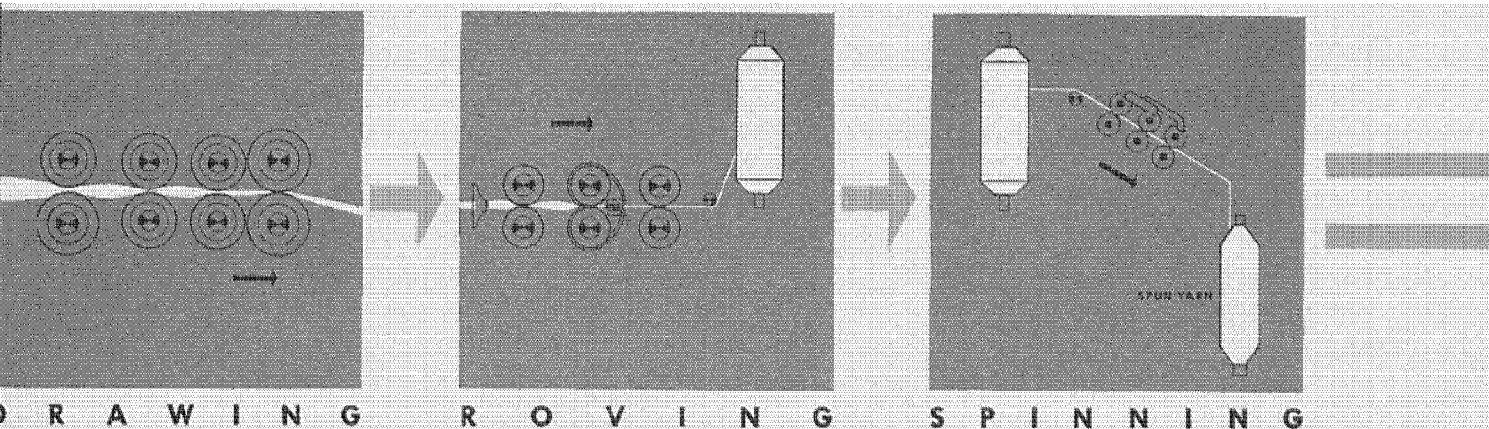
Conventionally, rayon fibers are converted to yarn in much the same fashion as cotton and other fibers. Du Pont produces rayon staple in continuous lengths and then chops it up into the short ones desired by the customer. Fibers arrive at the mill in bales, and, as you can well imagine, the material is a jumbled mass. The fibers have to be carded to line them up parallel again and to fashion them into a continuous strand, ready for drawing, roving and spinning.

Mill men had good reason to ask themselves why rayon, which had so many natural advantages to start with, should have to run the same gauntlet as other fibers. To make spun rayon yarn, rayon must be cut into short lengths. But why jumble it, then go to great pains to unscramble it again? Another thing: rayon, unlike natural fibers, starts out clean and does not have to go through the processing steps needed to remove impurities and foreign matter. Originally, rayon staple was working under a handicap because it was going through traditional processes not designed for it. Like driving a spanking new car over a rough road, it makes headway, but the road may not bring out the best in the car.

DU PONT SEES POSSIBILITIES

In the mid-30s, a machine was invented that caught the eye of Du Pont technical men. It was based on the idea of converting continuous filament rayon tow into broken fibers, at the same time keeping them parallel. This was a real step in the right direction.

Then in 1940, a representative of the Rayon Department was shown a new machine at the Saco Lowell Shops in Biddeford, Maine. This was being used experimentally to process glass fibers, from a state roughly resembling tow, to spun glass in one operation. He took a look at it, then hotfooted back for some samples of rayon tow. By August of that year, he had run several trial batches through it. Results were encouraging, and the Rayon Department set up an appropriation for further research.



During the war period the project lay dormant, but at this writing things are rolling again. The Company has invested many thousands of man hours and large amounts of money, although Du Pont has no financial stake in this Saco Lowell machinery.

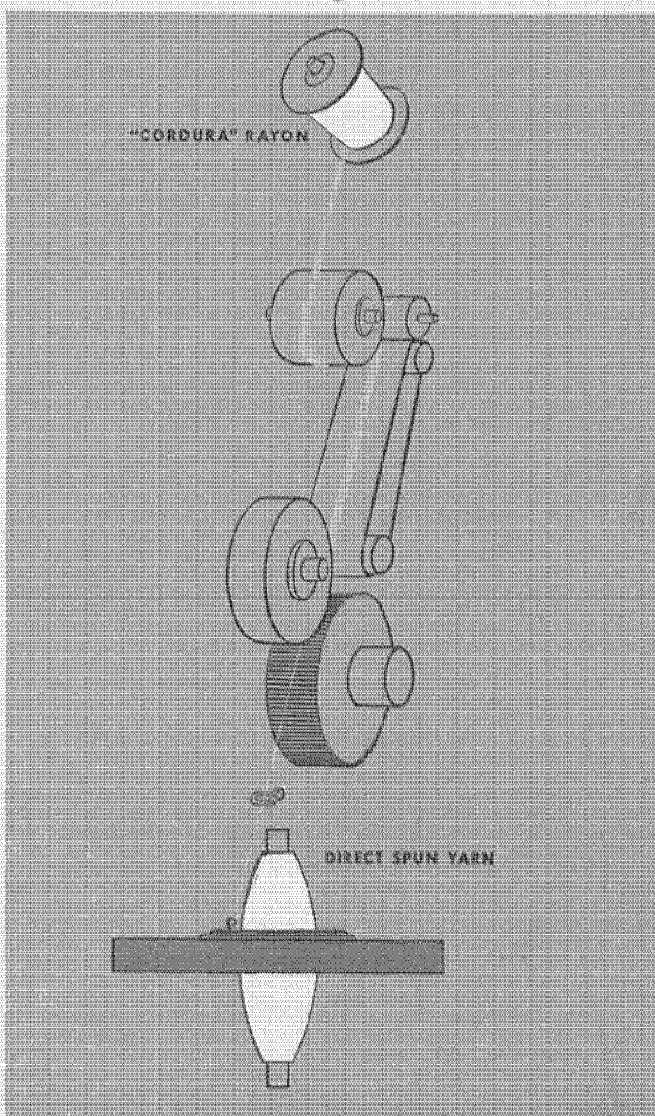
Interest among customers of the Rayon Department kindled early because of the extreme simplicity of the process, and because of advantages already inherent and others that looked interesting. The direct spinner's compactness makes it a natural for a mill owner. The machine is actually a complete spinning mill in itself. Using Du Pont "Cordura" rayon, it produces strong yarns with average staple lengths ranging from four to seven inches. The extra length of staple in itself contributes to good yarn strength. Among other characteristics, this improved property of the yarn may be of great importance in washable fabrics and garments.

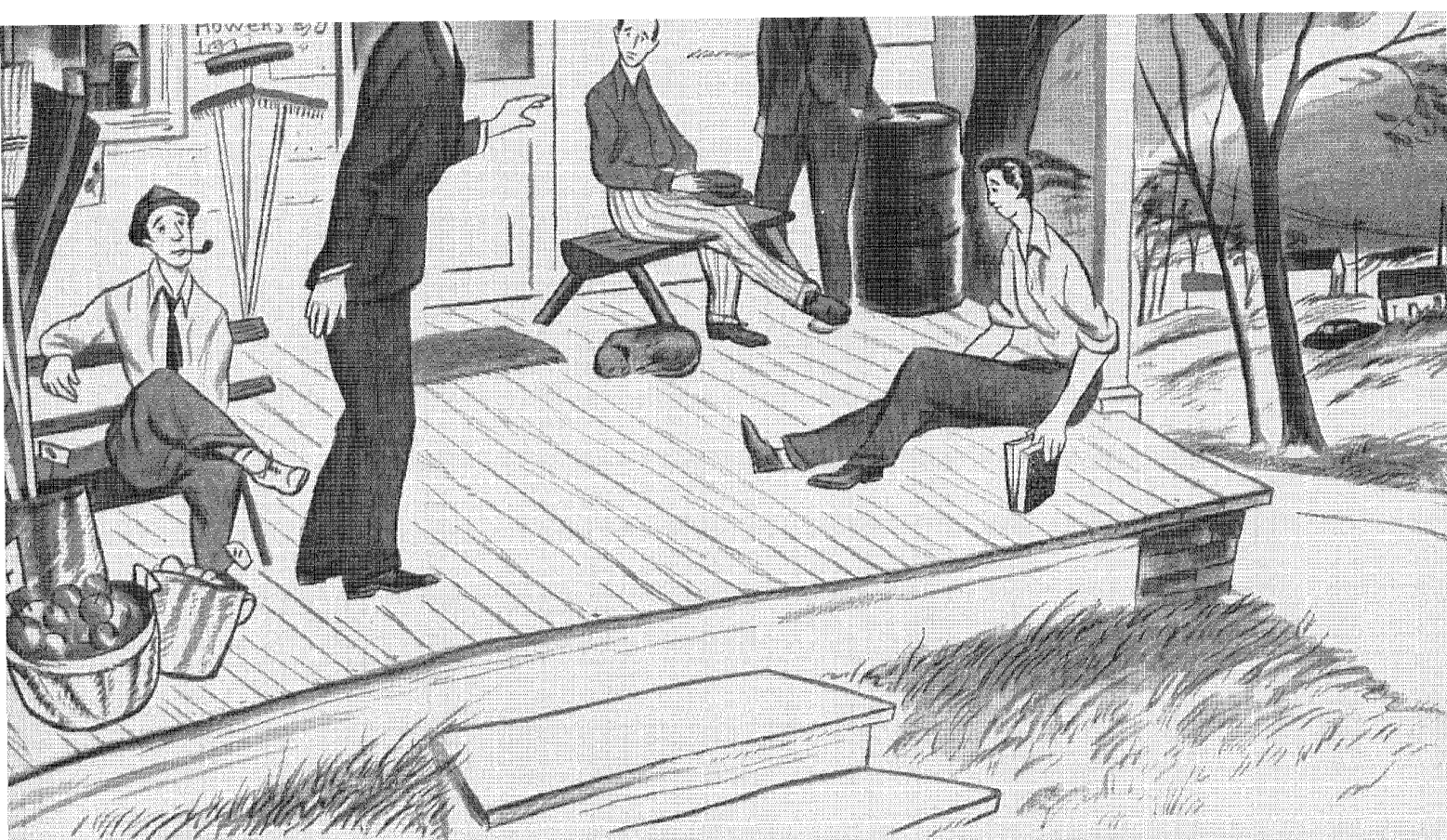
FUTURE FOR NEW PROCESS

Since direct spinning seems to be well suited for synthetics, Du Pont is, to say the least, more than mildly interested. The development period hasn't been a protracted honeymoon by any means, and there are still "bugs" in the process. But the process seems to make sense and may open new vistas and new markets. In addition to Du Pont's deep-rooted belief in the future of rayon and other synthetics, it sees in direct spinning a fine research tool. Laboratory records show, in some instances, that a trial run on a new yarn, ordinarily a matter of weeks, can be telescoped into days.

Referring to the comparative youth of direct spinning, Rayon Department technicians like to point out that the basic cotton process, now more than two centuries old, is still being improved. Direct spinning, in the commercial sense, is just reaching the ripe old age of two. At that rate, they say, it is barely out of the incubator. Its future, like the weather, is hard to pin down. But it sure is interesting to contemplate.

SPUN RAYON ON THE DIRECT SPINNER





Of books and baseball

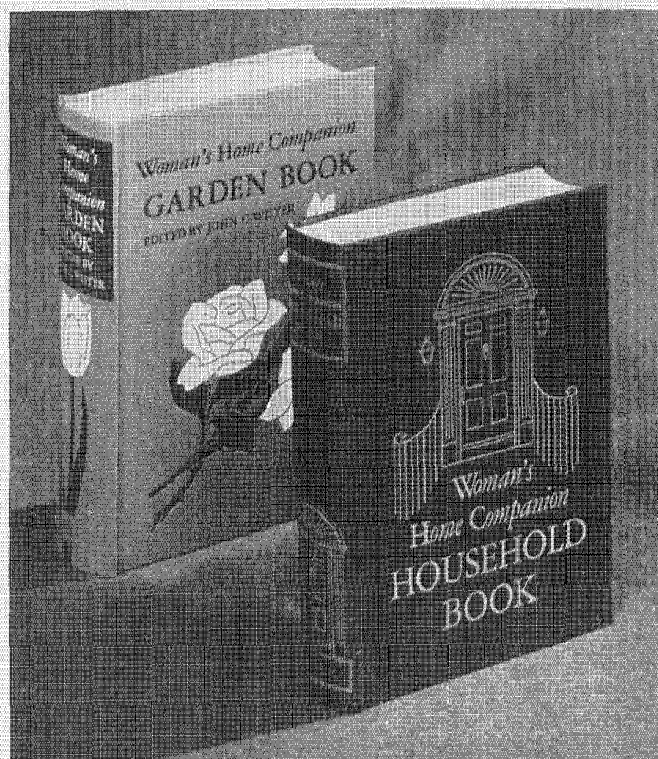
We were sitting on the porch of Pop Hadley's store talking local baseball when an earnest-looking young man with a lop-sided smile drove up and asked for me. Said my wife sent him over to show me his books.

He stuck a volume of the famous *Five-Foot Shelf*, the Harvard Classics, in my hand and said, "I'm Earl Dallas, a representative of P. F. Collier and Son Corporation, a subsidiary of the Crowell-Collier Publishing Company. You know them. They publish *Collier's*, *The American Magazine* and *Woman's Home Companion*. We distribute millions of books each year—the kind that educate the whole family and keep it up to date."

He paused a minute while a couple of us leaned back more comfortably. We hadn't anything better to do than listen, anyway, since the Saturday afternoon ball game had been rained out and it wasn't time for the Braves broadcast.

"Last year," the book man continued, "my company printed and delivered to American homes thousands of sets of the Harvard Classics. They went everywhere from the lonely cabins of Alaska trappers to fruit growers' homes in Florida. Now look at what's in them . . ."

He kept talking, and I idly ran my finger over the cover of the book, thinking about our rained-out ball



• Useful new books bound in durable "Fabrikoid."

game. The boys had stood to win today, too, since Steve was going to pitch. And a win would put us back in second place in the Valley League.

"Like the feel of that cover, huh?" The salesman's voice cut through my reverie. "It's a Du Pont product. They call it 'Fabrikoid' pyroxylin coated fabric. Looks like leather and stays fresh looking for years. In fact, we used it on more than 3,500,000 books last year."

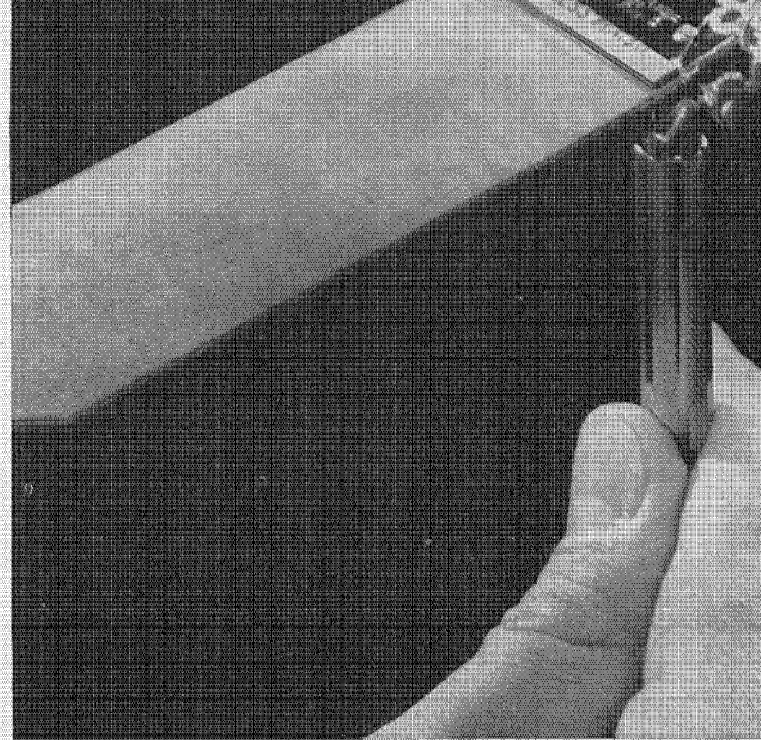
That young fellow sure likes to give you impressive figures, I thought; and that set me to wondering if the team manager could ever persuade the Deacon to let his boy play. We needed a husky boy like that who could raise the team's batting average and hit the ball all the way to the creek.

Then I heard the salesman saying: "The men who bind our books like the uniformity of 'Fabrikoid': colors and quality don't change from lot to lot. Yes, sir, it's a good cover for a good book." He stopped, and seemed to expect a reply.

"Well," I answered, not exactly meeting his eye, "the last time one of you Collier men was through this way the wife and I bought this set. But my brother across the street wants a set of your Junior Classics for his kids. Guess my wife was too busy baking to tell you."



• This is a corner of the Collier Corp. library. Most books here are bound with DuPont bookbinding fabrics.



• Flexibility and wear resistance are features of the "Fairprene" coated fabric now in the new Autostrop.

Tops in strops

A lot of young blades these days think of the razor strop as something out of the primitive past. It may have seen its heyday—but that was before it took a society to preserve barbershop quartet singing in America.

The past 40 years have indeed seen the rise of new shaving methods, safer ones that save time and energy. For many men living at today's fast clip, these are important advantages. As a result, safety razors—and more recently the electric shavers—have all but relegated the straight razor to the barber shop, where professionals still think it does the best job.

But there are many home shavers, even today, who have become attached to the idea of stropping their blades for longer wear. To these men, shaving sets such as Gillette's Valet Autostrop offer the advantages of the long-lasting stropped blade, together with the safety features of the modern razor.

Of course, the quality of the strop is important. It should be tough and flexible, and must stand constant abrasion. That bill is filled by a new strop, made of Du Pont "Fairprene" synthetic rubber coated fabric, recently incorporated in the Autostrop set. It requires no dressing and resists deterioration from soap, moisture, oils and heat.

The man who likes to use a freshly-sharpened blade each time, with economy, will find this "Fairprene" strop a dependable accessory.



An ore miner prepares a "shot," using Du Pont Series B Delay Electric Blasting Caps.

New blasting tools

***Improved Du Pont explosives, blasting supplies
and accessories have been developed
during the past 18 months***

By E. L. THAYER

Mineral deposits in the earth don't change much either in form or substance through the ages. But mining tools and techniques do; they must be improved to keep pace with production demands. Otherwise, many industries would soon bog down for lack of raw materials.

Among industry's primary tools are commercial explosives. Du Pont has been making them for almost 150 years—black powder since 1804, dynamite since the 1880s. Early, they were adapted for mining, construction and quarry uses, but not until this century did any American powder maker start organized research work to improve his products or to develop

new ones. This Company was first to do that when a group of chemists began work at the Eastern Laboratory in 1902.

Since then many improvements have been made through well-directed teamwork of this staff, a group of field technicians, and cooperating explosives customers. During and since the war years, these groups have been busy, as you will gather from a brief summary of developments that have come to light within the past 18 months.

Consider coal, for instance. Nearly 600 million tons are produced annually for home and industrial needs. Most of it is mined with permissible explosives—special dynamites approved by the U. S. Bureau of Mines for use under prescribed conditions. There are several types, most of them for use in coal. But miners often have to work in hard rock, too. Another type

was needed, and the research team produced "Gelobel" AA permissible explosive. This stronger, water-resistant gelatin dynamite works well in its special field.

Quarrymen and strip miners for years have used "Nitramon" blasting agent wherever possible because of its safety characteristics. But a stronger companion product was needed to "break the bottom" in some quarries. That problem was solved with Du Pont's new "Nitramex" blasting agent. Both are now used together with safety and economy in many a hard-rock quarry and open-pit ore mine.

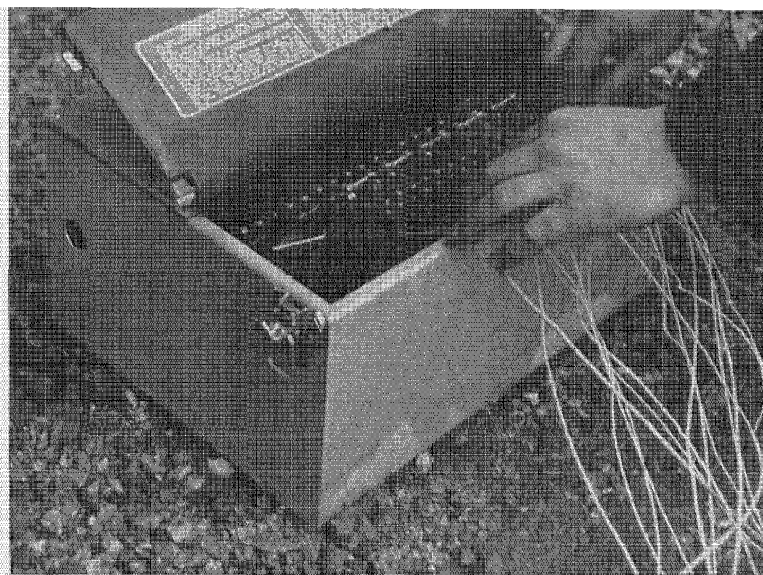
The search for oil deposits never ends. Blasting to cause miniature earthquakes is part of the routine practice in geophysical prospecting. The object is to record on delicate instruments information about underground strata as shock waves traveling through the earth are intercepted and reflected back to the surface. For years land crews have used "Nitramon" S to produce the "quakes." Now they're also blasting in coastal waters from boats.

Naturally, for safety reasons, crewmen didn't like living with high explosives as boat companions for a week or more at a time. They much preferred "Nitramon" S, and hopefully asked: "Could it be adapted for water work?" The answer to that is "Nitramon" WW. It's as effective as the older type, and is just as safe to use.

In the many types of blasting, such as sinking shafts, driving drifts and tunnels, the several holes that make up each shot must explode in proper sequence. To accomplish this, use is made of small but indispensable tools called delay electric blasting caps. Usually these function perfectly and the individual holes fire in the desired order, but on rare occasions one or more may fail to function. This causes a dangerous interruption of the work. The reasons for these unusual and puzzling misfires have long been the subject of study by explosives research workers.

Recently, they developed "Series B" delays that definitely eliminate some of the causes of failure. These caps, because of their greater dependability and safety, have come into widespread use.

But that isn't the whole story. More recently, in mine and tunnel work, it has been found helpful to reduce the time intervals of delays from one second to fractions of a second. So Du Pont has developed



• Du Pont Blasting Timer reduces vibration, improves fragmentation in quarries and open-pits and ore mines.

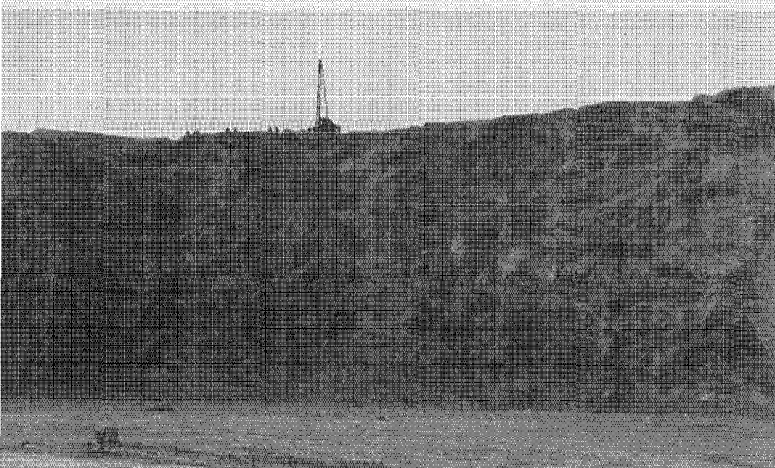
another new series called "MS" (millisecond) Delay Electric Blasting Caps. Their use results in better breakage, less damage to mine timbers, reduced vibration during a blast, and a greatly reduced hazard of finding unexploded dynamite cartridges afterward in the broken rock. There are nine delay intervals, ranging from 25 to 300 thousandths of a second.

Vibration from quarry blasts can now be greatly reduced by the use of the Du Pont Blasting Timer, a new accessory that functions much like the timer in your automobile engine. But instead of regulating the flow of current to six or eight cylinders, this one activates as many as 15 separate blasting circuits at split-second intervals. It does the work with far greater precision than has ever been attained before.

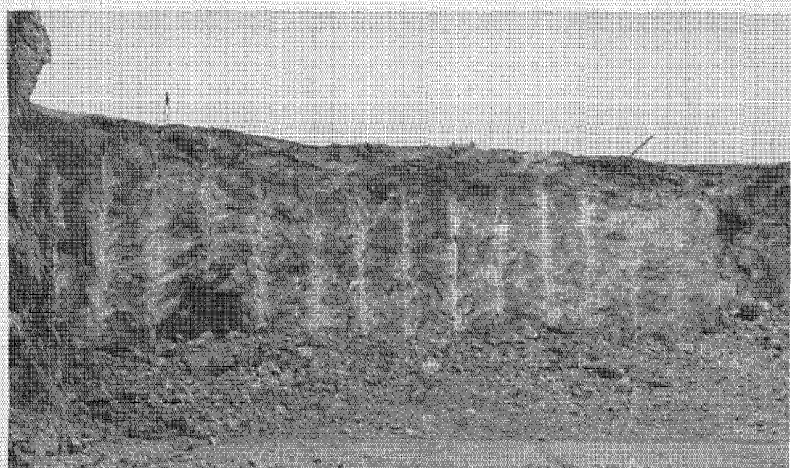
Accurately-controlled timing with this machine results in increased efficiency and safety. It pays off in reduced vibration, improved rock breakage, and fewer damage complaints from nearby property owners.

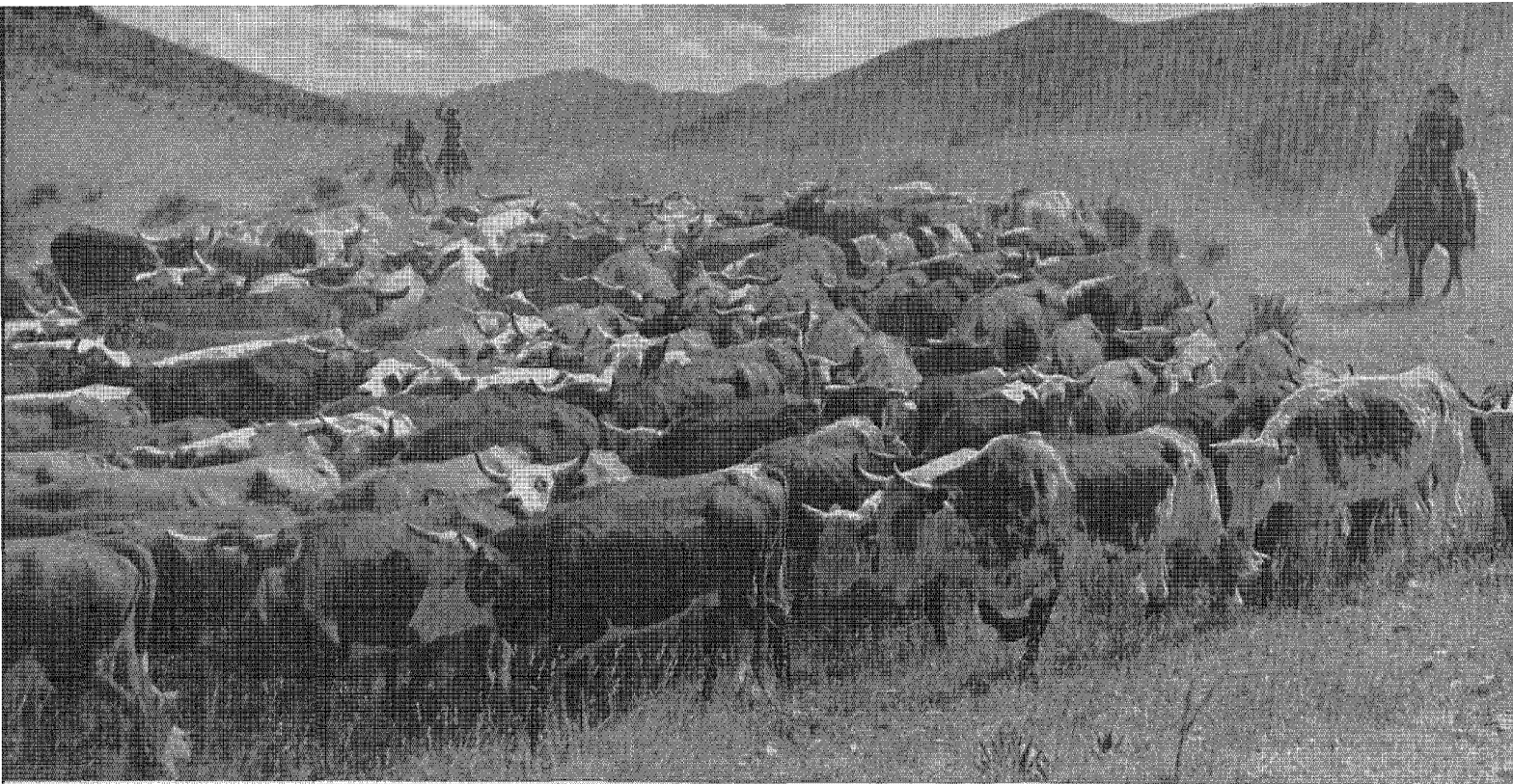
All of which illustrates the point first made. Tools and techniques must be adapted to ever-changing work conditions. Du Pont explosives, blasting supplies and accessories have been improved, and that work is continuing both at the Eastern Laboratory and in the field.

• Portrait of a hard-rock quarry face before shooting time. Deep holes have been loaded with new "Nitramex."



• After the blast. Note below the huge pile of broken rock brought down by using better tools, supplies, accessories.





First cattle drive on the Chisholm Trail... a scene from the movie, "Red River," photographed on Du Pont motion picture film.

Cameraman of the year

When it comes to outdoor motion picture work, Russell Harlan, A.S.C., and Du Pont motion picture film make an unbeatable team

When was the last time you saw a movie photographed by Russell Harlan?

If you didn't think of "Red River," released through United Artists, which won Harlan the 1948 *Look Magazine* award for superlative photography, you may have remembered the Hopalong Cassidy movies. Many of them are now being televised. Harlan was responsible for photographing about 60 of them and some 20 other feature pictures as well.

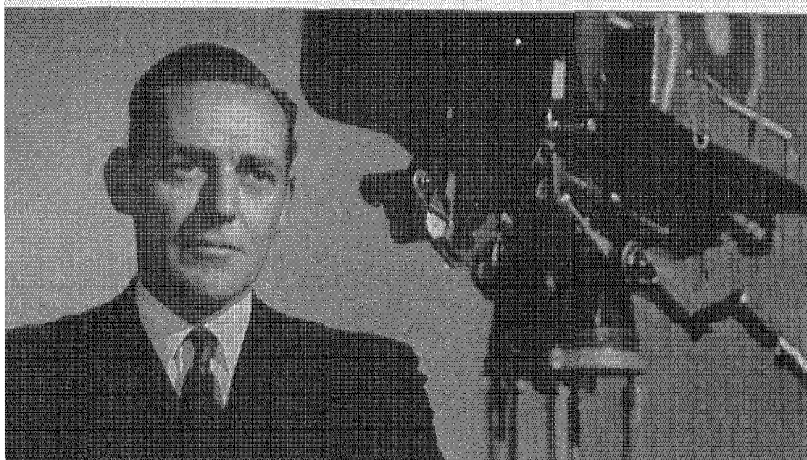
Born in 1903 and reared in Hollywood, Russ Harlan drifted into motion pictures more or less accidentally. He was schooled in Manual Arts High School

and in his 'teens became a vacation-time cowboy on Arizona ranches. A job in 1921 with the Famous Players-Lasky Laboratory gave him a start as an assistant cameraman. Thirteen years later he acquired the coveted first cameraman status, and soon afterward started his long career with Harry Sherman productions, where he "shot" the Hopalong Cassidy features.

Today Harlan is noted in the motion picture industry for his magnificent outdoor photography. He had already achieved this reputation when Howard Hawks sent for him to film the epic, "Red River." In a sense this picture is a culmination of his years of hard work and perseverance. If he had not been in Germany working with Hawks on "I Was A Male War Bride" and thus unable to submit his movie to the judges, it is likely that "Red River" would have been in the final balloting for the Academy award.

Next to "Red River," Harlan's work was outstanding in "A Walk in the Sun" and in "Silver Queen." In shooting all three of these movies, Russ used Du Pont "Superior" 2 motion picture film. He said: "Personally, I prefer Du Pont film particularly for exterior work because of its latitude. And its quality can't be excelled. Du Pont film is certainly the friend of the cameraman."

• Harlan, long noted for his outdoor photography, won 1948 *Look Magazine* award for shooting "Red River."



Hidden harvest

Du Pont seed disinfectants give bigger yields—better crops

Many of us take part in annual campaigns to fight cancer, infantile paralysis, heart disease, tuberculosis and other diseases of mankind. But we hear little about the campaigns against plant diseases.

More than 50,000 of these diseases have been classified by plant pathologists. They take an annual toll from farmers estimated at between 1½ and 2 billion dollars. If an unexpected loss like that occurred in any one year, it would be considered a national disaster. But because it happens year after year, it is accepted as inevitable—which it is not.

Crusaders against these diseases are county agents and extension departments of the United States Department of Agriculture, plus farmers, millers and grain industry leaders organized into crop improvement associations.

More than 500 plant diseases are carried on the seed itself and in the soil at the same time as the seed germinates. Effective materials to combat these diseases are seed disinfectants and protectants—Du Pont's "Ceresan" and "Arasan."

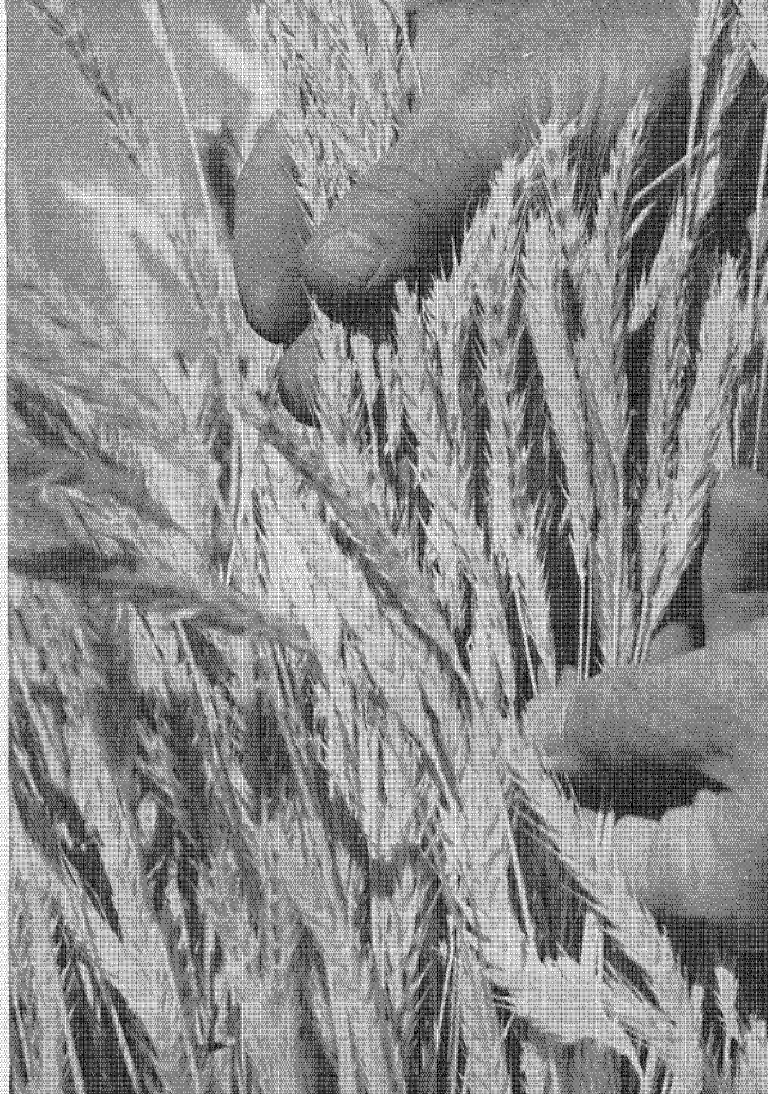
In many areas of the country, seed treatment has become a standard practice. For example, it is estimated that more than 90 per cent of hybrid corn in America is treated with disinfectant before planting—usually by the seed producers.

For other crops, many farmers grow their own seed. Some take it to a firm that does custom treating commercially—such as grain elevator or cotton gin operators. Others may treat their seed at home. For farm use, Du Pont seed disinfectants are available in convenient-size packages. Yet with seed treatment so easily available, there are still millions of acres planted each year without benefit of treatment.

As a result, many seeds die "aborning" from seed decay. Many of the plants which do germinate are snuffed out by attacks of seedling diseases which cause plants to rot at the stem or to head out with pockets of smut where the plump, golden kernels should be. The results are reduced yields and poor quality grains, for which the grower is "docked" at the market, because such grains may not be suitable for food purposes.

From data assembled in terminal markets and state colleges, the state pathologist of Kansas estimated in one year that seed treatment saved for farmers in his state 5 million bushels of wheat, 7½

■ This machine comes to nearby Kansas farmers to clean seed and treat it for planting.



● Control of smut and other diseases has helped increase the profit on the farmers' investment in labor and seed.

million bushels of oats, 5¾ million bushels of grain sorghum and 370,000 bushels of barley. On his estimates, seed treatment that year repaid farmers approximately \$21.50 for every dollar of cost. It takes only half an ounce of "Ceresan" to treat seed for a whole acre of grain.

With the benefits of seed treatment so well established, it follows that they can and should be extended to more farms and more crops.

The extra yield from treated seed is indeed a "hidden harvest."





Bridging two kingdoms

*A story about Friedrich Wöhler, 1800-1882,
who synthesized urea and unlocked the door to
synthetic organic chemistry*

At the risk of admitting our age, many of us can remember back to that childhood Fourth-of-July delight, Pharaoh's Snake—that little pyramid of solid stuff which, touched with a flame, gave rise to writhing, swelling serpents. The inventor of that ingenious plaything was a German chemist of the last century, Friedrich Wöhler. And, we might add, he caused much consternation to his landlord, for young Wöhler hit upon it while experimenting with thiocyanic acid in his lodging room at Marburg.

At that time Wöhler was a student at the University of Marburg, preparing to be a doctor of medicine. In his spare time he performed chemical experiments that finally were to lead to many scientific discoveries—one of epoch-making importance.

Today even, most chemists have forgotten that Wöhler first isolated metallic aluminum and beryllium; that he explored in the fields of uric, cyanuric and cyanic acids, oil of bitter almonds, the compounds of silicon, and other phases of chemistry. But many a high school science student has come across a word of praise for his syntheses of urea.

In that chemical feat, Wöhler touched a match to the ever-expanding "Pharaoh's Snake" of modern synthetic organic chemistry. Until then, it was assumed that products of living organisms could not be made from "dead" mineral sources. Inadvertently, Wöhler struck this theory its death blow. His discovery led to the knowledge that "organic" materials are not necessarily products of living organisms.

The year of his great discovery, 1828, found the amiable, soft-spoken young chemist teaching in the technical schools of Berlin. He was experimenting one day in his laboratory when the thought occurred to him; "Perhaps this white crystalline material I've made by combining cyanic acid and ammonia solution might be organic." "The unexpected result," he wrote later, "was the remarkable fact that it seemed to be an example of the synthesis of urea, an animal substance, out of inorganic raw materials."

IN WÖHLER'S FOOTSTEPS

The gates were now open. Little by little, chemists not only learned how to reproduce organic materials in the laboratory—they even made new ones that outshone those in nature. They went on to synthesize dyes, drugs, aromatics, plastics and other products. The discovery of nylon is a shining example of how far they have come in the century of creative chemistry set rolling by Wöhler.

Wöhler was born in 1800 near Frankfurt-am-Main. After starting school in Frankfurt, he met a Dr. Buch who interested him in science and let him use his kitchen as a laboratory. Leaving here, the homely youngster went first to Marburg, and then in 1821 to Heidelberg, where he worked under the great chemist Leopold Gmelin.

It was Gmelin who urged the young man to drop his plans to become a doctor and take up chemistry in earnest. He advised Wöhler to work in Stockholm under the famous Swedish chemist Berzelius. Wöhler took Gmelin's advice on both scores, with happy results for himself and for science. After teaching in the technical schools of Berlin and Kassel, he was appointed to the chair of chemistry in the medical faculty at Goettingen, a professorship he held until his death in 1882.

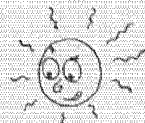
Although Wöhler showed that urea could be made synthetically, it remained for the modern chemical industry to produce it in quantity. The first commercial manufacture of urea in this country began in 1935, in the Du Pont Ammonia Department. Today, enormous tonnages are used for the production of fertilizers, plastics and adhesives.

In spite of the importance of urea itself, Wöhler's greatest contribution lies in the implications of his discovery for modern creative chemistry. It was the key of his talent that unlocked the door to the future.

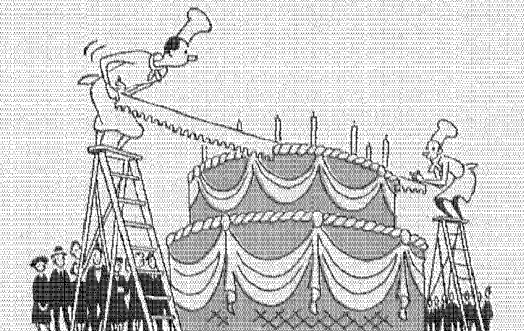


• A load of synthetic urea leaves the de-watering unit.

Did you know

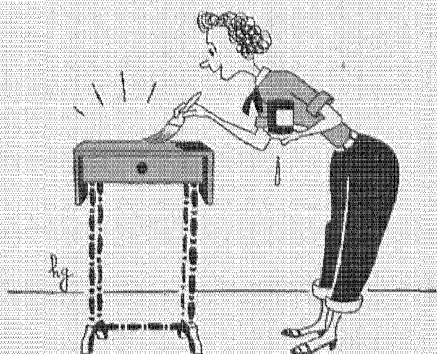


... THE CEMENT INDUSTRY uses an industrial gun shell made by Remington Arms to break down clinker rings in rotary kilns?



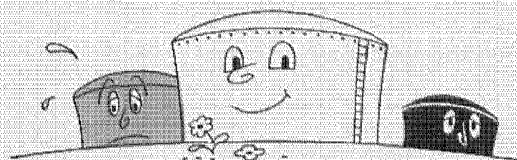
... DU PONT "MYCOBAN" sodium propionate added to retard spoilage, was used in making the world's largest cake for the birthday celebration of a Miami supermarket? The six-ton cake—22 feet long, 10 feet high and 12 feet wide—was served to an estimated 175,000 patrons.

... LAST YEAR our employees established a new Company-wide safety record in more than 200 plants, laboratories, warehouses, stores and offices? The frequency rate of disabling injuries per million man-hours worked was 0.77 as compared with 0.91 in 1947, the previous record low.



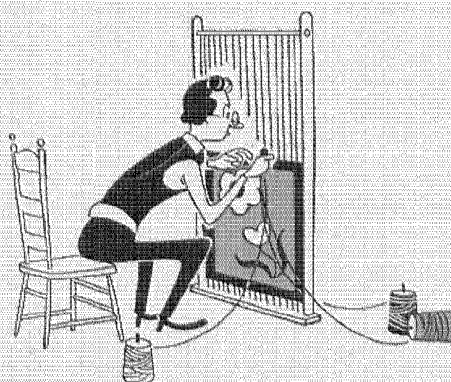
... FOR THE FIRST TIME Du Pont nylon-bristled paint brushes are available for the home painter? Formerly, these bristles were used in brushes for master painters only, but now a complete line in various sizes is being supplied to local paint and hardware stores in certain sections of the country.

... COAL HAS BEEN known for more than 2,000 years, but only been used as a chemical raw material since William Henry Perkin, an English chemist, made the first "coal-tar" dye in 1857?



... THOUSANDS OF GALLONS of gasoline are lost annually through evaporation while in storage? This waste can be substantially reduced by painting the metal spheres and cylinders with Du Pont "Dulux" Tank White. It reflects the sun's heat waves and helps to keep the tanks cooler, particularly during the summer.

... DU PONT'S Fine Chemicals Division makes more than 40 chemicals for the textile trade?



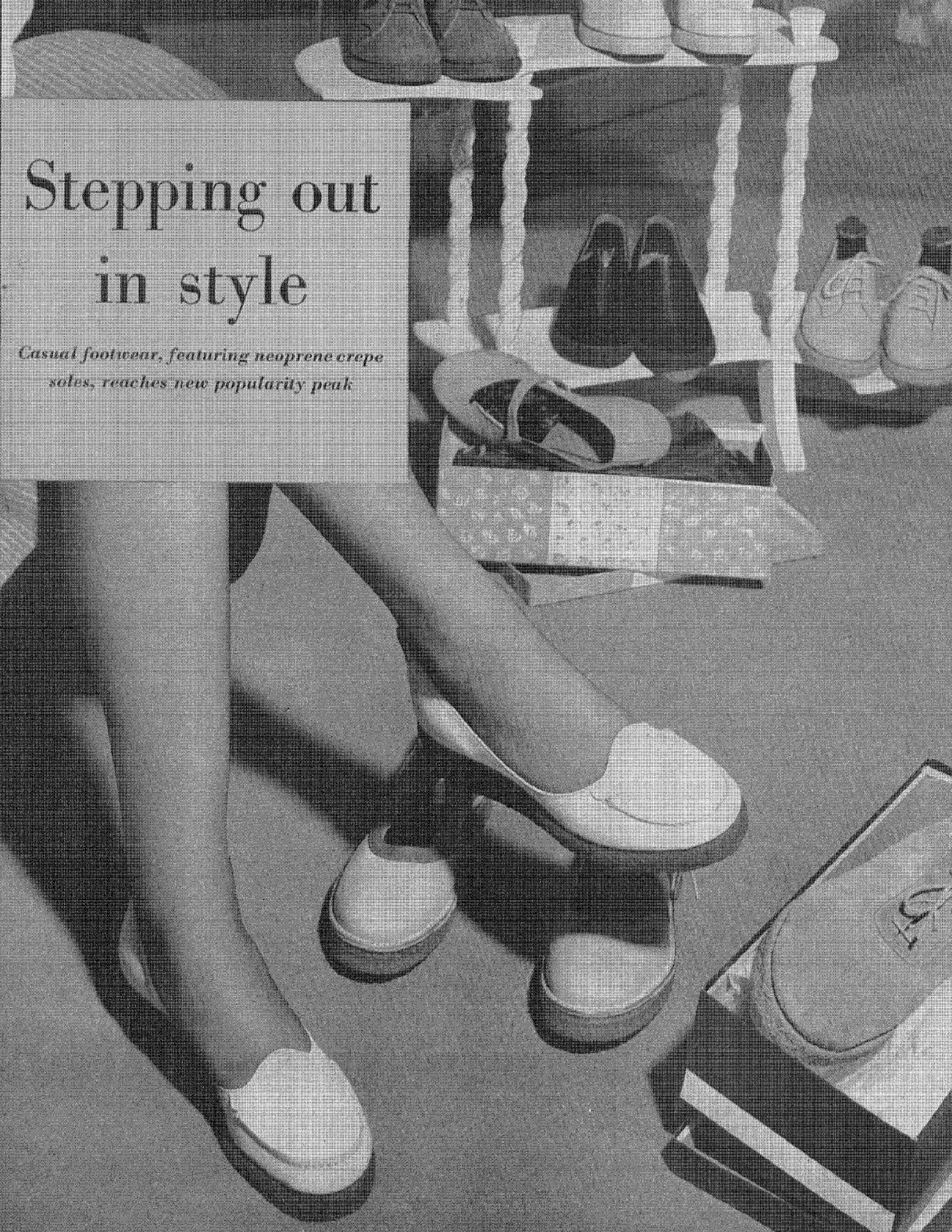
... NEARLY THREE-QUARTERS of the carpet looms in America were still operated by hand in 1869? Incidentally, one of the newest advances in rug and carpet manufacture is the use of Du Pont "Cordura" rayon yarn in the "chain" warp—used to tie the wool tufts to the back of the rug or carpet.



... ON EASTER SUNDAY the Du Pont Exhibit on the boardwalk at Atlantic City was visited by 40,391 people—the largest single day's attendance in the history of the exhibit? Twenty-six of the 47 displays were devoted to fashion articles and wearing apparel.

Stepping out in style

*Casual footwear, featuring neoprene crepe
soles, reaches new popularity peak*



The "casuals" and the "flats," the shoes that started their style career as accessories to sport clothes, have become more and more popular and versatile. Now there are some types that can be worn with practically any costume.

Obvious reasons account for these new fashions. Trim, flattering and "tops" in comfort, they are smart in appearance and really practical for the great variety of casual costumes that have found high fashion acceptance. Footwear of this kind has become an intrinsic part of "the American look."

With this style trend has come a wide variety of designs and colors in casual footwear. There are sandals and wedgies, platforms, oxfords, ghillies and pumps, high or low heels, or no heels at all. And there is a wide range of fabrics, suedes and leathers in many color combinations.

Manufacturers have recognized the swing toward these shoes. Predictions in the retail trade indicate that casuals will replace other types by as much as 30 per cent during the current year. To quote from the December 1948 number of an authoritative business magazine: "One alert New Hampshire producer whose output was traditionally two-thirds high-heeled dress shoes, now makes 65 per cent flats and casuals. By spring the proportion will be 80 per cent." Such widespread acceptance signifies that casuals have become a greater factor in footwear styles.

Neoprene, the rubber made by Du Pont, has played a significant role in increasing the popularity of one important type of casual footwear—the crepe-soled shoe. Because neoprene crepe can be produced in brilliant or soft colors without any loss in wearing quality, many new styles are possible. The processing operations necessary to add color do not soften neoprene nor reduce its toughness, as so often happens when colors are worked into other crepe soles.

EYE APPEAL ADDED

Many alert manufacturers who appreciate the sales and eye appeal of pleasing colors have designed a variety of casuals, with great emphasis on brilliant neoprene crepe soles. In addition, the objections most people have to older style crepe-soled shoes have been eliminated. The new style casuals are light in weight, cool and unusually flexible. The soles are not heavy even though they sometimes appear thick because of a new design featured.

One recent line features soles in natural, red, gray, green, tan or navy blue, matched or contrasted with suede uppers. By the use of these rich colors, shoes were produced which appealed to the fashion-conscious woman as much for their beauty as for their comfort and superior wearing qualities.

It is no longer news that neoprene crepe soles offer superior wear. According to manufacturers, these soles satisfactorily withstand excessive abrasion, snow

- You'll like wearing new casuals with neoprene crepe soles; they won't get gummy in the hottest weather.

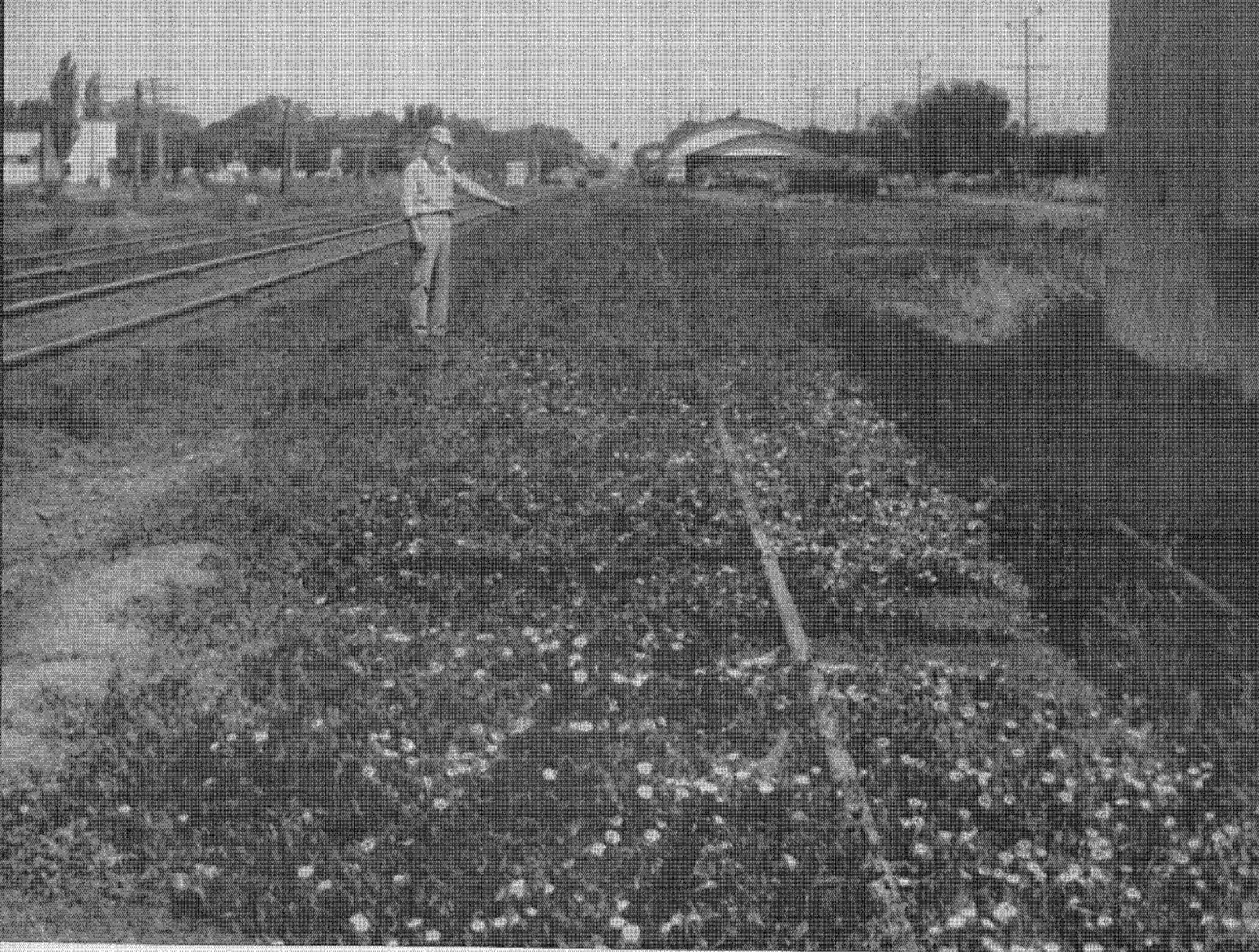
and ice, mud, water, heat and contact with oil and grease. Unlike crepe soles of other materials, they will not get "gummy" in hot weather nor gradually spread at the sides. They retain clean-cut outlines and pick up less grit to be tracked into the house.

With these outstanding advantages, plus good looks and moderate cost, it is no wonder sales of neoprene crepe-soled shoes have skyrocketed. Many men in the shoe industry believe that this year will be marked by the biggest sales of casuals in the history of footwear.



- Today casual shoes are available in many styles for every member of the family. They are light, cool and flexible.





When weeds threaten to take over like this, there's a job ahead for chemical weed killers.

Chemicals clear the way

Du Pont weed killers are helping to keep railroad and public utility lines open

Railroad watering stations, where the iron horses drink, have some new customers on the Santa Fe. Chemical weed killers have been tested along hundreds of miles of track. Santa Fe has developed a special rail-borne sprayer that tanks up at the regular watering stations. Hitched behind a locomotive, this sprayer will cover a six-foot swath along each side of a stretch of track quicker than you can say 2,4-D. Furthermore, it can reach weeds that could not be reached from any point except the track itself.

Clearing brush and weeds from rights of way has always been laborious. But it's necessary work, for no railroad can permit vines, bushes and scrub plants to foul rails or switches. The vegetation must be kept under control.

Public utility companies also face this same problem. For example, if there is a break in a power circuit, linemen have no time to cut their way through a jungle-like growth to reach the place where repairs must be made. That's a job for other maintenance men, and now they can do it the easier way—with chemical weed killers.

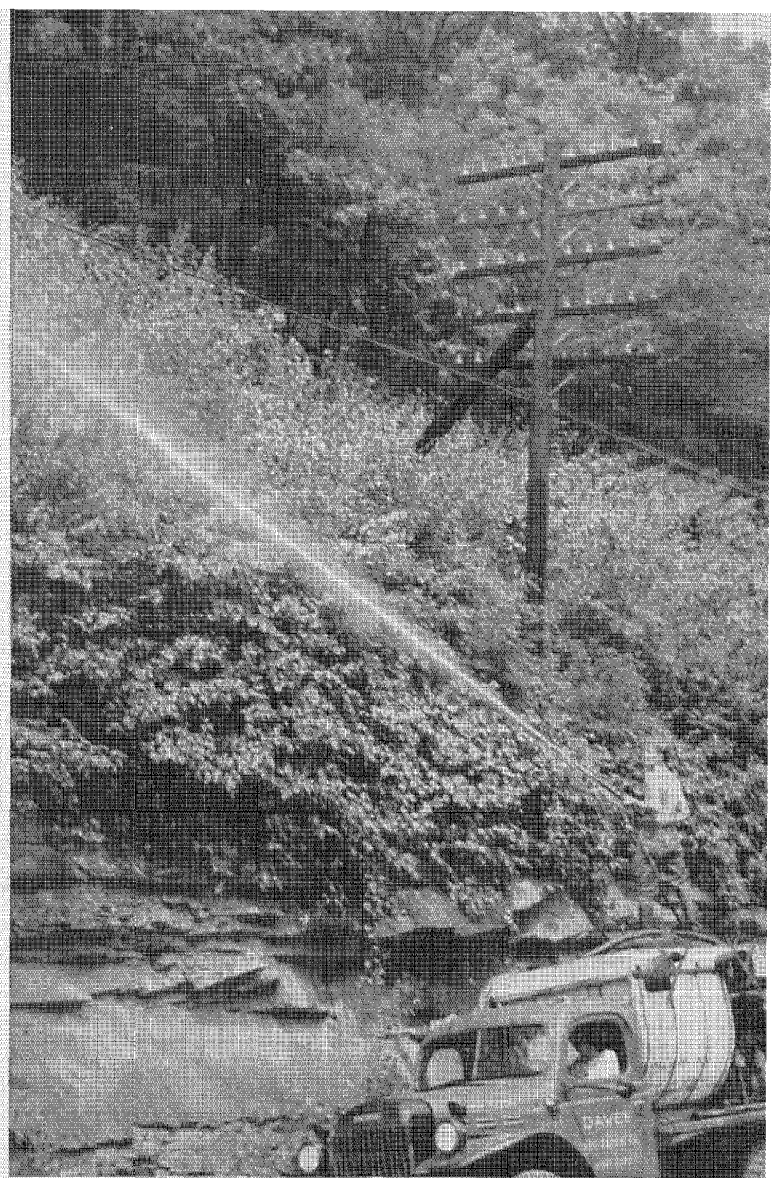
One power company estimates that chemical spraying costs only 60 per cent as much as cutting does—and the job is done better, with fewer accidents resulting from the use of sharp tools, exposures to whipping branches, and contacts with poisonous plants.

Du Pont now supplies several materials that are well suited for this work, so that railroads and utility companies may select chemical weed killers to cope with particular requirements. For example, usually a right of way has to be cleared without killing all plant growth on it permanently. Some cover of vegetation is generally needed to protect against soil erosion. Du Pont has three chemicals which meet this problem in different ways: "Ammate" weed killer, 2,4-D and the new TCA trichloroacetic acid.

"Ammate" kills most growing plants, but when used as directed, its effects do not persist long in the soil. Thus seeds of clovers, grasses and the like may germinate in a few weeks after a treatment, or at most in the season following. Du Pont 2,4-D weed killers, like those used on turf and some crops, kill only broad-leaved plants, leaving most of the grass to hold the soil. And where grasses themselves are a weed problem, the new 60% TCA is giving excellent control service.

None of these chemicals, at the proper dilutions for weed control, will corrode metal constructions along a railway or damage power-line equipment. When properly applied they are not toxic to people. Debris from plants killed with these chemicals presents no unusual fire hazard; it usually mats rapidly enough so that working crews can easily maneuver over the dead brush the next season.

In short, chemical weed killers give promise of improving thousands of miles of railroad and power lines. Thus, herbicidal chemicals have become increasingly important not only to farmers but to business and industry as well.



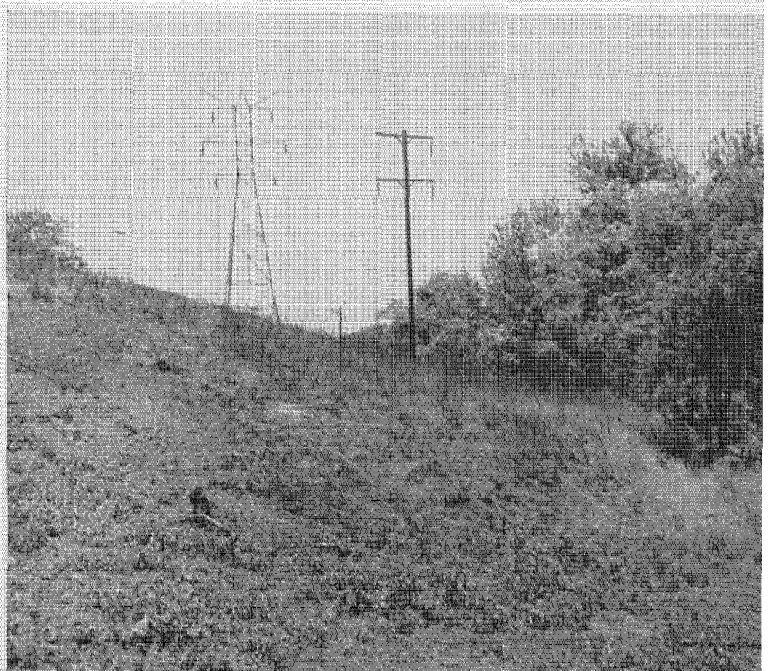
Some firms are already making a business of brush and weed control on a contract basis for utility companies.

[29]

- Clearing out this mass of growth with brush-hooks, saws or axes would be a laborious and perhaps hazardous job.



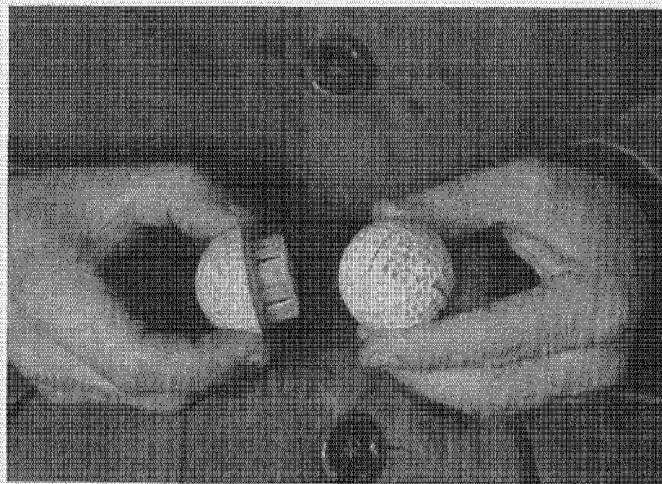
- A later view of the hillside after vegetation was sprayed with "Ammate." Note absence of dense underbrush.



What's New

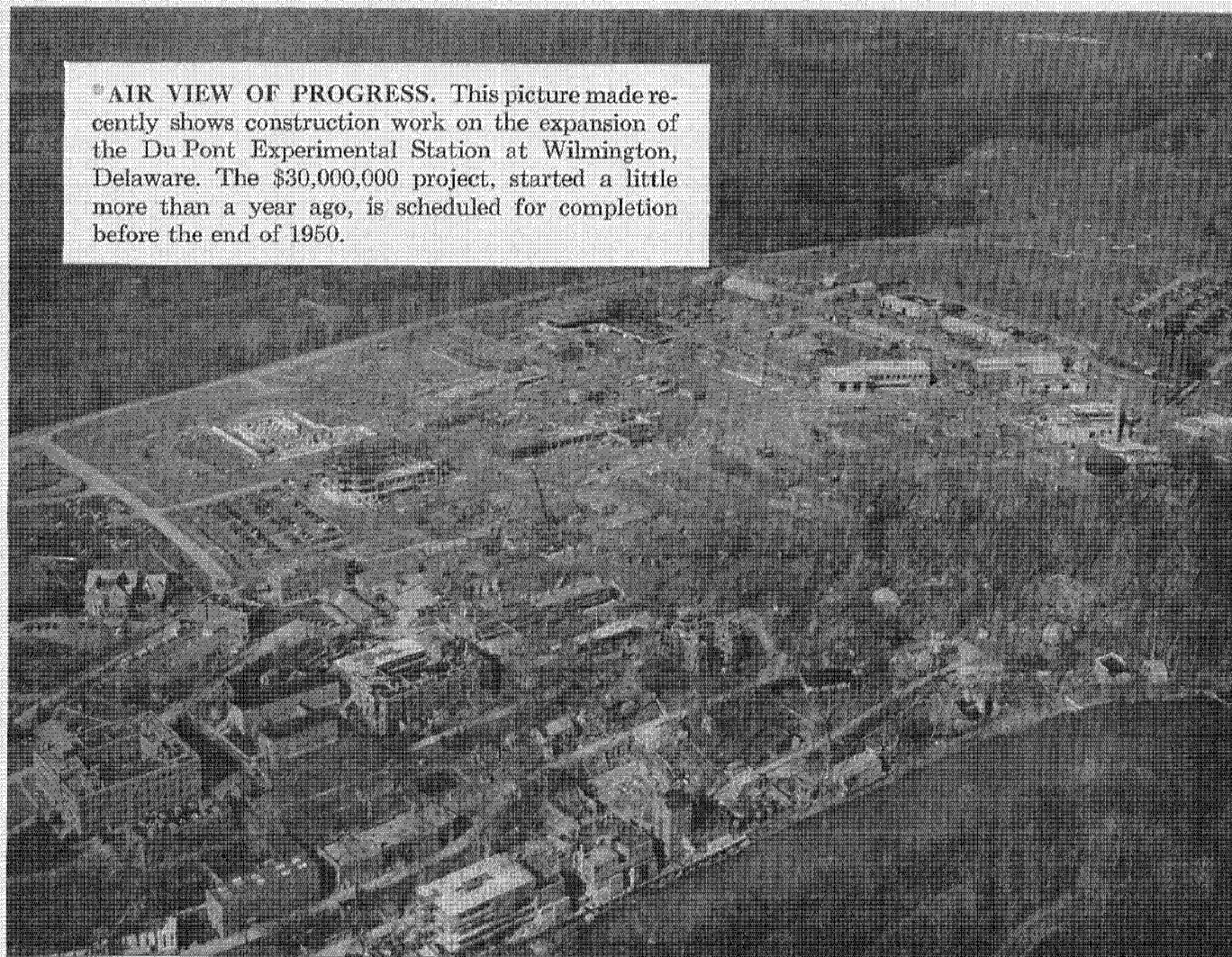
* **A NEW-TYPE** shade cloth, especially suitable for hotels and apartment houses, is in production by the Fabrics Division. It's Flame-Resistant "Tontine" washable window shade cloth—a safer, flame-resistant, shadowproof, triplex quality material. While this improved "Tontine" may char, it will not ignite or burst into flame. It is this added quality, plus all the other features, which make this Du Pont product so popular.

* **REFRIGERANT DATA.** Chemical and refrigeration engineers will find most helpful a recently issued 69-page manual on methyl chloride and some 15 other fluids used as refrigerants. A copy may be obtained by writing to the Chlorine Products Division, D-41, Electrochemicals Department, at Wilmington, Delaware.



* **PLASTIC "BIRDIE-BRUSH."** This golfer's gadget, which looks like a regulation ball, actually is a handy cleaning tool made in two sections. Inside one is a spike for removing dirt from cleats. In the other is mounted a stiff Du Pont nylon-bristled brush for cleaning a club, ball, or even one's hat and clothes. The bristles are easy to keep clean with soap and water. It's made and distributed by the Birdie-Brush Manufacturing Company, 1539 Nelson Ave., Toledo 9, Ohio.

* **AIR VIEW OF PROGRESS.** This picture made recently shows construction work on the expansion of the Du Pont Experimental Station at Wilmington, Delaware. The \$30,000,000 project, started a little more than a year ago, is scheduled for completion before the end of 1950.



Product Insurance

*...is easily provided by using
"Cel-O-Seal" cellulose bands*

Most people will agree that an ideal food package is one so tightly sealed that dust and foreign matter cannot possibly get in, and whatever is contained inside cannot leak out. They'll agree, too, that products from factory to the consumer should be protected against tampering and adulteration.

Since many a jar of jelly or coffee winds up as a drinking glass or flower vase, housewives naturally want a type of closure that will not detract from the symmetrical beauty of the container in its secondary use.

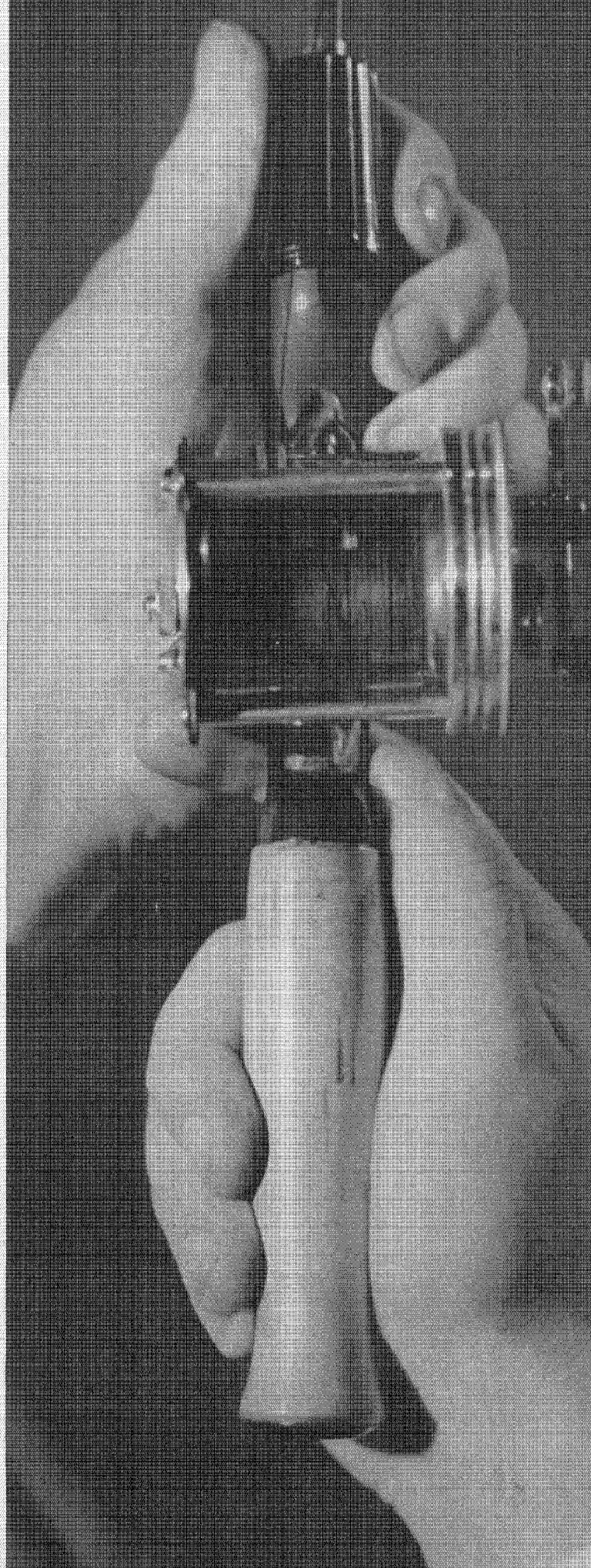
Du Pont "Cel-O-Seal" fills the bill on all of these counts. This cellulose collar, applied wet, shrinks as it dries to fit the neck of the jar or bottle exactly. That's product insurance.

Cellulose bands have solved many packaging problems. For example, when manufacturers of soap, grocery and drug items first offered combinations of two or three products, they fitted them into bottoms of paper cartons. This was expensive. In recent years they have discovered a better way. Merely by binding the separate items together with a "Cel-O-Seal" band they quickly assemble a more compact display unit at less cost than was possible before.

To cite another instance: A sporting goods manufacturer had to find some way to shield the cork grips on his fishing rods. Shopwear complaints were coming in from dealers, who reported that perspiration on the hands of customers and clerks was causing the trouble. Couldn't something be done to stop this? He solved that problem neatly with a protective skin of "Cel-O-Seal."

Many manufacturers who use screw caps as primary closures have solved the problem of "leakers" in transit by use of bands of "Cel-O-Seal" that shrink

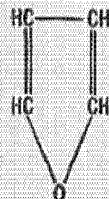
Problem: how to keep cork handles of fishing rods from becoming soiled when handled in retail stores.
Solution: a thin, protective skin of "Cel-O-Seal."



NEW CHEMICALS FROM DU PONT

FURAN

An important intermediate
in organic synthesis



With its conjugated unsaturation, furan has reaction characteristics somewhat similar to divinyl ether and butadiene, but modified by its cyclic structure. Substitutions, additions, and fission of the ring can be effected depending on conditions employed. The following reactions serve to illustrate the versatility of furan:

Oxidation	→ Maleic Acid
Reduction	→ Tetrahydrofuran
Chlorination	→ Chlorofurans
Nitration	→ Nitrofurans
Sulfonation	→ 2-Furan Sulfonic Acid
Conversion to other Heterocyclic Compounds	→ Pyrrole and Thiophene
Acylation	→ Alkyl and Aryl 2-Furyl Ketones
Acetalization	→ 2,5-Dialkoxy-2,5-Dihydrofurans
Diels-Alder Diene Synthesis	→ Dehydropyrotantharidin
Metallation	→ 2-Furyl Sodium

PHYSICAL PROPERTIES

Appearance Colorless liquid
Odor Mild, pleasant
Molecular Weight 68.07
Boiling Point 31.3°C. at 760 mm.
Specific Gravity, 20/4 0.937
Index of Refraction, N_D20/D 1.4214
Flash Point Below -40°F.
Solubility Insoluble in water,
Miscible with most common or-
ganic solvents.

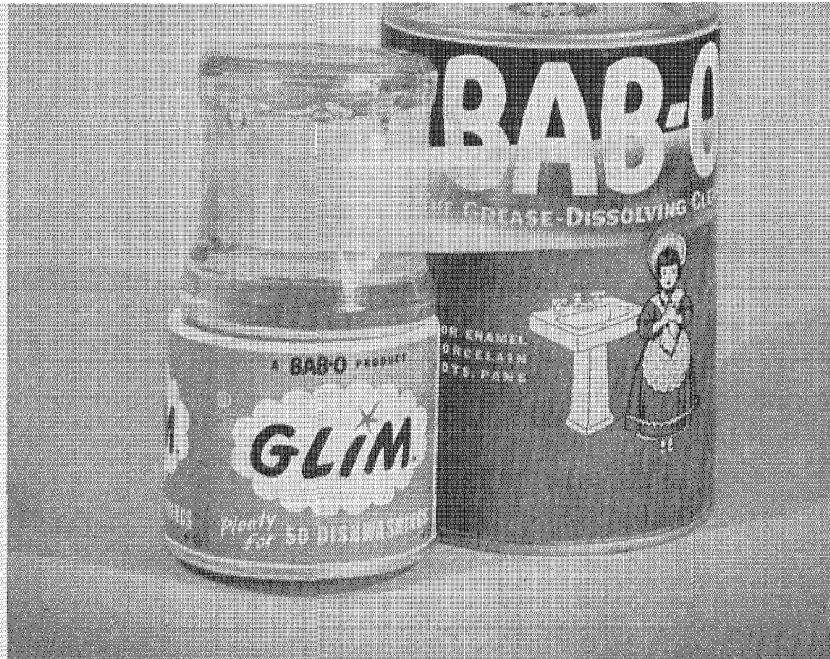
AVAILABILITY

Furan is available in ample quantities for research and development purposes. A request on your company letterhead will bring further technical information and also a sample if desired. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Depart. D-41, Field Research Section, Wilmington 98, Del.



Better Things for Better Living . . . Through Chemistry

DU PONT
ELECTROCHEMICALS
FIELD RESEARCH SECTION

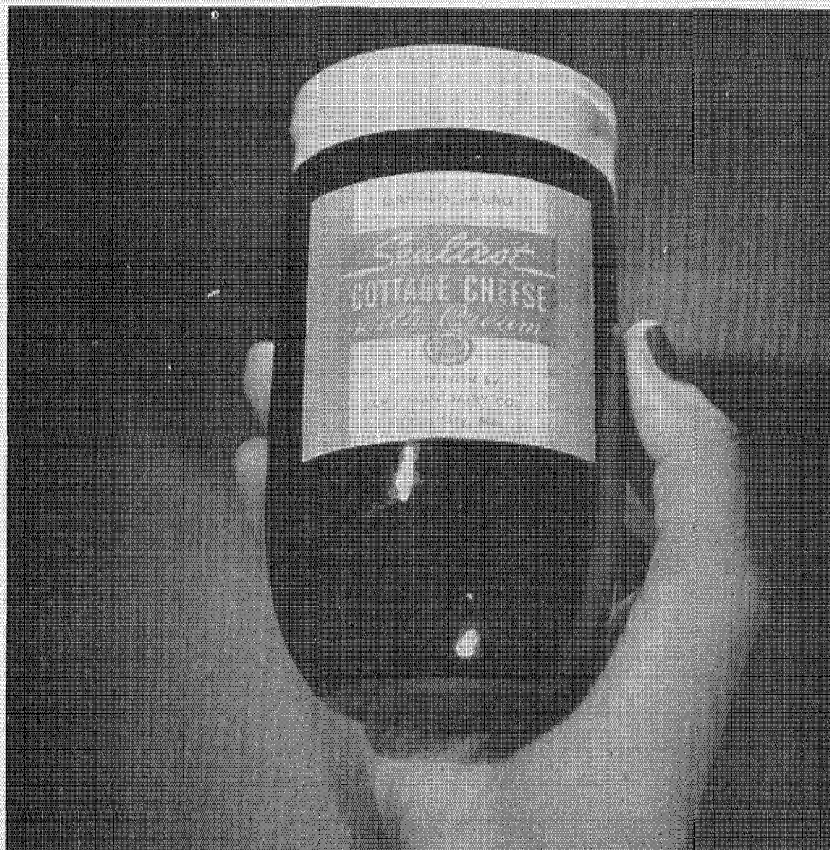


• "Cel-O-Seal" bands two or more products into a compact display unit.

skintight, holding the caps in place. For example, that's a good way to protect bottles of olive oil and mayonnaise. Band sealing is especially helpful in the case of volatile products where evaporation losses may occur if there is any failure of the primary closure. The use of "Cel O-Seal" bands extends the shelf life of certain drug and beverage products considerably.

The bands come in a wide variety of sizes, colors and color combinations, transparent or opaque. They can be indelibly imprinted with a firm name or sales message. If you have a closure problem, we suggest you write to the Du Pont Company, "Cel-O-Seal" Section, Wilmington, Delaware.

• Container's beauty is preserved for secondary use when bands are used.





How to add horsepower to your sales this year

TODAY'S tough competition and high costs call for signs that hit hard and save money.

Socony-Vacuum's new flying red horse is an example. Made of "Lucite" acrylic resin, it's striking to look at, yet costs almost nothing to maintain. "Lucite" weathers well, retaining its beauty and color values for years. High shatter-resistance repels attacks by vandals. From the manufacturer's viewpoint, "Lucite" is easy to fabricate—economical, too. Use it for building signs that will add horsepower to your sales.

WRITE FOR DATA on "Lucite" and other Du Pont plastics. Have it handy when you're planning unusual signs that will attract sales and save money. E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, 350 Fifth Avenue, New York 1, N. Y.; 7 S. Dearborn Street, Chicago 3, Ill.; 845 East 60th Street, Los Angeles 1, Calif.

FACTS ABOUT SOCONY-VACUUM OIL CO.'s NEW FLYING RED HORSE OF "LUCITE"

Fabricated by Steiner Plastics Mfg. Co., Long Island City, N. Y., from 3/16" opaque red "Lucite" sheeting. Sign is 4 feet high, 6 feet wide, 4 inches deep at greatest depth. Mounted with bolts through "Lucite" brackets to exterior walls of Socony-Vacuum service stations. Sign is single-faced, without backing. No illumination.

DU PONT
REG. U. S. PAT. OFF.

Plastics

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY