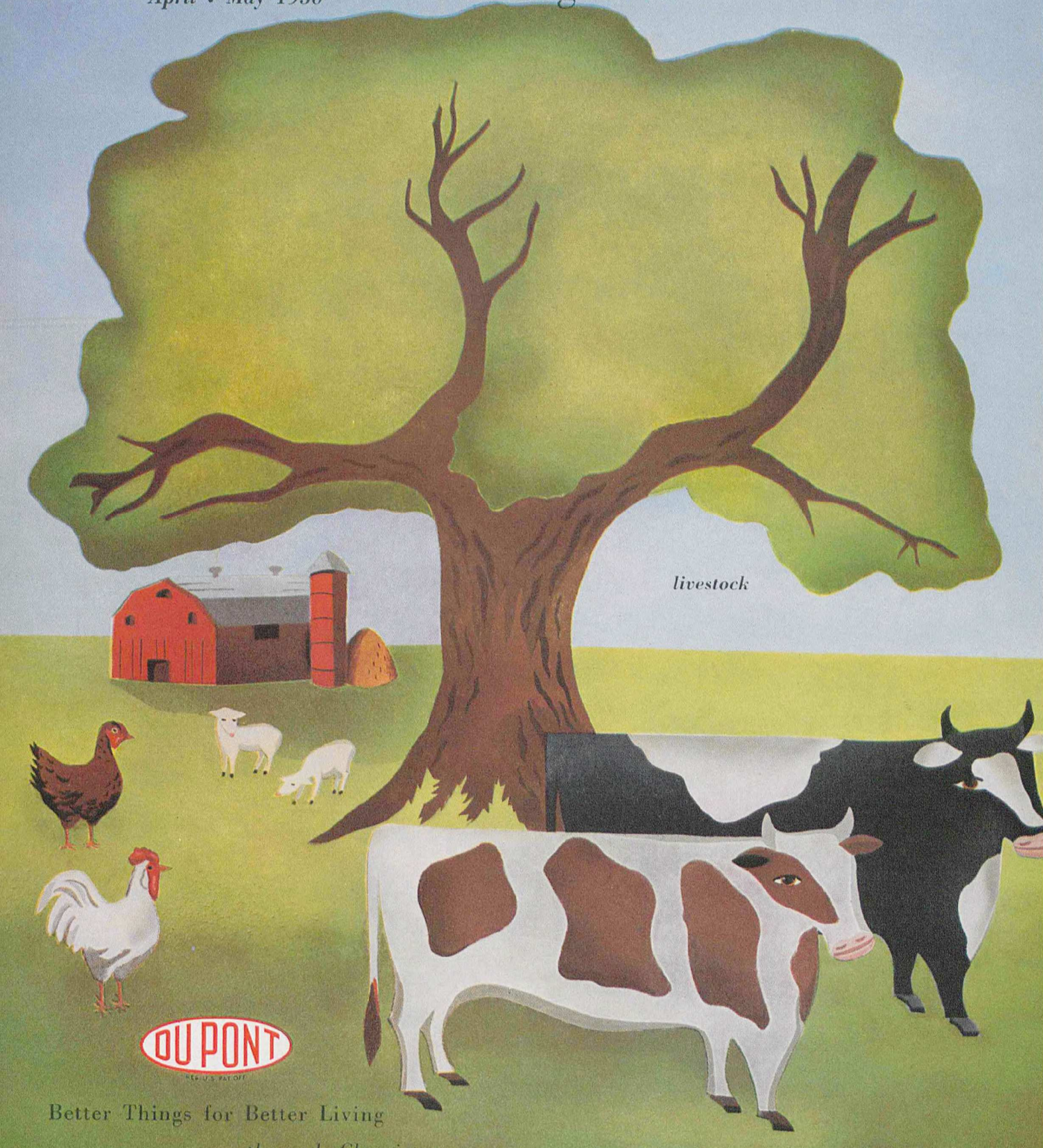


April • May 1950

magazine



livestock



Better Things for Better Living

through Chemistry

NYLON paint brushes for householders

NOW on retail counters

NEW!

NYLON

paint brushes



When you ask for a paint brush, ask for a NYLON...

Nylon paint brushes are made by leading paint brush manufacturers. Sold in paint, hardware and wallpaper stores everywhere, in all popular sizes. Buy a nylon paint brush today!



Smoothest painting



Easy to clean



Ideal for nearly all finishes



Durable bristles... won't break off

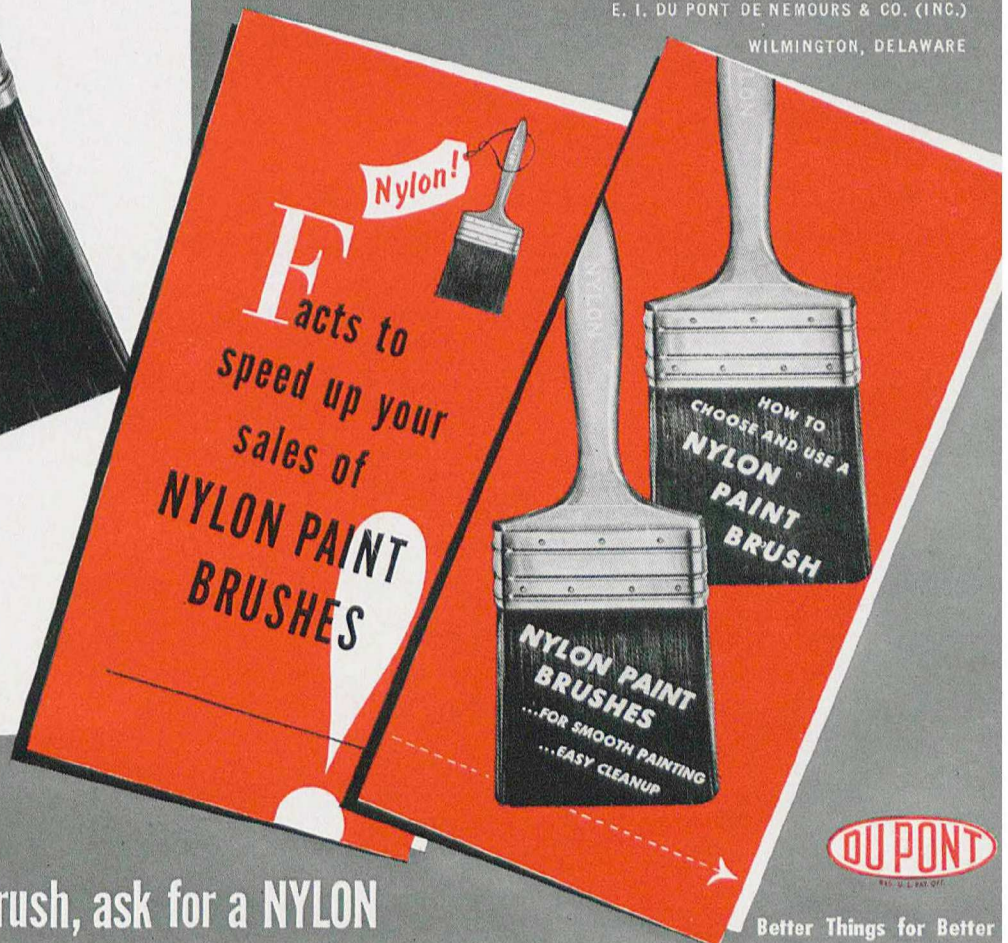
**NYLON
PAINT BRUSHES**
*for smooth painting
...easy cleanup*

New nylon-bristled paint brushes for consumers, which lay down a smoother coat of paint and are easier to clean than ordinary types, are now being sold by retailers. Produced by leading paint brush manufacturers, these new brushes are available in a complete variety of sizes and sell at moderate prices. New nylon brushes can be used in nearly all types of paints including oil paints, lacquers, enamels, varnishes, calcimines, synthetics, etc.

To fully describe their performance and properties, a booklet and a folder have been prepared. The booklet, "How to Choose and Use a Nylon Paint Brush" is filled with helpful hints for the amateur painter on brush selection and use. The folder, designed for the wholesaler, retailer and professional painter, answers the nineteen technical questions most frequently asked about nylon bristles.

If you would like copies of this literature, write today.

POLYCHEMICALS DEPARTMENT—PLASTICS SALES
E. I. DU PONT DE NEMOURS & CO. (INC.)
WILMINGTON, DELAWARE



When you ask for a paint brush, ask for a NYLON



Better Things for Better
... through Chemistry

DU PONT

MAGAZINE

Vol. 44 No. 2



BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. R. Manchester, Editor

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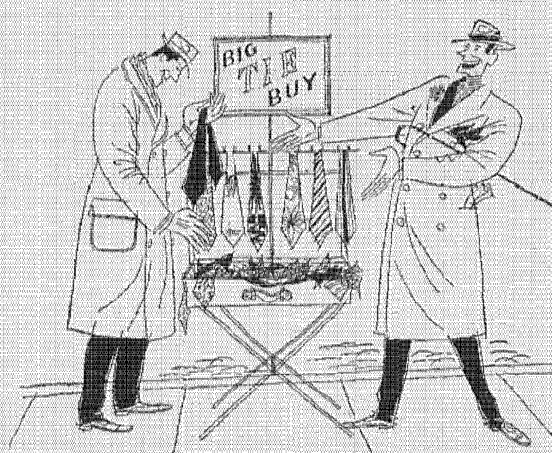
COVER: The cover for the livestock issue looked fine, and we were about to turn to other work. Then a visitor said, "Seems to me that barn should be a lot brighter. That's the way they were when I was a kid up in New Hampshire." The artist remarked that it was a rich red that characterized the barns in Pennsylvania, and that was good enough for him.

We had no axe to grind for Delaware barns, and asked if it really made any difference. "Maybe," we said, "we should paint it another color. Lots of people are using Du Pont No. 40 outside white paint to make their barns match their house."

The artist smiled. "Did you ever see a painting of a wooden barn that wasn't red?" That seemed to settle it.



How long is a profit?



If you had a one-man business—let's say you sold neckties on the street—at the end of each day you would know exactly how much money you made. The difference between the cost of the ties and what you sold them for would be your profit. In your true cost there would also be such things as wear and tear on your shoes and suit, but as an individual, you wouldn't count that.

With a manufacturing business it's quite a different story. All costs must be counted. To begin with, it often requires five or more years of research and development before a new chemical product reaches the market. An example of this is "Orlon" acrylic fiber, featured in an article starting on page 17 of this issue. Think of all the time, money and effort that a company like Du Pont must invest before there is any chance of being repaid. And there is a risk, of perhaps millions of dollars, because not all products succeed. When they do—when the public is willing to buy the new product at a price above the manufacturer's costs for research and development as well as for current operation—then there is a profit.

This may seem like making a profit the hard way. It may seem a gamble, and in a sense it is. But this kind of willingness to venture is what has built America. It is this kind of enterprise in which all Americans have a stake. Why? Because successful new products give to America something better than it had before. They create new production, new jobs—a higher standard of living. The reward for their success is profit. It provides the incentive for industry to develop still more products.

As long as the people of America encourage business to venture, to progress, to grow—so long will this nation grow. So long will Du Pont be able to provide the nation with more new and improved things for better living . . . like the "nylons" of tomorrow.

Aⁿnual report 1949

The year 1949 was for the Company, as for many branches of industry, one of transition from a seller's to a buyer's market . . . In most of the industries in which Du Pont operates, supply now meets or exceeds demand. Keen competition prevails. The low point in sales was reached around the middle of the year, and was followed by an uptrend in the fall.

Dollar sales totaled \$1,025,000,000. This amount was some \$56 million, or 6 per cent, larger than in 1948, the previous record year . . . Larger physical volume of goods sold resulted chiefly from increased

production of nylon, tetraethyl lead, Cellophane, plastics, and acetate rayon. This was made possible by enlarged manufacturing capacities.

The Company's sales prices showed little change during the year. Price increases and decreases resulted in an average increase for 1949 of about 3 per cent in the Company's sales price index. However, at the end of the year the index was slightly lower than at the end of 1948.

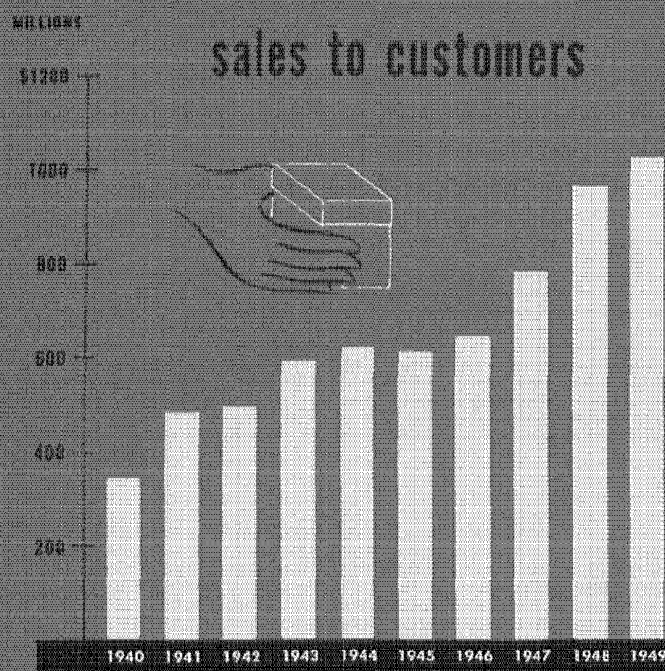
Foreign sales in 1949 amounted to about \$68 million. This is equivalent to 7 per cent of total sales.

Earnings applicable to the common stock for 1949 were \$4.52 a share . . . compared with \$3.28 in 1948. These earnings are based on the present stock, which became effective June 15, 1949 following a four-for-one stock split.

Dividends paid on the common stock were \$3.40 a share in 1949. The year-end dividend was the 181st consecutive quarterly dividend paid on the common stock.

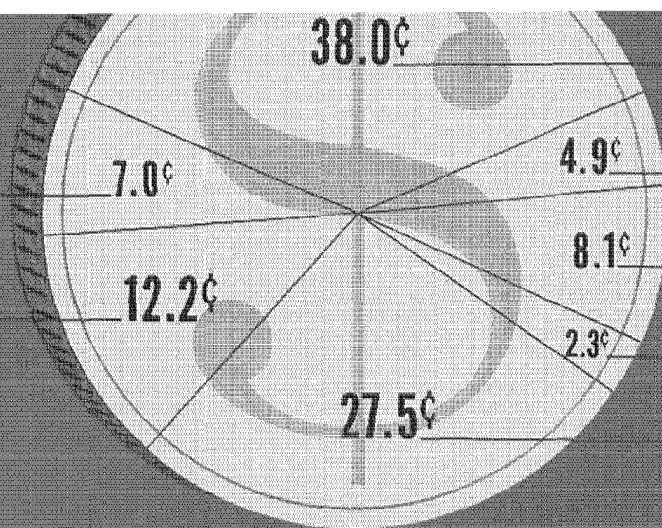
Total dividends paid on the preferred and common stock amounted to 76 per cent of the total earnings. This compares with an average of 84 per cent paid over the ten years, 1939 through 1948.

The Company's return on operating investment was 10.5 per cent in 1949 compared with 9.3 per cent for 1948. Many of the Company's plants and facilities were built before the recent war, when construction costs were considerably lower than those of the post-war period. This investment is carried on the books substantially at cost. If operating investment were stated at present replacement costs, the return on investment for 1949 would be substantially less.



Set aside for depreciation
and obsolescence of plants
and equipment

Set aside for
applicable taxes



Materials, services and
miscellaneous items

Retained for the needs
of the business

Paid to stockholders
as dividends

Set aside for class "B"
bonus for employees

Wages and salaries—and
paid or set aside for
employee's benefits

where the customer's dollar went in 1949

Du Pont and the national economy

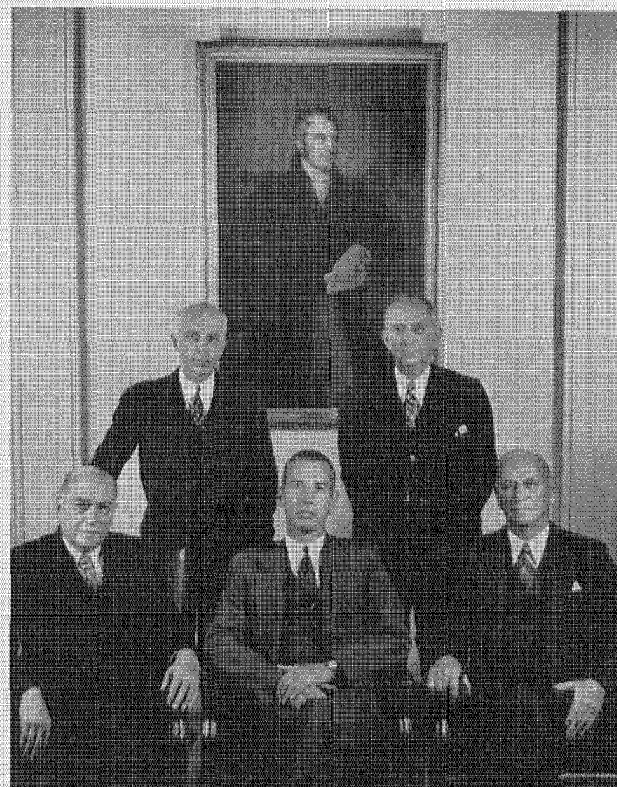
During the past year there has been a growing tendency in certain government circles to attack business on the grounds of mere size. Some groups hold that size is synonymous with monopoly, and recommend laws to limit corporate size or to put large corporations under government control. Du Pont is undeniably big business. These trends in government thinking can greatly affect the further growth and prospects of the Company and of business generally. Therefore, it seems appropriate to give its customers the Company's views on this important subject.

The Du Pont Company has enjoyed a steady growth since its founding in 1802. Over the past 25 years its operating assets have grown at the average rate of 9 per cent a year. As a result it has now become one of the largest and most diversified manufacturing enterprises in the chemical industry. That growth is looked on with pride and satisfaction. It is a measure of services rendered to customers, employees, stockholders and, through all of them, to the American economy.

The Company's sales are about 7 per cent of the aggregate sales of companies classified by the Commerce Dept. as manufacturers of chemicals and allied products. The Company believes in the keen competition in the fields in which it operates. That is regarded as healthy and in full accord with our system of private enterprise.

The Company has for many years adhered to a policy of growth through research and through development of new products to fill public needs. Research expenditures have risen steadily over the years . . . During 1949 these expenditures, excluding cost of new facilities, totaled \$33 million.

That policy of aggressive research has resulted in a number of new products—laboratory curiosities in the recent past, household words today. In 1949 about 60 per cent of the Company's sales



DU PONT PRESIDENTS. These men have served as presidents since 1915. Left to right: P. S. du Pont, W. S. Carpenter, Jr., C. H. Greenleaf (1948 to date), Lamont du Pont, Irénée du Pont.

resulted from products that were unknown or in their commercial infancy 20 years ago.

No reason is seen to change this policy which has been so fruitful for the Company and for the nation. There can be no doubt that its abandonment would hurt the public interest. And if growth were limited by law, Du Pont would not be justified in forwarding a program of research whose principal justification is a search for broader horizons.

The Company has at all times kept two principles in mind. The first of these has been to diversify in chemical fields where it can make a substantial technical contribution. Through this policy, research results have been applied over a wide commercial area.

The second principle has been to look for the large and difficult tasks that inherently require great resources in technical ability and finance. The Company believes that these tasks are the responsibility of a large business like Du Pont. Converting basic materials into the host of products that finally reach the public gives the many smaller units of industry the best opportunity to expand and prosper.

The Company gets on well with its 70,000 customers, the great majority of whom are small businesses. The value added by their manufacturing far exceeds the price they pay for the basic materials. There is thus a cooperative relationship between big and little business; it contributes greatly

to the American economy and living standards.

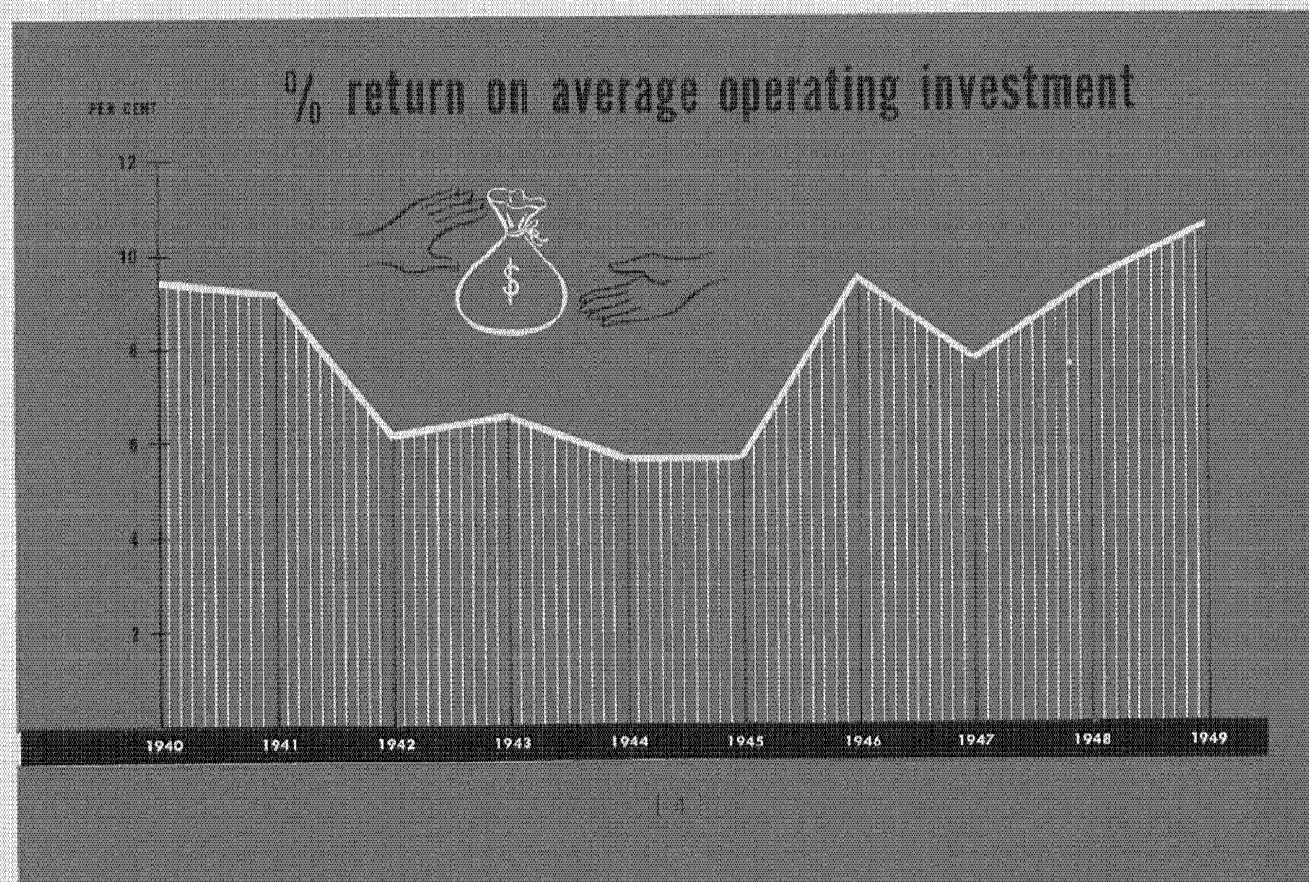
In the final analysis, any business must first sell its wares before it can prosper. Its customers will be keen to detect business inefficiencies. Their appraisal of the goods and services offered them will determine, with justice and certainty, whether or not a business will prosper and grow.

The laws governing business conduct today are fully adequate to protect the system under which business operates. Any effort to penalize success by placing arbitrary limits on business growth thwarts the customer in the free exercise of his judgment. This would harm our nation's economy.

partners in business

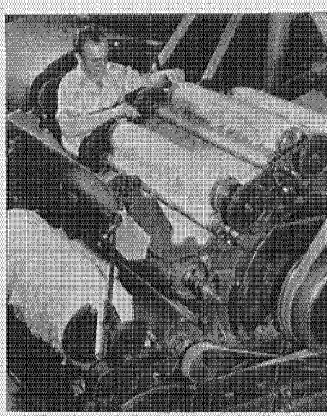
Teamwork is required to make every manufactured product you buy. There is the teamwork of many persons and of several companies, both small and large. Making the new spun nylon sports shirt, shown on the next page, is a good example.

From the time the nylon staple leaves a Du Pont plant until it is made into a finished shirt, 5 to 10 companies in almost as many states have combined their creative and productive efforts to produce the garment. It is an illustration of free enterprise at work.

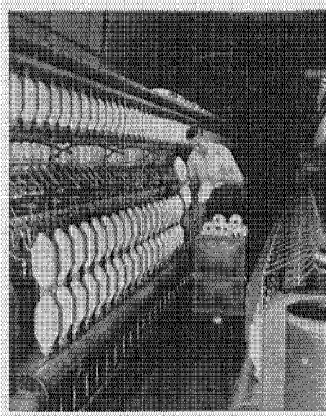




Trucker starts ball rolling by taking nylon to the customer.



At Newnan Mills in Georgia, the nylon staple is "carded."



Doffing. The nylon staple is now in the form of spun yarn.



Newnan does own yarn dyeing. Often this is done elsewhere.



Weaving the cloth. Same looms make fabric from other fibers.



"Finishing" at Fairlawn, N. J. gives stability and a soft feel.



Designer inspecting cloth ready for sale to shirtmaker.



Another journey... and B.V.D. in Baltimore makes the shirt.



In New York showroom, buyer places an order for his store.



Finally the consumer buys a shirt at The Hub, Madison, Wis.

construction

During the year, \$86 million was spent for construction of additional manufacturing capacity and service facilities. Also included are improvements of existing equipment and facilities . . .

Additional capacities were mainly for the manufacture of:

- Nylon products • Titanium pigments
- Polyvinyl alcohol • "Cordura" rayon tire yarn
- Methanol

Construction of a plant for the commercial manufacture of the new synthetic fiber, "Orlon" acrylic fiber, was begun during the year at Camden, S. C. This plant is scheduled to begin production during 1950.

For several years an important part of the Company's construction program has been the provision for up-to-date and enlarged research facilities. Since the war several new laboratories have been completed. Additional facilities are planned for, or are under construction at a number of other locations. Enlargement of the Experimental Station, the principal project involved, will provide facilities for nearly half of the Company's research personnel. This project was about 70 per cent completed at the end of the year. It is scheduled to be finished late in 1950 at a cost of some \$30 million. About 1951, when the over-all laboratory construction

program is completed, the Company's research facilities will house a staff of more than 1,800 technical personnel. That is an increase of some 40 per cent since the war.

ownership of the Du Pont Company

During 1949 the number of stockholders, after eliminating duplications, increased by 15,000 to a new high of 110,000. Substantially all of the increase occurred in the common stockholders, who numbered 92,753 at the end of the year. Holders of preferred stock numbered 23,570.

Approximately 90,800, or 83 per cent of the total number of stockholders, are individuals. Of these individuals, about 57 per cent are women . . .

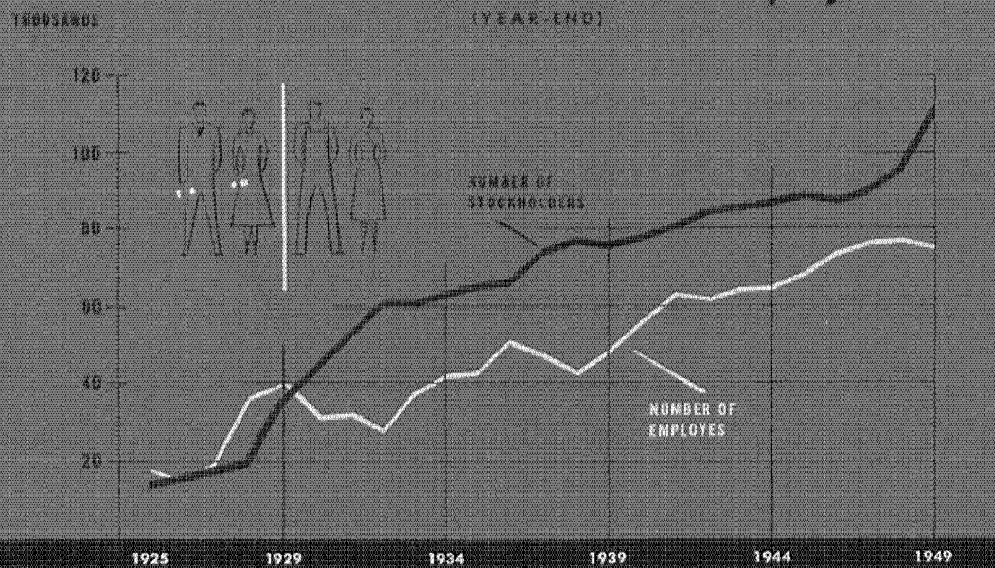
Some 19,100, or 17 per cent of the stockholders, are "groups." They consist of estates and trusts; banks, bank nominees and brokers; charitable, educational and fraternal organizations; insurance companies; and other groups, companies and organizations. Analysis indicates that these "groups"—who altogether own about 68 per cent of the shares outstanding—represent literally millions of persons who have a beneficial interest in the earnings of the Company . . .

The ownership of the Company is widespread geographically. Its stock is owned by residents of every state in the Union, the District of Columbia, and several territorial possessions. Less than one per cent of the stock is held by residents of foreign countries.

At the last annual meeting of the stockholders, about 87 per cent of the shares entitled to be voted were voted in person or by proxy. These shares were voted by some 50,000 holders of the common stock.

The adjacent chart shows that in recent years the Company's owners have outnumbered its employees.

relation of stockholders to employees





Pennant for distinguished service to safety is presented to Du Pont for its outstanding 7-year record.

safety

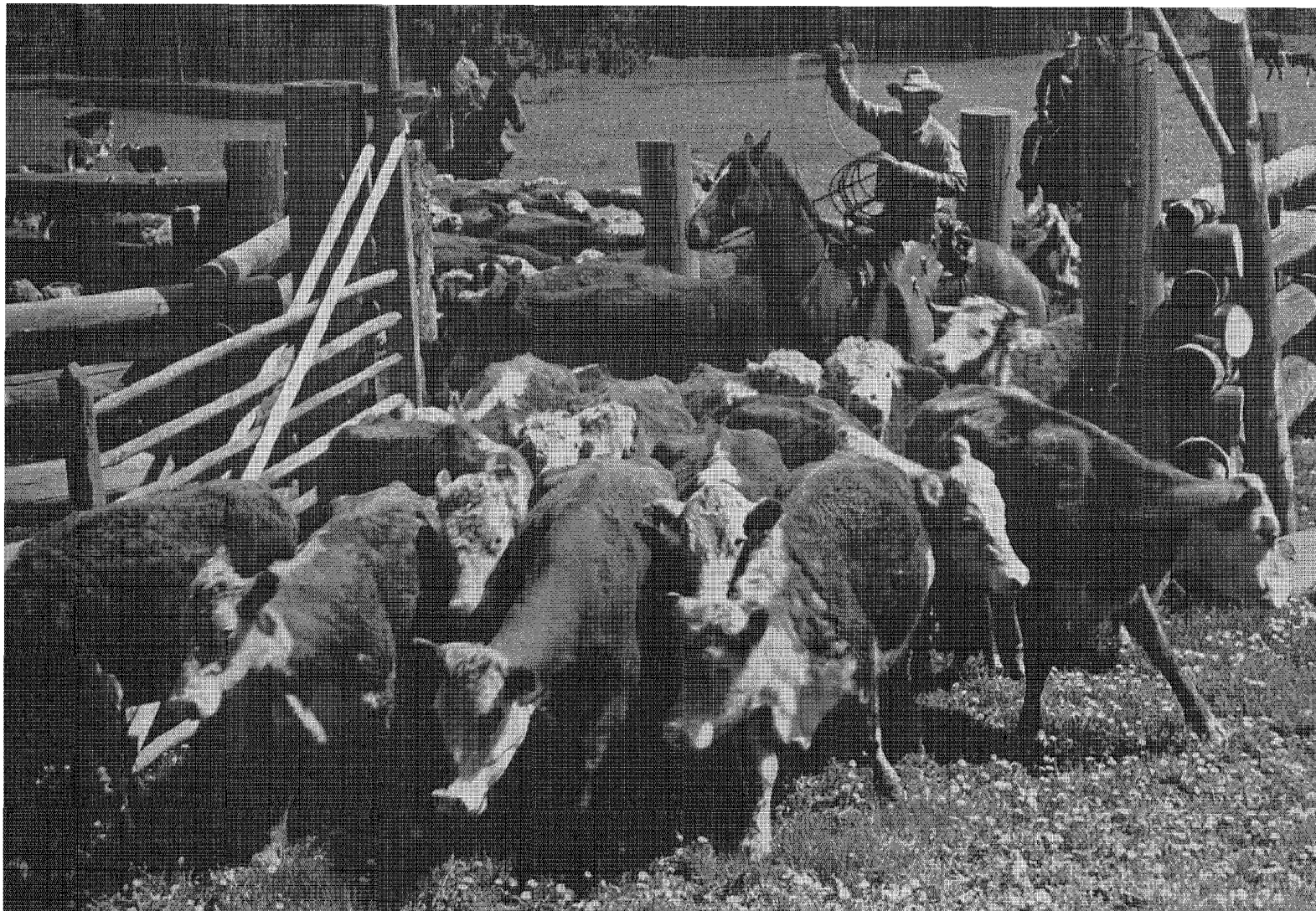
The Company's safety performance in 1949 was the best in its history. Only one time-losing injury occurred for each 1.4 million man-hours worked. This is an improvement of about 14 per cent over 1948 . . . The Company's injury rate continues to be substantially less than that of the chemical industry as a whole. This rate, in turn, is better than that of all industry . . .

The National Safety Council presented to the Du Pont Company the Council's "Award of Honor for Distinguished Service to Safety" for each of the years 1945 through 1948 . . . The Company had previously won the awards for the years 1942, 1943 and 1944.

EACH year Du Pont develops and markets many useful products. While not mentioned in the Annual Report, we thought you would like to see a few representative ones. The illustrations, reading in the usual order, are: High Speed Pan Type 428 "Defender" photographic film; polythene film; Livestock Spray and Dip No. 30; "Ovalcene" dry cleaning detergent.

Typical new Du Pont products first commercially available in 1949.





Chemistry on the Hoof

Research and field men at Du Pont help put more meat and milk on our tables

In a postwar conversation, a European friend studied his vitamin capsules for a moment. "It's nice to have these with our meager diet," he said, then added wistfully, "but somehow they just don't taste quite the same as a big, juicy beefsteak!"

Meanwhile government officials in Washington were adding up figures on the "big, juicy beefsteaks" that Americans had been blessed with during 1948. In the big business of feeding its people, this country consumed almost 20 million cattle, half as many calves, to say nothing of 60 million hogs and a goodly number of sheep and lambs.

Many factors helped to build up these staggering totals. Important among them was the modern, scientific approach used by our livestock raisers to produce

sturdy animals, free from disease. Behind that was research on new products and techniques, much of it backed by large sums of industry's money.

"Research helps put new chemicals on the market, all right," say Du Pont scientists, "but we're interested in more than that. They have to be used right, and the proof of the pudding is in the field." So at San Antonio, Texas, in the heart of the livestock country, the Company maintains an experimental station for testing new insecticides for livestock.

Here work has been done on methoxychlor, DDT, and benzene hexachloride insecticides; on Screwworm Smear 220, used to control the disastrous effects of the screwworm fly; and on Livestock Spray and Dip No. 30, which has proved so effective in combating the ticks that carry cattle fever and most other external parasites of cattle and sheep.

"When the laboratories send us a new insecticide, we spray an animal and turn him loose on the range

for a period of time," says the San Antonio station's director. "We bring him back periodically, put him in a special cage, and expose him to flies we've raised. In this way, we can tell how long the insecticide remains effective by noting how many flies are killed and how fast."

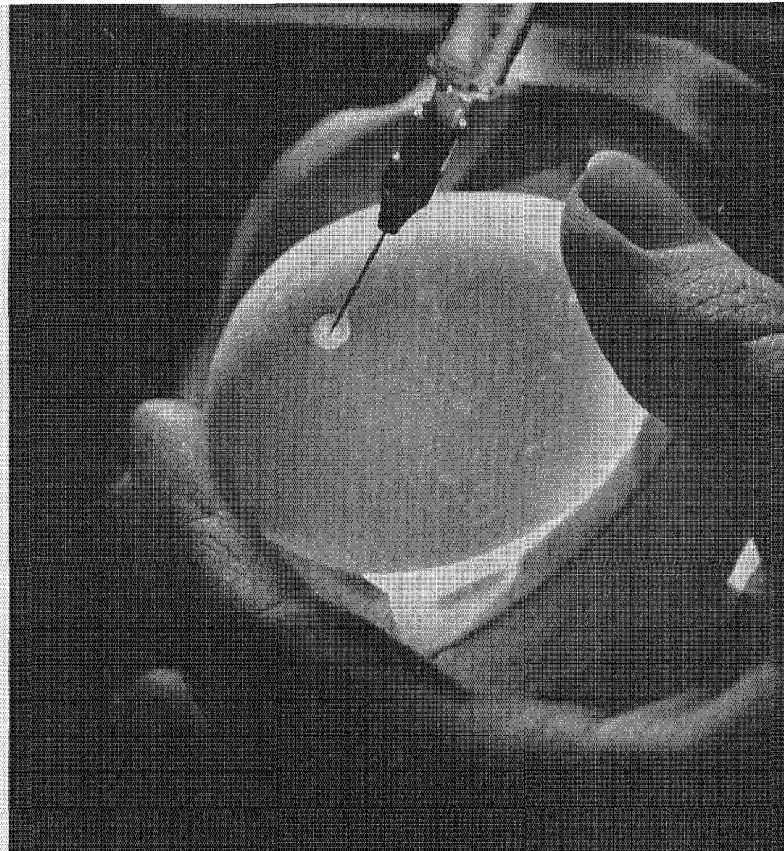
The basic chemical and biological research that lies behind this field testing work is conducted at the Du Pont Experimental Station near Wilmington, Delaware, and by a veterinary chemicals research group at the Stine Laboratories near Newark, Delaware.

NEW INSECTICIDE FOUND

Existing insecticides have cut down losses greatly. But Du Pont scientists have always felt that it is possible to find still better and safer ones. For years they have carried on research to develop new weapons against pests.

Much of their effort went into the fly-control problem. They raised millions of flies and tested their reaction to new insecticides. After eight years of research and field testing, plus intensive study by Federal and State men, a new product, called methoxychlor, was announced. It is sold today as "Marlate" 50 insecticide and Du Pont Dairy Cattle Spray.

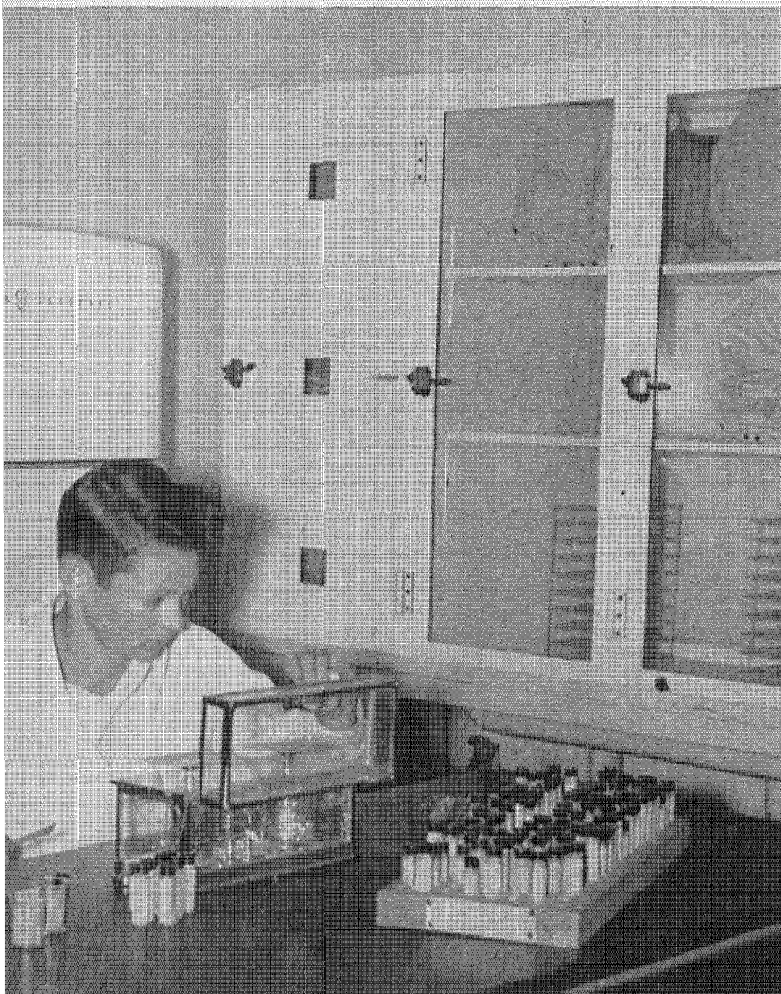
Here was a good combination of the properties they wanted—killing power for pests, low toxicity to warm-blooded animals, and a long-lasting residual effect. Unlike DDT, it showed little tendency to be



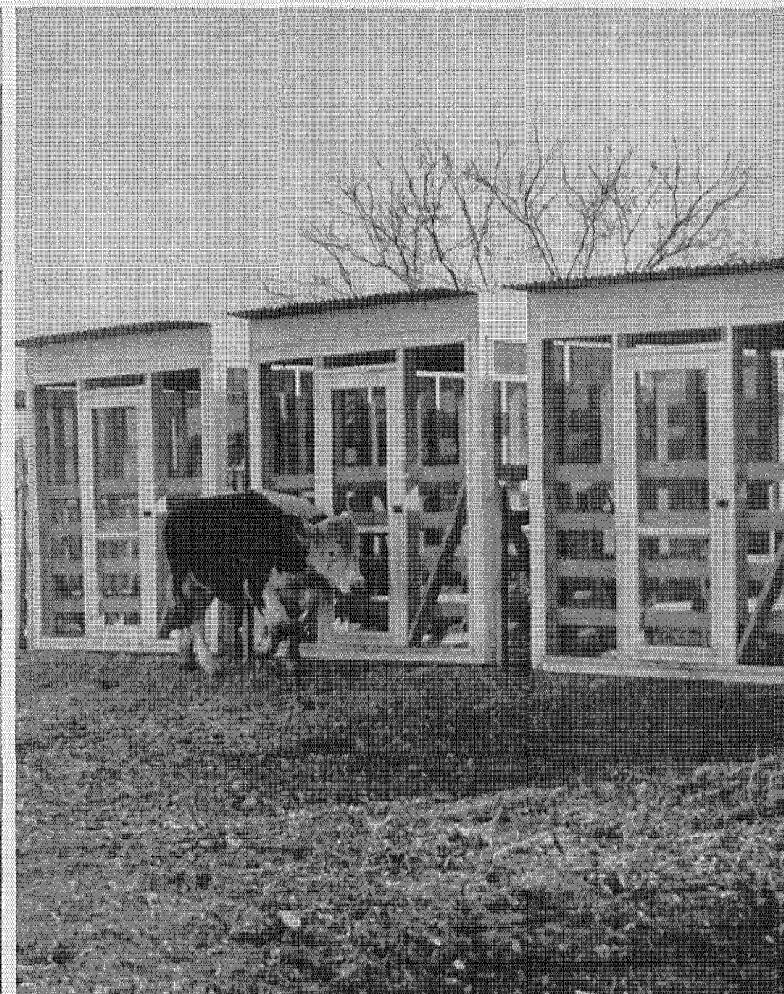
Eggs make fine miniature laboratories. First a disease organism is injected, then the chemical that may prove to be a cure.

[9]

In the experimental station laboratory at San Antonio, a technician weighs out a sample of chemical being tested.

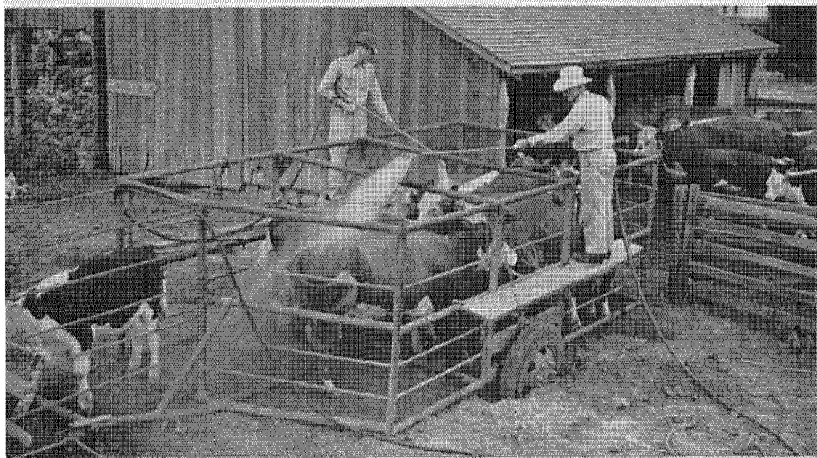


After being sprayed with insecticide, animals are turned loose, and then brought back to these cages to evaluate the results.

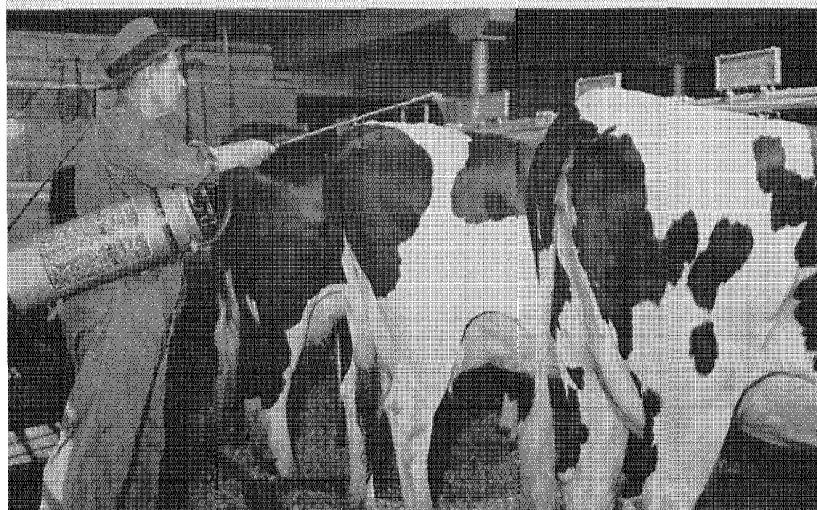




"Drenching" sheep with remedies based on phenothiazine is a standard procedure used to get rid of internal parasites.



"Marlate" insecticide, plus sanitary precautions, keeps down population of flies that often causes serious livestock losses.



absorbed through the skin of animals or to build up in their fatty tissues. In March, 1949, entomologists of the Department of Agriculture recommended that methoxychlor be used to control insect pests on dairy cows.

Aided by effective clean-up and sanitation, "Marlate" and Dairy Cattle Spray are indeed doing the job for the dairyman. He likes the way they keep flies from irritating his animals, and the higher milk production that results.

Controlling bothersome insects, however, is only part of the picture of keeping animals healthy. There are many diseases that hamper the growth of cattle and take a big toll of profits. In Du Pont laboratories many chemicals are now being tested against various types of disease-causing organisms. Compounds that show promise may be the useful products of tomorrow, after they have run a gantlet of laboratory and field trials.

SUPPLEMENTARY FEED SOURCE

Du Pont products also are fed internally to livestock today. One is phenothiazine, supplied to manufacturers of stock remedies to get rid of worms that infest the stomach and intestines of cattle and sheep. A more recent development is "Two-Sixty-Two" feed compound, a synthetic urea material sold to feed manufacturers for mixing with other ingredients. Such feeds are for ruminants only, mainly cattle and sheep.

These days, farmers and stockmen are relying more and more on ready-made feeds containing urea. Such feeds pay off in healthy, productive animals and help ease protein shortages. Even ground corn cobs can be the main part of a good feed mixture that contains, among other things, the right percentage of urea.

To date, well over four million tons of commercial feeds have contained this chemical. The animals thrive on such rations. Just last summer a load of Nebraska cattle, fattened on a diet containing urea, topped the Kansas City market.

This supports the statement made about urea by scientist Carl S. Miner in his Perkin Medal Award acceptance speech: "When we realize that one of the serious world shortages is of protein, that here is a potential substitute for one-third of the protein now fed to ruminants . . . the tremendous possibilities are apparent."

There are undoubtedly other possibilities for chemical contributions to the livestock industry. At Du Pont, a platoon of chemists, as well as entomologists, parasitologists and other biologists, is at work uncovering them. Sometimes they get an assist from the hunches and practical experience of field men. Thousands of chemicals are studied each year.

Few of these will end up as commercial products—which is why research funds are called "risk money." But those that do will be aces-in-the-hole for the farmer, the stockman and, in the end, the consumer.

Chosen by Government for dairy barns and animals, methoxychlor has little tendency to be absorbed through cow's skin.



The old swimming hole is one of many places that can be reclaimed from poison ivy with "Ammate" sprays.

No Ivy—No Itch

"Ammate" weed killer destroys poison ivy and helps to clear land

Does that patch of poison ivy in your back yard worry you? Then get rid of it. You can, easily, with the Du Pont "Ammate" weed killer. If you buy it by the jar, you'll be in company with some folks who buy and use this same chemical by the carload. It is helping utility companies to keep thousands of miles of right-of-way clear of brush and other vegetation, so that working crews can get through.

In the South, it is helping landowners clear out blackjack oak and other weed trees to improve land for growing timber and forage crops. For applying "Ammate" to tree trunks, there is a special technique that kills trees faster than girdling alone. Treated trees sprout less than those girdled or chopped down.

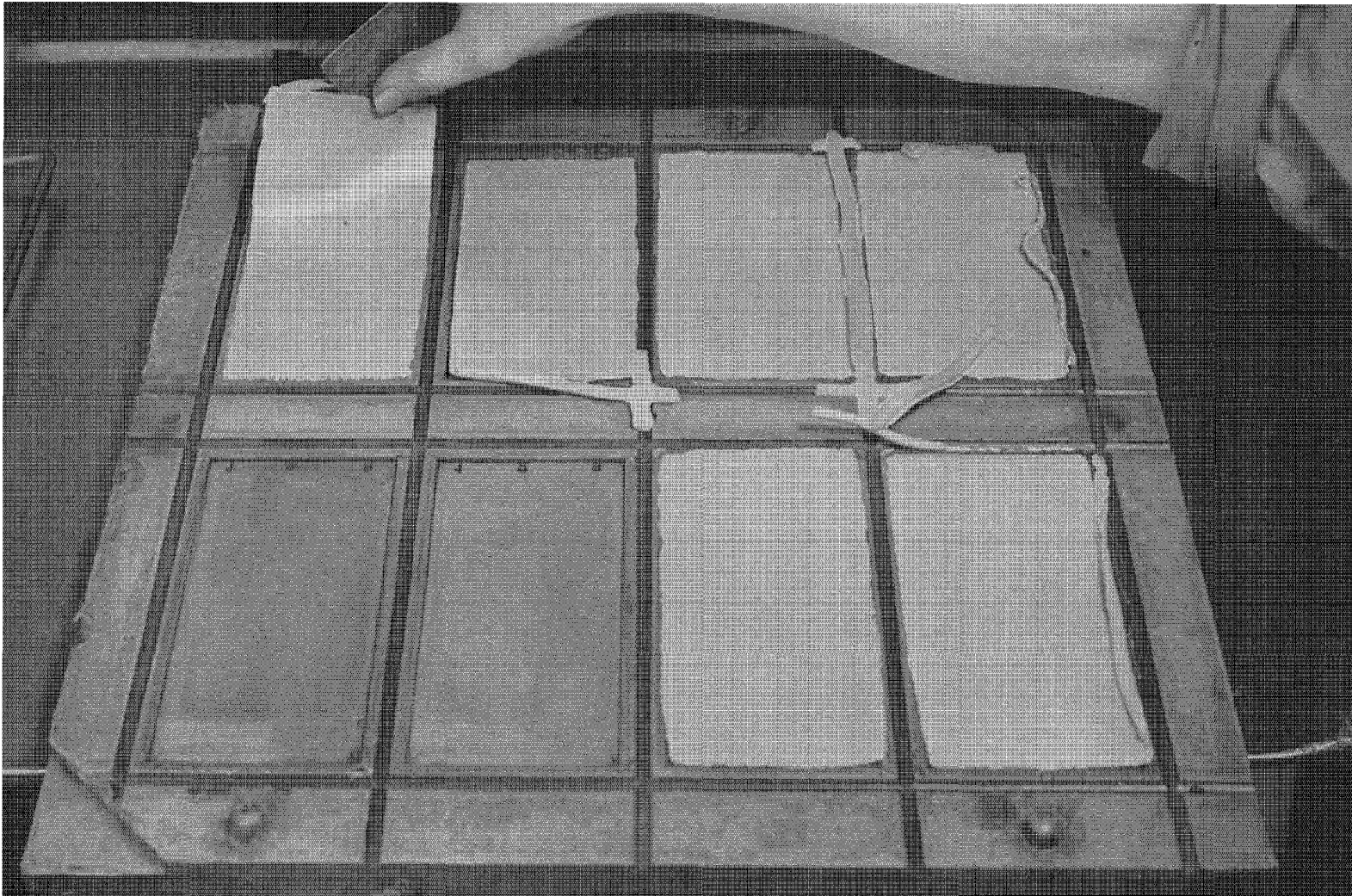
Since "Ammate" is not poisonous to people or animals, when used as directed, it can be used safely in recreation areas, home grounds, forests or grazing land. And there's no impairment of soil fertility beyond one season. Crops or grass cover soon can begin growing again.

In orchards where poison ivy often twines around the trunks of fruit trees, "Ammate" can kill the vines without harming the trees.

In short—don't get the itch. Instead, get "Ammate", a product of the Grasselli Chemicals Department, and follow the directions on the label.



Thousands of acres in the South are covered with low-value hardwoods which can be easily killed with "Ammate" crystals.



Removing rubber from laboratory mold. New Du Pont finish keeps rubber from sticking to mold.

Introducing "Teflon" Enamels

*Du Pont's tough guy among plastics branches
out into the finishes field*

Chairs slid away from the table. The conference was almost over. A last question was fired at the representative of the Company's Finishes Division:

"Mr. Young, what does this new 'Teflon' enamel sell for?"

"The price is \$250 a gallon," was the reply. "It's in the laboratory stage—the only place we can make it now."

"We'll take all you can ship us."

This conversation of two years ago gives a clue to the value of the unusual new finishes based on "Teflon" tetrafluoroethylene resin. Ordinarily enamels used in industry seldom sell for more than \$4 a gallon.

Of course, the output then was pitifully small. Many hours of work by highly skilled technicians yielded only a few pints. But the customer wanted all

of it, and more if he could get it. Why?

The answer goes back to 1943, when the Plastics Department began commercial production of this resin, described in our October-November, 1949 issue. The newcomer had properties never before found in a plastic. Its heat and corrosion resistance, and excellent electrical properties, soon prompted the idea of using it as a base for an enamel.

It wasn't the first plastic to be used as a raw material for paint-type products. In fact, the first of the plastics, cellulose nitrate, was the base for early lacquers. So why not "Teflon"?

"Impossible!" said some people. "There's no known solvent for it."

But chemists know that when certain materials are reduced to extremely small particles, they will stay suspended in a liquid—forming a so-called suspensoid. That's because the fast-moving molecules of the liquid bombard the particles and keep them so agitated

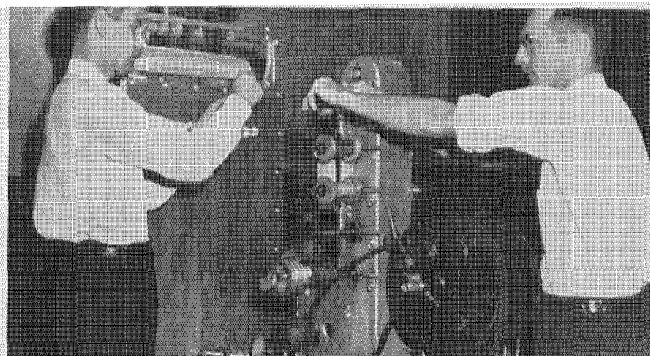
that they don't settle. They knew that if "Teflon" could be broken up into bits about 1/125,000th of an inch in diameter, an enamel might be possible.

No recipe existed for making such minute particles. It was a new frontier, and often a disappointing one. Many difficulties had to be overcome before the coatings became a reality.

"Workhorse" products are what you'd call the new "Teflon" enamels. Their resistance to chemicals and heat may fill a need for lining storage and processing vessels. Also since most materials won't adhere to such coatings, they are proving useful in tests on cold dough conveyors in bakeries, candy and rubber molds, and heat-sealing machinery.

Tests on enamel-coated wire point to important developments in the electrical field. For the first time, magnet wire can withstand 392°F. continuously. Designers have an opportunity to create lighter, smaller equipment with stepped-up efficiency. Equipment can be redesigned for longer life and better performance with less maintenance. Perhaps entirely new kinds of electrical equipment are in the offing.

It's fairly easy to use these enamels. They handle well in a spray gun, and may be applied on wire by a modified dipping procedure. Flow-coat application holds promise, but tests are not yet complete. The new



"Teflon" enamels show promise in the electrical field. Here they are coated on wire by special dipping method.

finishes are "dried" by fusing at high temperatures—around 750°F. At such temperatures, some toxic materials are given off, so good ventilation must be provided.

Today, "Teflon" enamels are made on a semi-works scale, and the supply is still limited. But the price has already dropped sharply—currently \$65 to \$110 per gallon, depending on the formula. In that respect they will probably be like so many other Du Pont developments, including neoprene and Cellophane. As output increases and demand grows, prices come down to make the infant product available to more and more users.

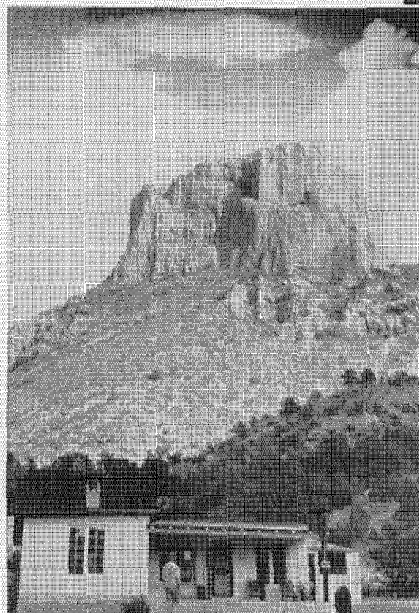
What's wrong with this picture?

The photographer who has never looked at one of his pictures with dissatisfaction is as rare as a silent politician. How many times have you said to yourself, "There's something wrong with this picture, but I can't quite put my finger on it?" One reason, of course, is that even experts don't always agree as to what makes a good picture.

Take the picture at the right, for example. One authority said, "The photographer should have moved closer to the buildings to get something interesting and arresting in the foreground. That would lead the eye to the rest of the photo. See how washed out the sky looks. If the photographer didn't have a filter, he should have waited for darker clouds or better lighting. The upper picture is a garden variety of amateur shot and isn't even a good record picture." He agreed the one below it was a big improvement.

On one point, however, many experts do agree. Du Pont photographic paper can bring out the best in your negatives . . . rich blacks, clean whites, and a full range of in-between tones. There's "Apex" photographic contact paper, "Varigam" variable contrast paper for either contact prints or enlargements, and "Velour Black" photographic projection paper, one of America's favorites for enlargements. Those, teamed up with Du Pont chemicals for darkroom work, will help you get the best from your camera.

Foreground lacks interest to lead eye into rest of photo. Sky is dull and washed out.▶



◀Improvement is made when photographer moves in closer to building, uses filter on sky.



Go Fly a "Kytoon"

*This "aircraft"—aerial jack-of-all-trades—
does its work without flying off anywhere*

Early in 1945 a French Canadian ex-flyer, track coach, and inventor brought to Cambridge, Massachusetts, something that looked like a cross between a kite and a balloon. He was ready to demonstrate what he called a "Kytoon" kite balloon.

A kite enthusiast since early boyhood days, inventor Domina Jalbert was soon showing that his craft with its tear-shaped balloon body with four air-foils or fins really insured stability in the air. He proved that it could be held steadily pointing into the wind—almost directly over its mooring point at a normal elevation of 100 to 200 feet. His helium-inflated "Kytoon" could lift more weight than a conventional balloon of the same size because of its kite-lifting power.

Officials of the Dewey and Almy Chemical Company—leading manufacturers of meteorological balloons—figured that the "Kytoon" was just what military aviators would need if they were making a trans-Atlantic hop and were forced down at sea. While life rafts are equipped with radio transmitters, the problem of getting antenna wires aloft hadn't been solved. By means of Jalbert's device, that could be done practically. So the Dewey and Almy officials arranged to manufacture "Kytoons" for that purpose.

They specified neoprene for the bladders because hundreds of tests had proved it would hold helium about three times longer than rubber, and that it was much more resistant to the destructive effects of sunlight, ozone and aging. For the bladder envelope they used a nylon fabric, because it is lighter than the lightest cotton balloon cloth available, and its sunlight resistance is satisfactory for the job.

The "Kytoon" has displayed an amazing knack for finding new jobs for itself. For example, it serves as a "skyhook" to hold up radio and television antennas in areas where portable units are needed, or where good reception requires very high ones.

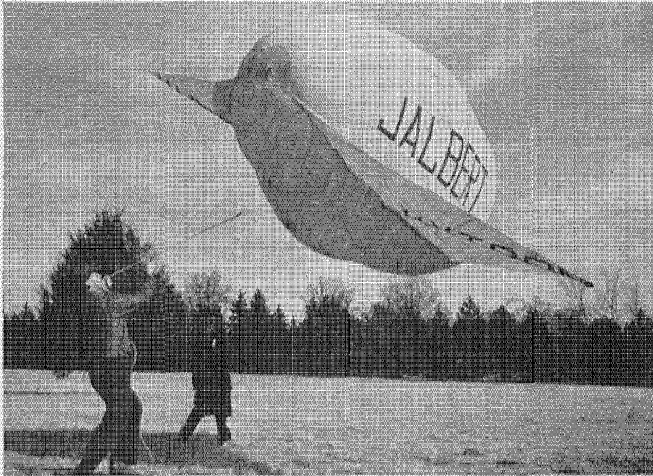
In many parts of the country "Kytoons" serve as advertising and promotional aids for political campaigns, fund-raising drives, county fairs, carnivals, store openings, and so on. A Troy, New York automobile dealer reports that by advertising his name

Inventor demonstrates a "Kytoon" which suspends a television aerial. "Cross" beneath nose is the receiving antennae; bladder is neoprene, case nylon.

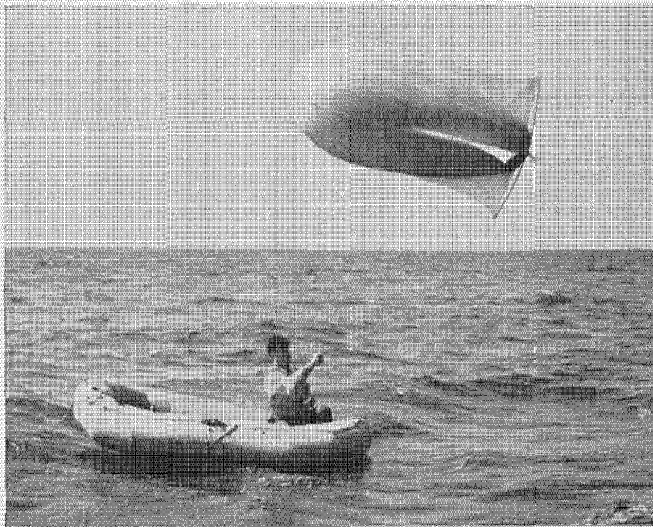
and product in this way, he has brought many prospective customers to his showrooms. In Saginaw, Michigan, a "Kytoon," with a large bright red feather painted on its sides, has carried the Community Chest symbol to eye-catching heights above that city.

Aerial photographers are employing the little "blimps" to raise cameras for low-level work and for marking "tie points" to avoid overlaps when shooting sectional maps. Engineers use "Kytoons" as sighting targets in large-scale surveying operations. And their value as air-sea rescue equipment is, of course, still as important as ever.

This story of the Jalbert development is a fresh example of how two Du Pont products—both unknown 20 years ago—helped a young inventor build his dream into a reality.

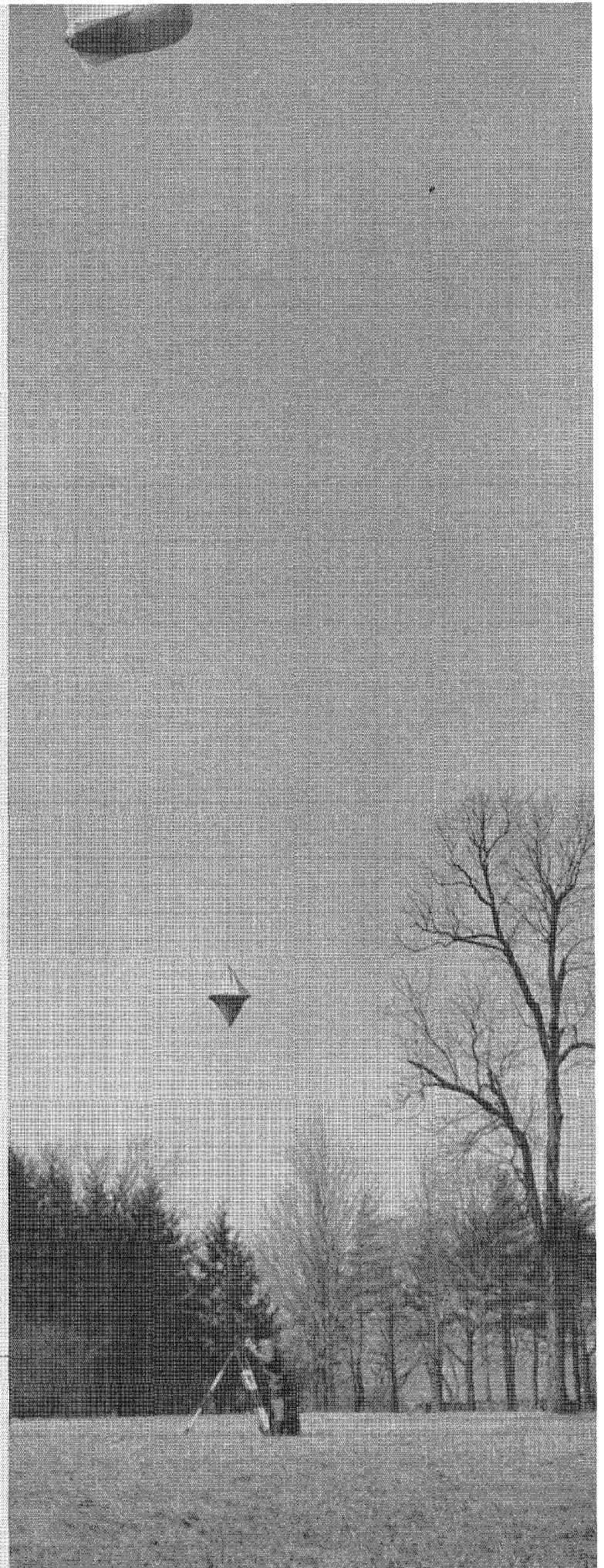


The inventor holds the anchor line of his first kite balloon during take-off in November, 1943 at Woonsocket, R. I.



The "Kytoon" was designed by the manufacturer as a "sky-hook" to suspend radio antennae used by fliers downed at sea.

Like a kite, a "Kytoon" climbs the wind, but won't nosedive or go into a tailspin because it's lighter than air. Civil engineers use it in land surveying.



Give a boy a gun... and be safe

By HENRY P. DAVIS

"The best way to keep a teen-age boy from shooting himself or somebody else is to give him a gun." This was the opinion freely voiced by expert riflemen and police officers at the recent annual convention of the National Rifle Association.

Of course, there's a catch in it. After you give the boy a gun you must see that he learns to use it properly. This isn't hard to do and you'll have fun doing it.

"Once a boy knows that the gun is only as safe as he makes it, he will respect the weapon," says C. B. Lister, executive director. "He'll know that a bullet from that 'harmless' .22 rifle will go right on through a door or a billboard or a man. He'll know which is the business end. And he'll realize that he must believe that every gun is loaded until it is proved otherwise."

In the 24-year-old record of the National Rifle Association's junior program, an estimated total of 2,250,000 boys have been trained in the safe use of firearms. During this time only one accident has occurred, according to Mr. Lister.

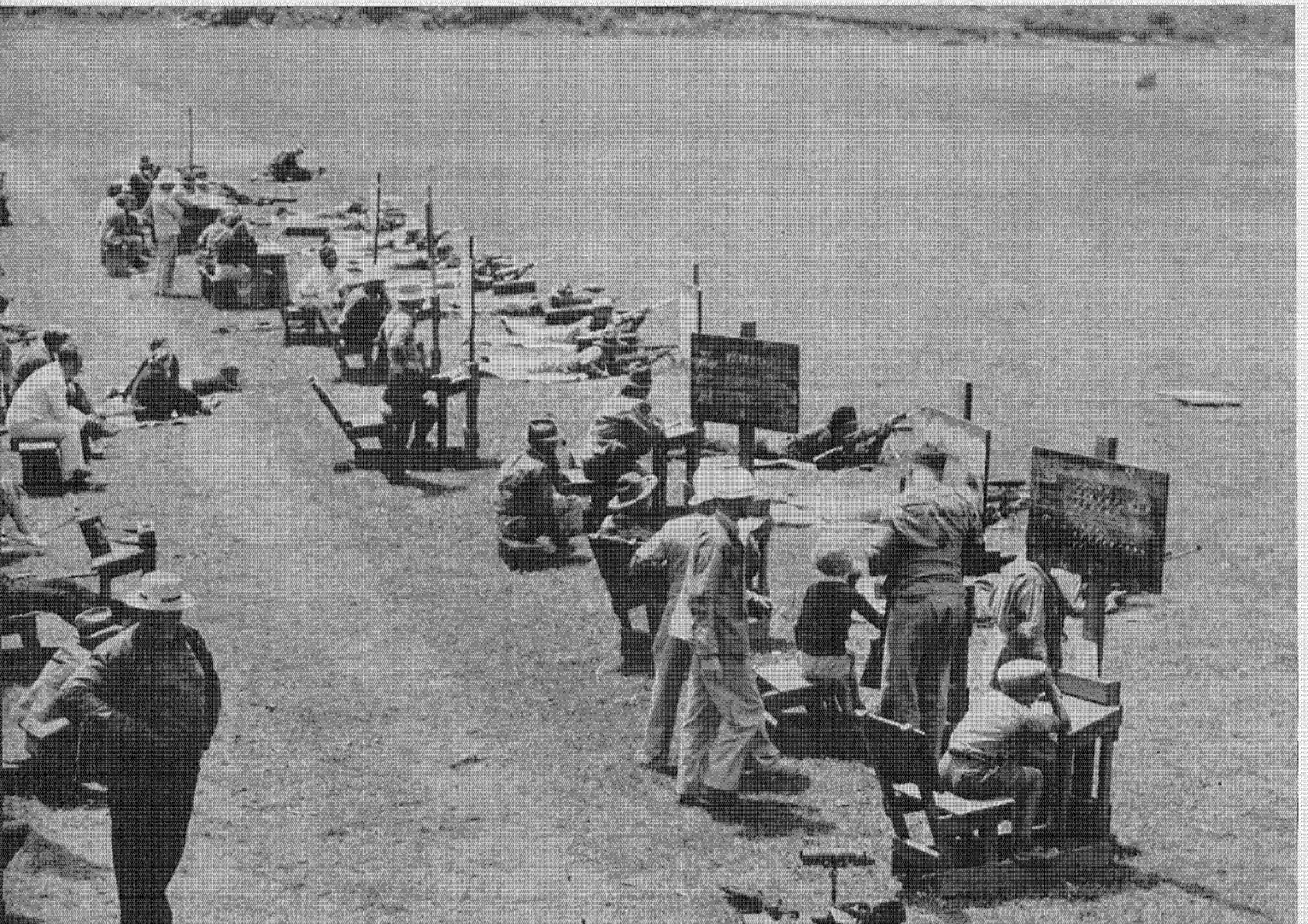
The growth of interest among youngsters in small-bore rifle shooting has been steadily increasing for a good many years, but 1949 saw a new high in these

activities. All boys like to know how to do things, and supervised or instructor-sponsored shooting has a great appeal to youngsters. Approximately 2,000 junior rifle clubs, most of them sponsored by adult clubs, are affiliated with the N. R. A. This does not include almost a thousand affiliated camps that conduct supervised rifle shooting during their summer activities. Nor does it take in more than 200 rifle clubs which are active in American colleges.

Another indication of the growth of interest in rifle marksmanship is found in the 27-year-old history of the William Randolph Hearst Marksmanship Competitions. In the Junior Trophy Match, conducted by mail, more than 600 teams scattered throughout the country compete.

The greatest problem in rifle shooting competition is that of finding adequate range facilities. This is not so important in informal shooting among youngsters, for there is hardly a community now in the United States that does not have some facilities for youth shooting instruction. Every father should give his son the opportunity to take advantage of this supervised recreation. If he is started off right, he will practice shooting safety through the years to come.

A boy will enjoy firearms more if he knows how to use them properly. He'll be safer, too.





It wasn't just a new product the men were

discussing that day; it was the beginning of a . . .

Pay-off for Camden

By ROBERT DE VORE

More than eight years ago, a conference of Du Pont chemists at Buffalo, N. Y., set in motion a chain of events that was to reach with profound effect into Camden, South Carolina. The men were concentrating their attention upon a curious white powder with the formidable name of polyacrylonitrile. There was nothing to indicate, around the table that day, that history was in the making for the quiet Southern town. The meeting resulted, however, in a multi-million dollar gamble by Du Pont on the possible birth of a new fiber.

The chemists were concerned with the fact that none of the usual chemicals would dissolve polyacrylonitrile. The problem was intriguing. If a suitable solvent could be found, there was a possibility that a good fiber might be spun. And it stood to reason that fabrics woven from the fiber would be endowed with the pow-

der's unusual chemical resistance. It would be valuable, therefore, in many industrial operations.

One of the chemists suggested a chemical solvent not then considered usable by industry. It worked. But not until 1948, after five million dollars had been spent in probing the white powder's secrets, was the Company in a position to announce it had developed a new product. It was based on polyacrylonitrile and trade-marked "Orlon" acrylic fiber. In that same year, its engineers were working on plans to build a plant in Camden for the manufacture of "Orlon". That's when Du Pont's gamble began to pay off for the town.

The effect of a new industry is the same in any community, although it may be obscured by size in heavily industrialized areas. But Camden is primarily a small winter-resort city, and the significance of the Du Pont decision was not lost upon any citizen old enough to read.

"This is a great day for South Carolina," said



At ground-breaking ceremonies, the Governor of South Carolina (left) greets Project Manager in charge of building plant.

the chief executive, Governor J. Strom Thurmond.

The state's General Assembly unanimously adopted a resolution extending to Du Pont a "most hearty welcome."

"Everybody is pleased as spiked punch," declared a Camden housewife.

Mayor Savage predicted that the city's population of 8,000 would gradually be doubled.

He was probably right. In only a few months, construction was under way on an addition to the Sarsfield Hotel, a new junior high school, and a new bus terminal. Within a year, 200 new homes, four apartment houses, four stores, three theaters, five filling stations, a supermarket and a laundry were com-

pleted or being built. All of this, plus a \$900,000 city improvement project, added up to \$3,500,000 in new construction in the Camden area after it became known that a new industry would be located there.

Now these things came to pass in a year of declining employment. So all the bustle of building could not have been less than comforting in hundreds of homes in the community. It is not known how many went to work off the plant site, but an average force of 423 persons found jobs on Du Pont construction during the first year. About 70 per cent were from the vicinity of Camden, and most of the remainder from Columbia and nearby areas. Some of them, and other residents too, will work in the plant when it begins operation. During the past year, their wages and salaries totaled about \$1,200,000. At the same time, the Company bought \$500,000 worth of materials from suppliers within a 50-mile radius of the city. That amounted to a transfusion of more than \$1,500,000 into the local economic blood stream.

MORE SMALL BUSINESSES

Small wonder, then, that the advent of Du Pont was followed, within a year, by the expansion of 10 existing businesses and the establishment of 35 new, small ones. Little wonder, either, that retail sales increased 15 per cent in the face of a downward trend elsewhere and despite the fact that the cotton crop in that part of the state was only about half of normal. Bank deposits also bucked the trend. They were down four per cent for the state, but virtually unchanged in Camden.

That just about tells the story of the gamble Du Pont started to make in Buffalo more than eight years ago and of the pay-off—for Camden. There is, of course, another matter—the magnitude of the wager. Before the new synthetic fiber meets the supreme test of competition, in 1950 or 1951, Du Pont will have spent \$7 million in research, \$15 million in plant investment, and additional sums for inventories and other working capital. In free America it still is possible to risk upwards of \$22 million on the chance that a new synthetic fiber will win the nation's approval.

When this "Orlon" acrylic fiber plant begins operation, it will offer new jobs to many local residents.



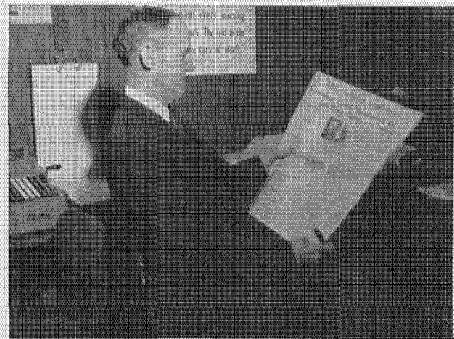
CITIZENS COMMENT ON WHAT NEW PLANT WILL MEAN TO COMMUNITY



GROCERY STORE OWNER HERBERT MADDOX
"Camden needs steady, year-round income. Du Pont's plant will give us that."



COTTONSEED OIL MILL MGR. TOM ANCRUM
"Our work is seasonal. Some men we've had to lay off have found work at Du Pont."



NEWSPAPER EDITOR HAROLD BOOKER
"The plant woke up Camden. It has set a pattern for other industries to follow."



CARPENTER GEORGE RABON
"There are a lot of us from around here who've gotten jobs building the plant."



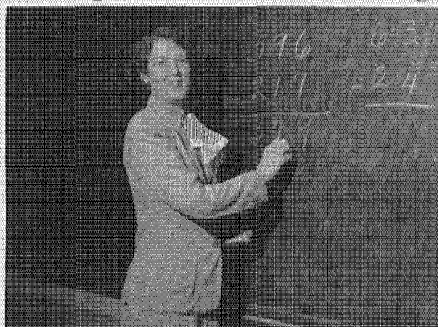
COUNTY AGENT W. C. MCCARLEY
"Excess farm labor will find jobs that will improve their standard of living."



PLANNER STANLEY LLEWELLYN
"This new industry will give young men a chance for good jobs in their home state."



REVEREND A. DOUGLAS McARN
"Newcomers have been a decided gain for Camden, spiritually and economically."



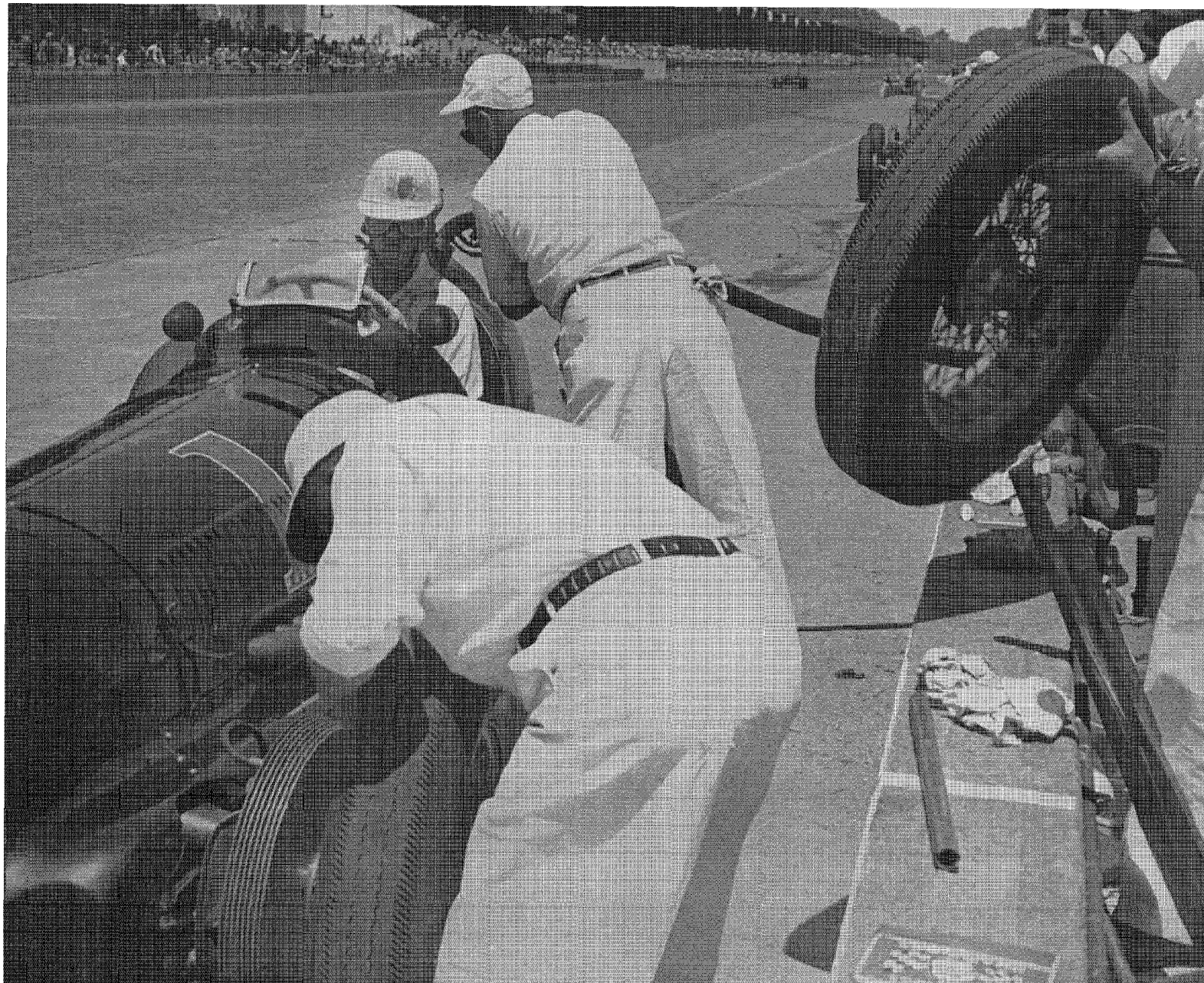
TEACHER IONA DARBY
"More money in Camden and vicinity should improve our schools before long."



TRUCK DRIVER REMBERT KEITH
"I like working on Du Pont construction. Later I hope to get a job in the plant."

[19]





Speed in the pits is a must, too. A stop for fuel and a tire takes less than a minute.

The Furious "500"

The Annual Memorial Day race at the Indianapolis Speedway, world's toughest proving ground, has contributed to many motoring developments, including tetraethyl lead compounds

By DONALD C. McSORLEY

It is May 30. At the famed Indianapolis Motor Speedway upwards of 175,000 spectators, more than attend any other sporting event in the country, are present to witness the annual running of the 500-mile Indianapolis race. The 33 fastest qualifiers, representing the world's top racing machines and drivers are lined up on the track awaiting the starter's flag.

The five-minute warning bomb has just been fired. Time—9:55 A.M. Signal bombs now go off at minute

intervals—four minutes—three minutes—two minutes. Tension mounts to fever pitch as some engines bark to life with a staccato roar. One minute to go. Now all engines are beating out a rhythm, straining like thoroughbreds to get underway—then the final bomb and they begin to roll, the roar of the crowd almost drowning out the thunder of the engines.

Paced to a flying start by a stock passenger car, they move down the track into the turn and out of sight. Then the engines can be heard in the distance as they gradually pick up speed on the backstretch. Another roar goes up from the crowd as the field comes back into view and heads into the homestretch. Now moving at 90 miles per hour they quickly move down the straightaway, the pace car pulls off the track and the starter waves them away—the race is on!

Like snarling monsters the cars fairly leap as the drivers accelerate in a fight for the lead. The field quickly disappears from view. As they again round into the homestretch, they are hitting up to 170 mph on the straightaway. The race is on in earnest and now settles down to a long grind. There are still 199 more laps before the checkered flag falls on the winner—and much can happen in 500 miles of racing on the Speedway.

FIRST "500" RACE IN 1911

This year will see the 34th enactment of the scene just described. The first 500-mile race was held in 1911, and ever since, except for the war years, it has been an annual event.

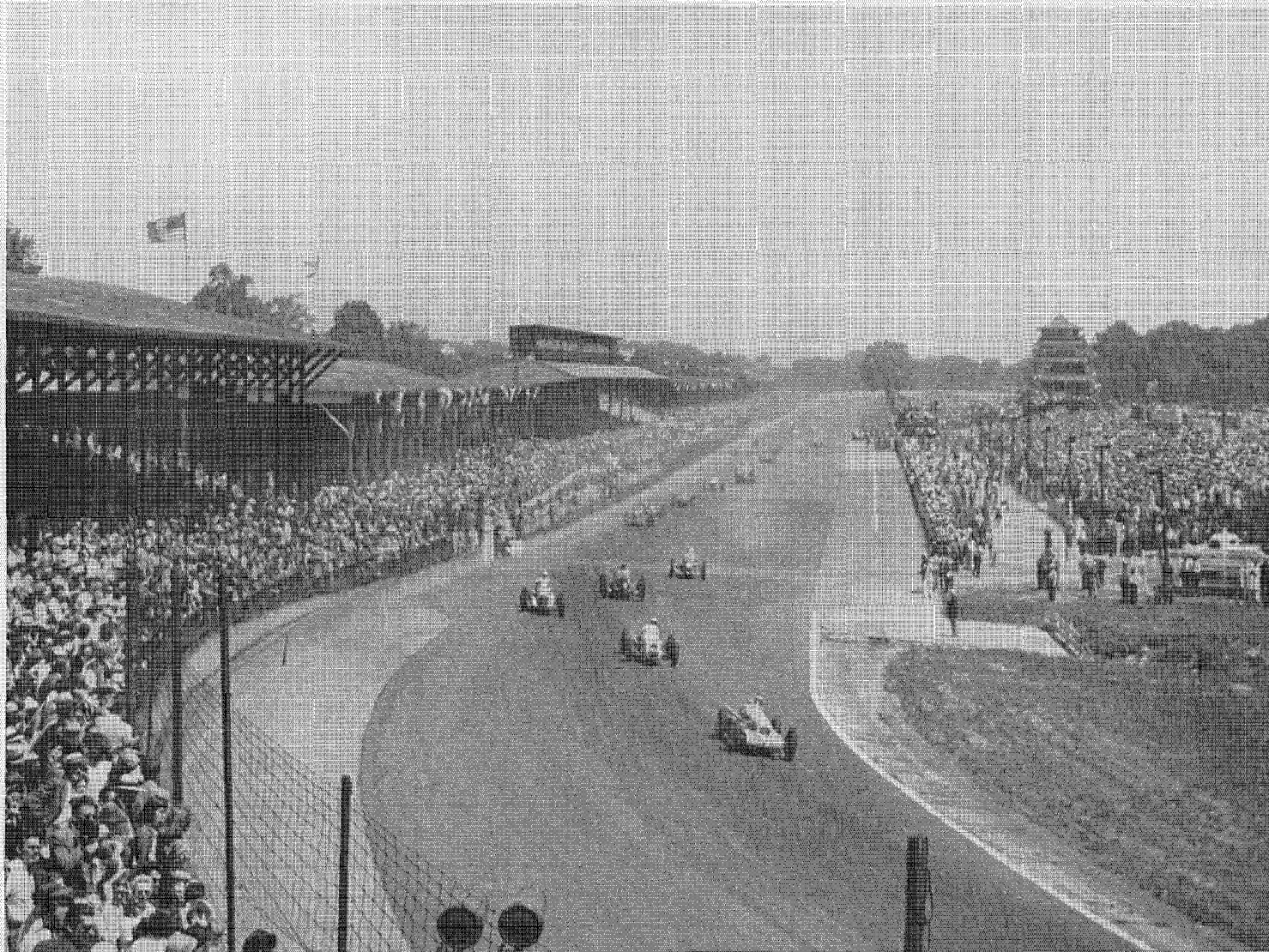
The Indianapolis Speedway was built in 1909 as a proving ground for automotive products. Although manufacturers of stock passenger cars no longer actively compete, it still lives up to its slogan, "The Great Outdoor Laboratory of the Automotive Industry." During 500 miles of competition, the cars undergo punishment considered equal to the strain of driving 50,000 miles on the highway. That's an idea of just how tough a proving ground this really is.

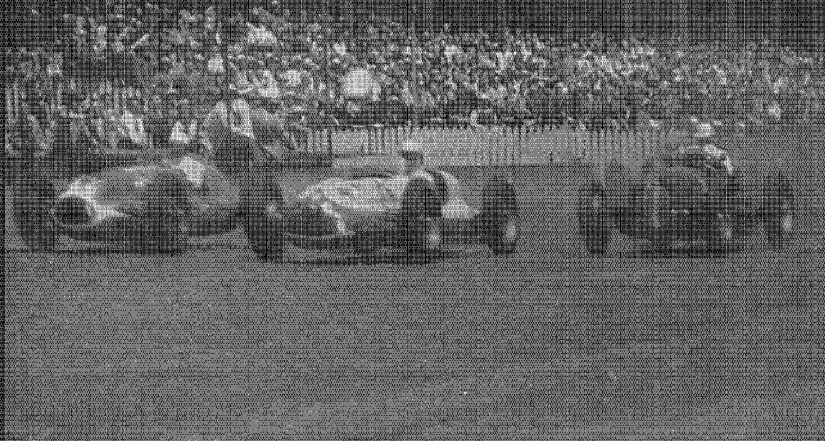
The track itself is $2\frac{1}{2}$ miles long so that 200 laps are required to complete the 500 miles. It is surfaced with asphalt, except for the homestretch of brick laid down in 1909. There are four turns, all banked for high speed, plus two long straightaways and short straightaways at each end. Thus, men and machines are put to the maximum test under a variety of driving conditions.

The cars that compete in this annual classic represent the current ultimate in automotive design. Al-

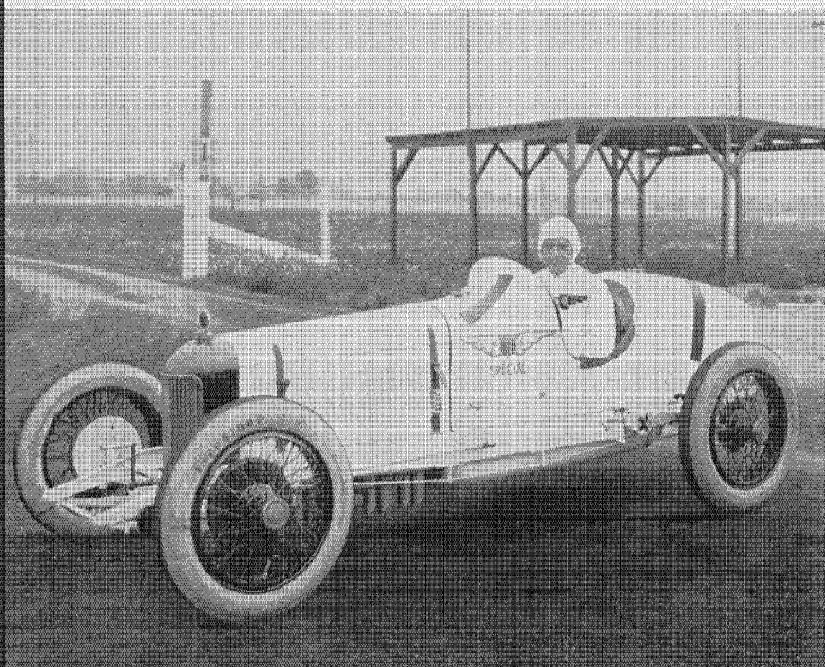
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Action on the Speedway. The field is coming down the homestretch and rounding into the first turn. The race is directed from the high pagoda on the right.



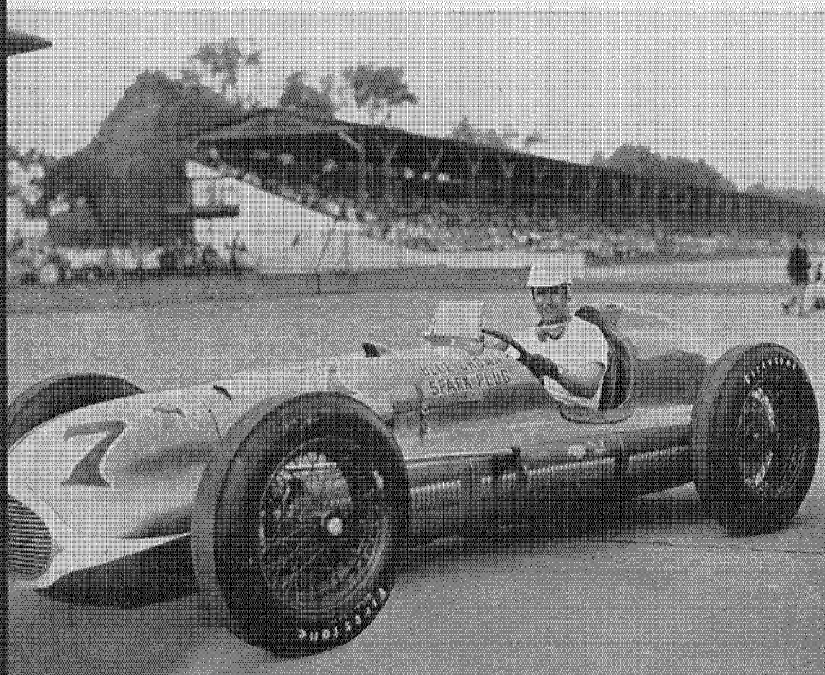


The flying start is one of the most dramatic moments of the entire race as the starter's green flag sends the field on its way.



Tommy Milton was the first winner to use tetraethyl lead compounds. His average speed in winning the 1923 race was 90.95 mph.

Bill Holland's average time in winning '49 race was 121.327 mph. This gives some idea of progress during the past 25 years.



though limited in engine size to about the same displacement as the average passenger car, some of these racing engines develop as much as 550 horsepower compared to 160 horsepower for the most powerful stock pleasure car.

And the drivers who pilot these machines oftentimes stake everything on a new idea that they hope will pay off with final victory.

Many refinements in our modern cars can be traced directly to high-speed tests on the Speedway, and new ideas are being tried in actual competition each year. For example, the rear-vision mirror is such a commonplace accessory on automobiles that few of us ever give it a second thought. Yet the car which won the original 500-mile event in 1911 was the first one known to have used a rear-vision mirror. No one would consider buying an automobile today that wasn't equipped with four-wheel brakes, but this was not always so. They were first used in the 1921 race.

The Speedway has been the scene of many more developments that are commonplace today. The first straight-eight engines were developed in racing cars in the early '20s. Other innovations include high-compression engines, spark plugs that stand up in high-compression engines and give more power at lower operating cost, streamlining of bodies to reduce wind resistance and improve appearance, light alloy pistons, improved fuels and oils, and balloon tires.

The Speedway has been the greatest proving ground for tires. In the early days, racing drivers changed all tires at least three times during a race. One car alone would use up more rubber than was changed during the entire 1947 Indianapolis race, when only 12 tires were changed.

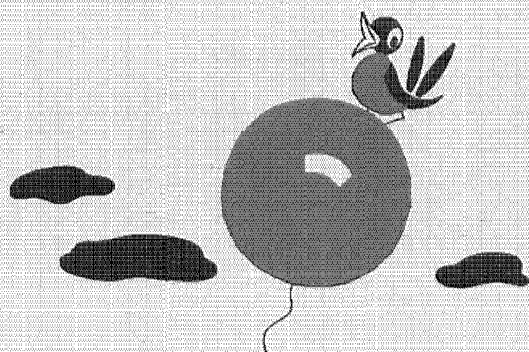
TEL COMPOUNDS TESTED

Another discovery which had far-reaching benefits for the motoring public was the development, by the General Motors Corporation, of tetraethyl lead compounds for improving the antiknock quality of gasoline. These were first tested on the Speedway in 1922 by Tommy Milton. He had been singled out for the TEL experiments because of his excellent record in winning the 1921 500-mile race and the AAA national driving championship the same year. His test runs proved TEL's superior performance and he used it in the 1922 race. A cracked steering knuckle kept him from finishing. The following year the value of TEL was dramatically shown when it was used by Milton in winning the race, as well as by several others finishing well up among the leaders.

It was late in 1923 that Du Pont completed its first TEL production facilities and started producing tetraethyl lead on a commercial scale. Since that date Du Pont has produced enough TEL compounds to treat over 250 billion gallons of gasoline.

Yes, the big winner at the Indianapolis Speedway is neither the driver nor the manufacturer of the winning car. The winner in the final analysis is you, the motoring public.

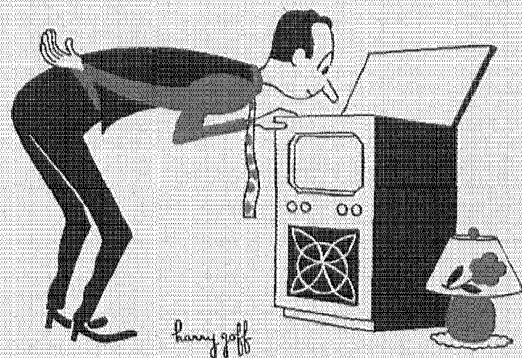
Did you know



... A METEOROLOGICAL BALLOON made of Du Pont neoprene for the United States Army Signal Corps has broken the all-time altitude record for flights into the stratosphere? This weather balloon recently rose to a height of 26½ miles.



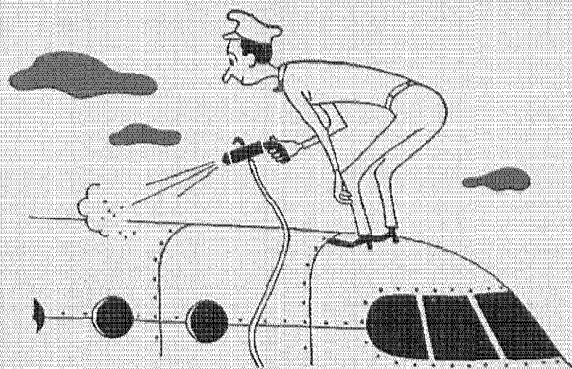
... LIMA BEANS are of South American origin? Now they are our most popular type of bean which grows on vines. "Marlate" 50 insecticide, when used properly, is especially good for controlling Mexican bean beetles that attack this plant and other bean varieties.



... THE DU PONT Photo Products Department makes luminescent chemicals for television tubes?

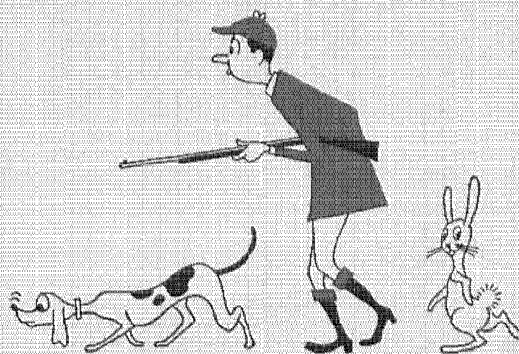
... DU PONT'S NIAGARA FALLS Electrochemicals plant uses about 2,000 tons of refined salt a week to produce sodium and chlorine? That's enough salt to furnish each man, woman and child in the United States with 1¼ pounds a year.

... COLONEL E.A.L. ROBERTS filed a patent application, back in 1864, on a nitroglycerin torpedo designed to increase the production of oil wells? Today, Du Pont Jet Perforators are being used; they embody the same shaped-charge principle that made bazookas such effective anti-tank weapons.



... UNITED AIRLINES have cut the temperature inside their passenger planes during airport stops as much as 10 to 15 degrees by painting the upper half of the fuselages with white "Dulux" enamel? It reflects the sun's heat.

... "PLASTACELE" CELLULOSE ACETATE plastic and "Pyralin" cellulose nitrate plastic are used to make piano keys? The National Association of Music Merchants estimates 90 per cent of the pianos produced today have plastic rather than ivory keys.



... HUNTERS AND FISHERMEN in the United States annually spend more than two billion dollars in enjoying their favorite pastimes? That's not so surprising when you learn, for instance, that 17,000,000 persons use firearms for sport, many of them made by the Remington Arms Company.

... SAFFLOWER, THE NEW CROP taking hold in the dry areas of Nebraska and Colorado, is grown primarily for the oil that is extracted from the seed? Agricultural experts advise treating with "Ceresan" seed disinfectant before planting.



Eight different dyes must be combined to duplicate a shade for a leather customer.

Meet Mr. Color

*His job is helping industries
get the most from Du Pont dyes*

By PEG MINER

An urgent request for help came to the Technical Laboratory at Deepwater Point, N. J. It was from a Du Pont field man: "I've got a cotton mill customer that's on the spot."

"On the spot was right," said Mr. Color, one of the chief trouble-shooters of the laboratory. "The mill had orders for millions of yards of new fabrics with lovely colored patterns. Our fast dyes were to be used. But when the yarn was colored, they got uneven results and the fabrics ended up streaky. It looked as though they would lose the orders."

"Our scientists set to work," he continued, "and found the answer. The fiber had been grown in an area where cotton had an abnormally high mineral

content. The dyers didn't know what to make of it. When we suggested a way to remove the minerals before dyeing, the trouble stopped."

That sort of help is typical of Du Pont's job as a member of the dye industry—an industry that is highly organized to give technical assistance. "You see," said Mr. Color, "when synthetic dyes were first made, their use had to be demonstrated to customers, familiar only with natural products. You couldn't walk into a man's office and say, 'Here's a new blue.' You had to run tests and help him try it out in his own plant. If it was better than what he had been using, you were in."

This situation accounts for the present setup at Technical Laboratory, a service and application-research organization under the Dyestuffs Division. It is staffed by experts who have complete facilities, including machines for dyeing and printing textiles, for paper dyeing, and for simulating leather coloring con-

tions. As a convenience to customers, there are also branch office laboratories in Chicago, New York, Boston, Philadelphia, Providence, Atlanta, Charlotte and San Francisco.

"Sometimes we have freak problems," he commented. "Once we were asked to recommend dyes to the Wildlife Research Laboratory of Denver for coloring poisoned grain to repel seed-eating birds, but not rodents."

However, there are certain regular types of work. You'll find scientists solving customers' problems, as we've noted. In addition, they standardize Du Pont dyes, find better application techniques, test new products that come from the research laboratories, and supply information to both customers and branch offices.

"Although establishing new shades is the business of fashion experts," said Mr. Color, "we often match those that our customers send in. From the 1200 or so Du Pont dyes, we can match any shade that anybody can think up."

"Another phase of our activities is color identification. A customer or salesman may send in a piece of dyed material no bigger than a postage stamp, and ask us to identify the dye or formula. By a chemical process of elimination, we can find the answer."

Fastness studies are very important. From 25 to 170 tests are run on each dye, including resistance to washing, drycleaning, crocking, perspiration and light. Then the laboratory passes the information on to the buyer.

"We also need to know the dyeing conditions in the mill, and the end use of the fabric," he said. "If it is a mixture of a number of fibers—nylon, wool, rayon,

cotton, etc.—we have to prepare a formula that will give the customer what he wants even though the different fibers take dyes differently. If a new synthetic fiber is used, we have to develop the right dye for it. If the cloth in service will have to take a beating—such as in workers' cotton uniforms or children's rompers—fast vat colors will be required. Carefully selected, these dyes will outlast the fabric itself."

PAPER COLORING STUDIED

Apropos of special conditions in a customer's plant, he mentioned a puzzling paper problem that once confronted the laboratory.

A Wisconsin paper company reported that it wasn't getting the right results with one of our dyes that was mixed into the pulp before the sheets were formed. The paper technicians tackled this one. A sample batch of the mill stock was made into paper at the laboratory and colored with the dye. It met the specifications easily. What was wrong?

"It turned out," he explained, "that we were using distilled water, but the mill wasn't. When they took our recommendation to condition the water, everything was fine."

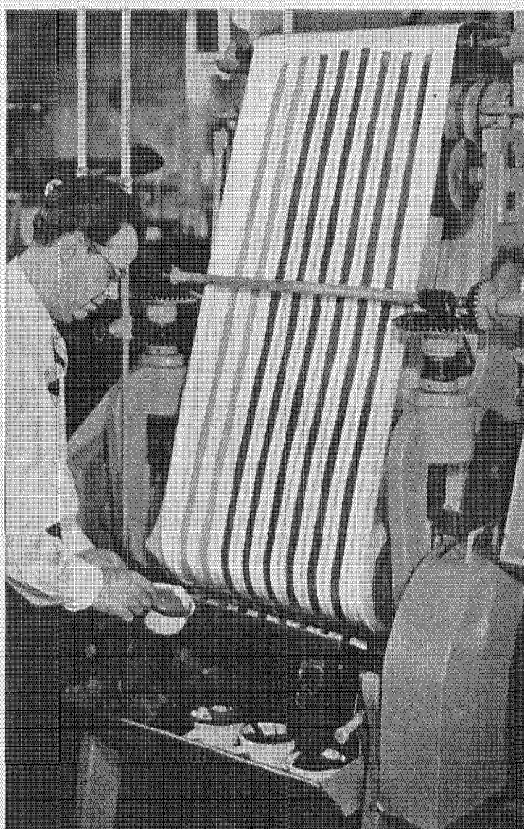
In parting, Mr. Color stressed the fact that Technical Laboratory is not a research institution in the strict sense. No new dyes are developed. That's the job of Jackson Laboratory across the street. But they are constantly at work advising customers on the best possible formulas and methods. To a concern that runs millions of yards, the savings that result can spell the difference between profit and loss.

(25)

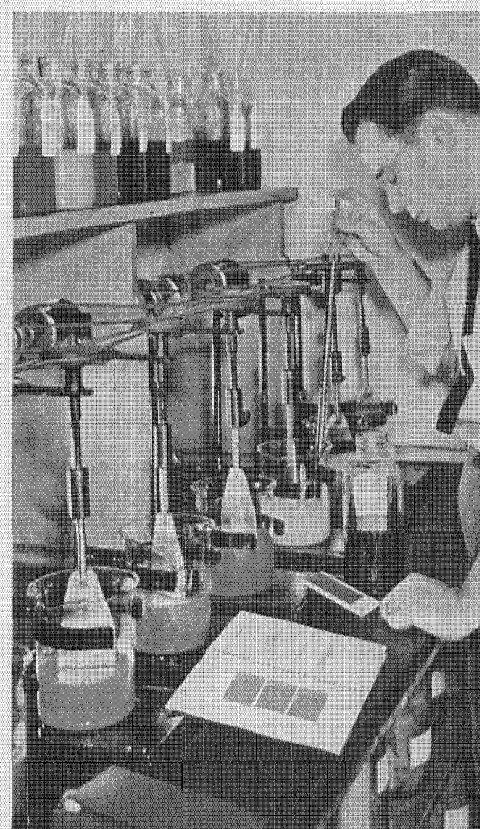
At the Philadelphia Branch Office Laboratory, swatches of cotton material dyed with vat colors are being tested in this Launder-Ometer for fastness to washing.

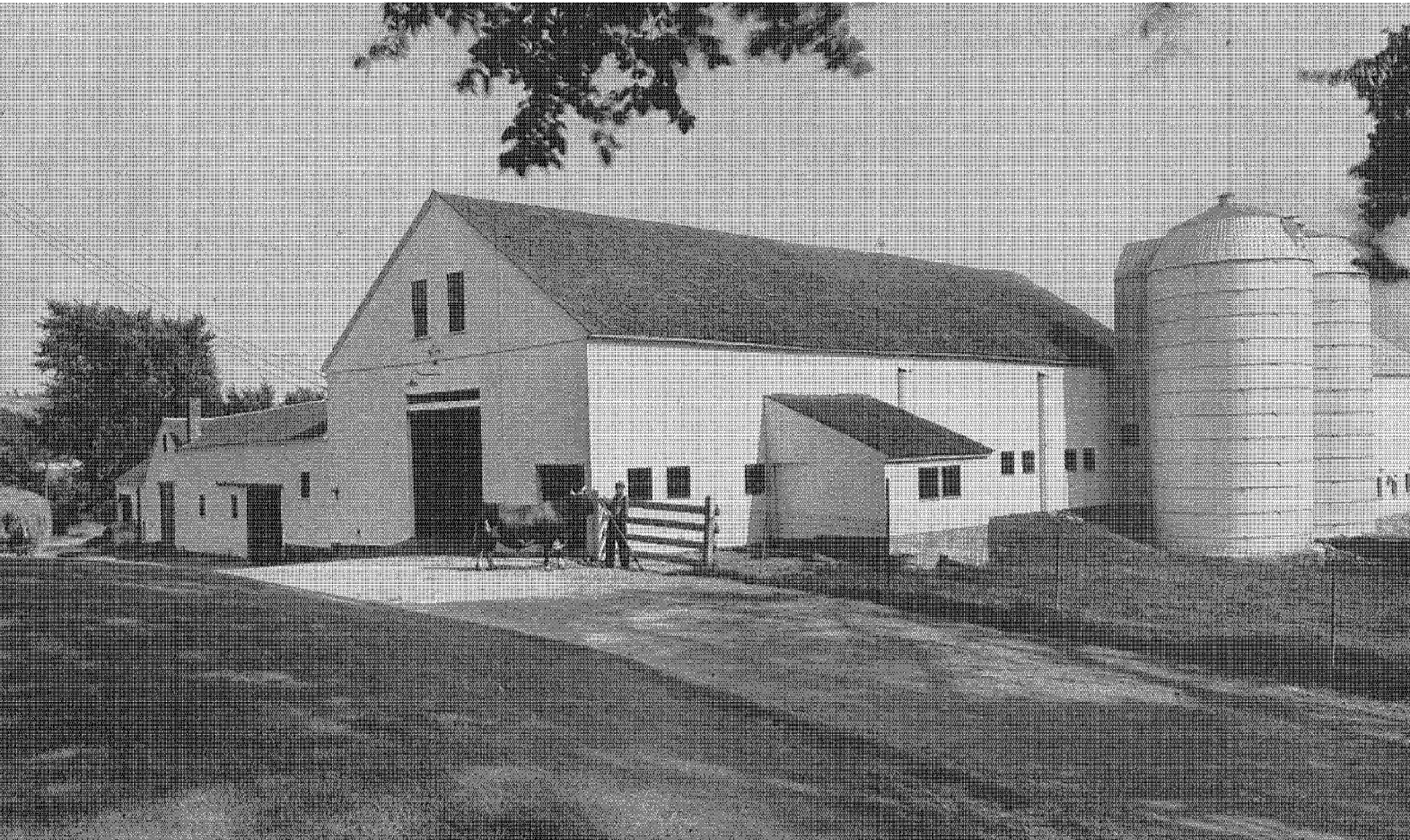


Textile printing machines are regularly used in the experimental work at Technical Laboratory. Here rayon fabric is being printed in several different shades in one operation.



When they are called upon to develop a formula for a customer in the paper industry, chemists in the Laboratory must simulate actual conditions in the mill.





Thousands of dollars have been saved by using good paint on homes and other buildings.

The Farmer Takes a Finish

*A New Englander tells why he chose
Du Pont finishes—and why
it paid him to do so.*

By BILL HOBSON

When Harold Olsen stopped to see our Boston paint folks the other day, we naturally thought he wanted some paint. Harold owns a farm up in Pepperell, Massachusetts. If you've ever passed through there, you may have noticed it . . . big, pre-Revolutionary farm house with shutters at every window and modern roomy barns, all spanking white. Harold didn't buy any paint, but he gave us some mighty good conversation.

"You know," he said, "using cheap paint these days is like trying to farm with horses. Sure, horses were fine when you could hire a man for a dollar a day. But with labor costs what they are now, I'd have to quit farming if I didn't have a couple of tractors."

He reached for his pipe and proceeded to fill it with New England deliberateness. Finally, he spoke again. "Same way with paint. It takes a painter just as long to apply cheap paint as good paint . . . sometimes longer. Then, in two or three years, what hap-

pens? You find the south side of the house wrinkled as a raisin, so you decide maybe you'd better have a complete new paint job. That's when you wish you had started with a paint that would last. 'Course I haven't been caught that way for some time. I changed to Du Pont 40 House Paint and 'Dulux' Trim & Trellis Finish in 1933. Since then I've had to repaint only twice, and I don't plan to paint again for awhile. Inside I've used 'Dulux' Super-White Enamel throughout. It's no trouble to keep clean, and it stays white." He paused thoughtfully . . . "Why, I've gone as long as 10 years without repainting. Besides having better-looking paint jobs and better protection, I figure I've saved over a thousand dollars in the last 17 years by using good paint."

MATERIAL COSTS SMALL

We've known all along that it pays to buy top-notch finishes which have been carefully developed and proven in the laboratory and in use. With materials representing only about 10 to 20 per cent of the total painting cost, it doesn't make sense to buy poor-quality, short-lived products. But it was good to

have a farmer tell us . . . a farmer who knows paint!

There are thousands of Harold Olsens in America who have found they can't afford inferior finishes. Perhaps that explains why the barn, traditionally painted red, is now being dressed up in white and tints . . . often in the same color scheme as the farm houses. (Artists and other red barn lovers, please note. Du Pont Red Barn and Roof Paint is still available and probably will be for years.)

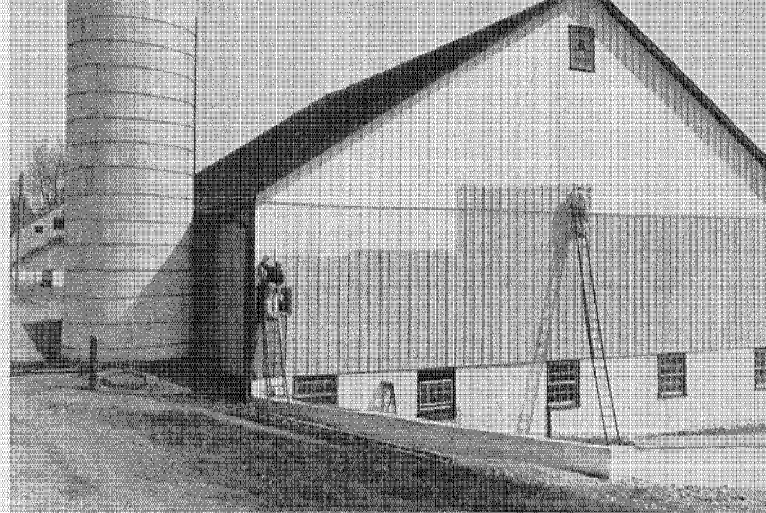
Artistically, an over-all color scheme brings home and farm buildings together in a pleasing, attractive unit. And if top-grade "self-cleaning" paints . . . like Du Pont 40 Outside White . . . are specified, home and barns alike will stay fresh and new-looking for years. Without this "self-cleaning" action, dust and dirt collect on the film until it is grimy and discolored. Only a new paint job will correct this condition.

PAINT STAYS CLEAN

"Self-cleaning" paints, however, normally begin to "shed" a microscopic layer of film about six months after application. Rains wash away the "dead" paint particles along with the collected dust and dirt, leaving a smooth, clean surface. The "self-cleaning" process is continuous, but it is so gradual it does not abnormally affect the life of the finish. And when it is time to paint again, the surface requires little preparation before a new application.

Another money-saver for the farmer is improved trim paint. Even more than his city cousin, the farmer is plagued by mildew attacking shutters and trim. In densely-shaded trim areas and on the backs of shutters, dark discolorations often appear, and areas exposed to the sun begin to fade after a few months . . . that is, unless "Dulux" Trim & Trellis Finish has been used. This enamel dries to a hard, tile-like finish that resists fading and attacks of mildew and other fungi. It dries quickly, minimizing the danger of dust and insects settling on the wet film.

Farm houses and buildings are just a part of the story. U. S. farmers have the enormous investment of 11 billion dollars in machinery and implements. Al-



Many barns, traditionally red, are now being dressed up in whites and tints . . . often in same colors used on house.

though equipment manufacturers provide excellent initial protection, finishes on tractors and plows, mowers and cornpickers take a beating in service. Unless spots that become bare are promptly protected with the proper paint, rust will start eating away vital metal. One of the most recent finishes developed to help the farmer protect his implements is Du Pont Tufcote Heavy-Duty Enamel. It resists gasoline, oil and grease and withstands considerable abuse. Since colors match those of leading implement and tractor manufacturers, it is ideal for either touch-up work or complete refinishing.

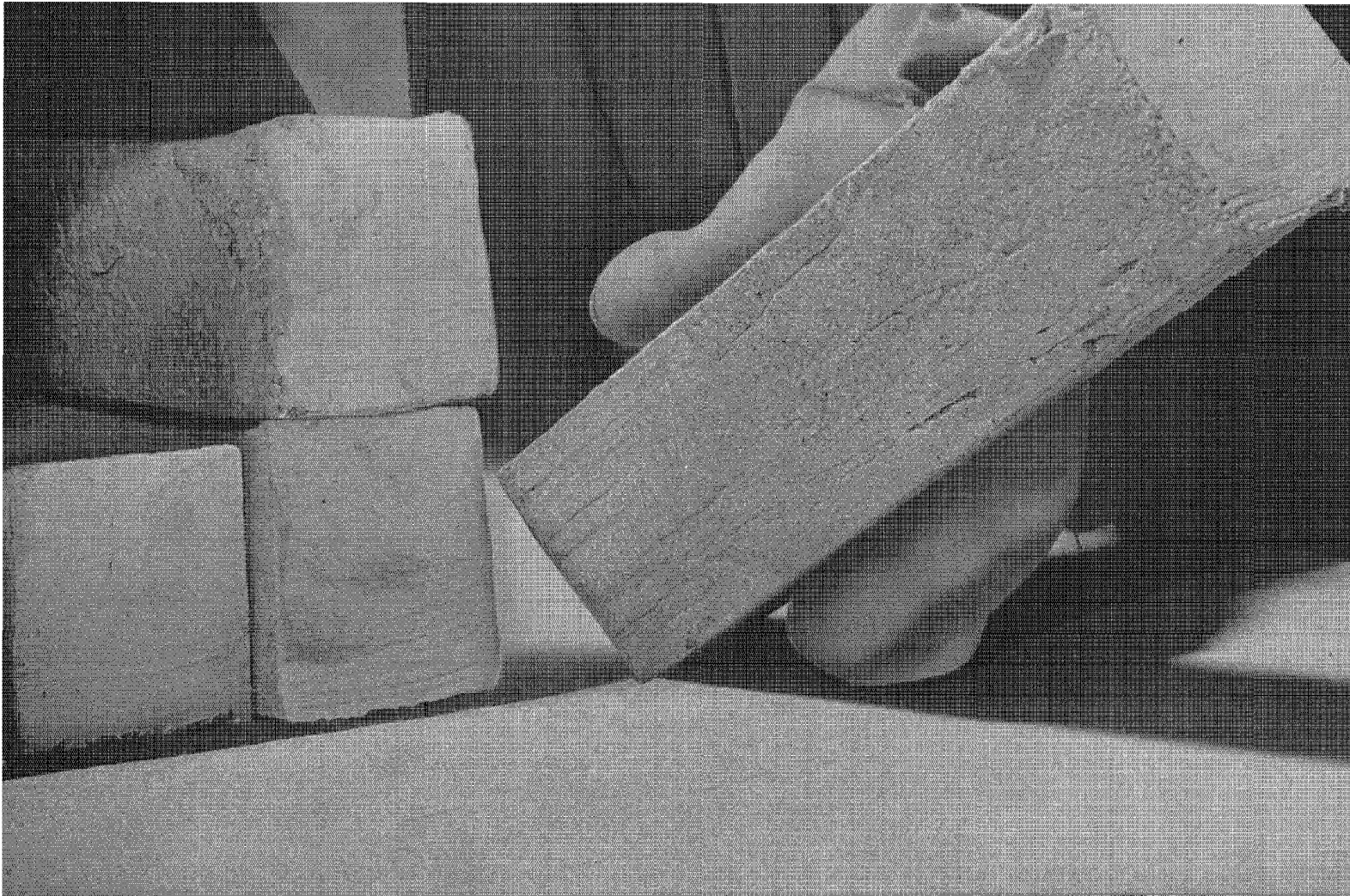
Rust doesn't stop with its attacks on farm implements. It is found on metal roofing, metal fence posts, metal window sash . . . any metal not well protected by paint. A good protective finish will prevent rust and add immeasurably to the life of the metal. But then, that's why the farmer uses paint. It protects his buildings and equipment and adds years to their life . . . it helps him in his tremendous task of feeding this nation and much of the world.

A few decades ago, most small farmhouses were painted like this. Shades of red and brown were the commonly-used colors.



Farmhouses look more like their city cousins today. Whites, once popular in a few regions, are now national favorites.





Millions of pounds of sodium, a soft, silver-white metal that reacts vigorously with water and a host of other chemicals, are used annually but none of it is found in the end product. It's truly . . .

The Disappearing Metal

By FRANK J. HOLT

You might think it costly and wasteful to use tons of a metal and have it end up as a by-product. In the case of sodium, however, such a practice means improved products at lower cost. Detergents, the new "soapless soaps," are typical examples. By treating with sodium, oils that would go into ordinary soap are converted to the alcohols used in making modern detergents. No longer is it necessary, after settling comfortably into your favorite easy chair, to respond to the irresistible "Dry the dishes for me, dear?" Even the glasses drain dry without streaks when washed with these detergents.

First cousins of the detergents are "wetting agents," another group of products born of sodium. These chem-

icals have the unique ability of making water "wetter." This has been spectacularly demonstrated by converting normal water, in which a duck floats "high and dry," into water that waterlogs his feathers and thus causes him to sink. On the practical side, wetting agents have helped in dyeing and processing textiles, and have made possible inks that write dry.

The biggest single use of metallic sodium is not in detergents but in the manufacture of tetraethyl lead, a fluid that raises the octane number of gasoline and cuts down engine knock. With the advent of higher compression ratio engines, tetraethyl lead has become almost as vital as the fuel itself.

Back in the early 1920s, the sodium-lead alloy for this process was made in a gas-fired pot, then cast out

in a slab, broken up with hammers, and collected in milk cans. Old-timers say that 25 gallons of tetraethyl lead fluid was a good day's work. Now processing consumes many tons of sodium daily, although here again the sodium is not a part of the final product.

At one time or another you've probably tried to figure out how "bluing" in the laundry can make white clothes whiter. That's a long story, but some of the coloring in grocery-store bluing is still extracted from the indigo plant of India and the East. Most indigo dye, however, now is synthesized with the aid of sodium. The product costs you less and the quality is better and more uniform.

DRUGS FROM SODIUM

Other important products manufactured with the aid of sodium, but containing none of this versatile material, are chemical intermediates and pharmaceuticals. The latter includes healing sulfa drugs, barbiturate sedatives, anti-pyrimines, anti-malarials, and the widely-publicized anti-histamines for the treatment of colds. Some of the glamorous scents of perfumes have been synthesized through chemical reactions using the reactive metal.

Much of the metallic sodium made at Du Pont's Niagara Falls plant is converted by the Company into sodium peroxide and sodium cyanide. Many of the moving steel parts of your sewing machine and car have been made more wear-resistant by treatment in a molten bath of sodium cyanide. Electroplating, which utilizes millions of pounds of this chemical, increases the beauty and utility of your car, silver plate, radio, lamps and the like. Sodium peroxide is an important bleach for paper and textiles. For instance, the paper in some of your favorite magazines contains ground wood that has been bleached with sodium peroxide.

In the applications we've mentioned, the greatest asset of sodium has been its high reactivity. This has also led to the false impression that the metal always must be handled under protective oil to keep it from burning. It's true that sodium, in finely divided form, will ignite spontaneously in the atmosphere, but in commercially available bricks of 1 to 12½ pounds it can be handled safely with gloves. It must be kept

out of contact with water. Even the perspiration of bare hands may start a fire.

Recently research efforts have been directed toward making sodium even more active by dispersing the finely-divided metal in inert liquids that can be pumped through pipes at room temperature.

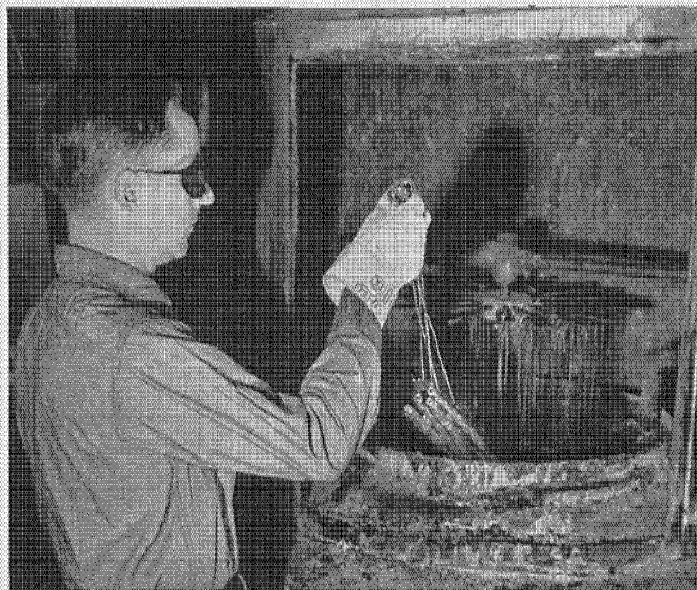
Did I say that sodium always disappears in use? Well, there is one interesting exception. In transportation equipment, if it were not for the small amount of metallic sodium in each valve, the internal combustion engines of modern airplanes, large trucks and buses would have a much shorter life. Sodium carries the tremendous heat from the face of the valve to the valve stem where it is dissipated to the cooling system of the motor. Here it serves as a heat-transfer material.

This story of sodium should help dispel any notion that the metal is a material of construction, like iron or aluminum. We do not expect to build bridges with sodium—although cast steel treated with it exhibits a greater low-temperature impact strength—but it will find more use in chemical reactions producing materials that don't contain a bit of sodium.

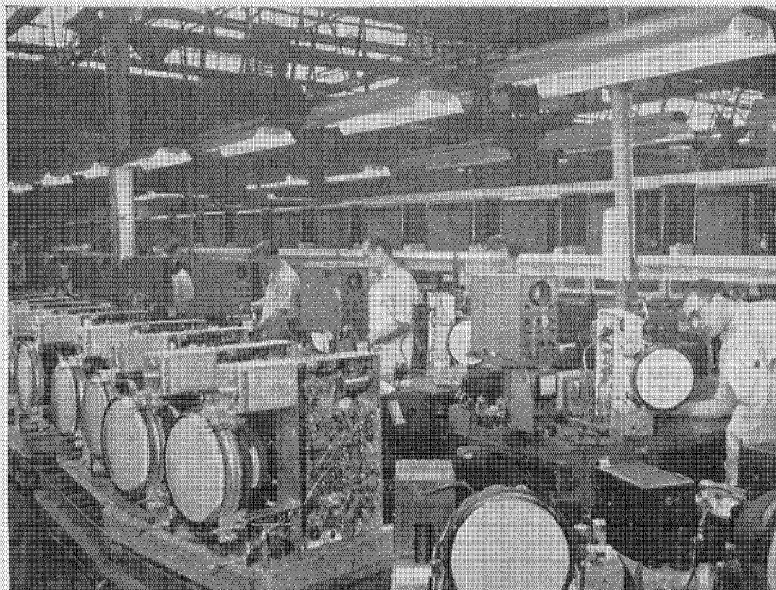
Men who made first quantities of alloy used in processing tetraethyl lead 25 years ago, now pose with billionth pound.



Metals are treated in molten bath of sodium cyanide to "case harden" them so surface will have greater resistance to wear.



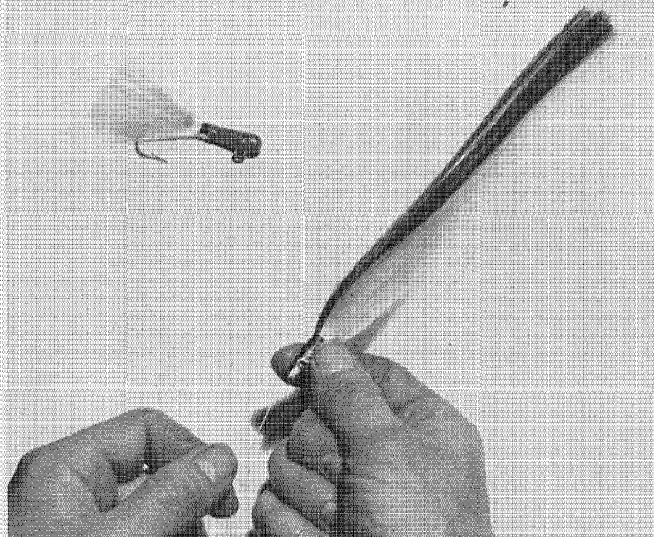
Television sets gain in beauty and utility through electroplating which uses millions of pounds of sodium as sodium cyanide.



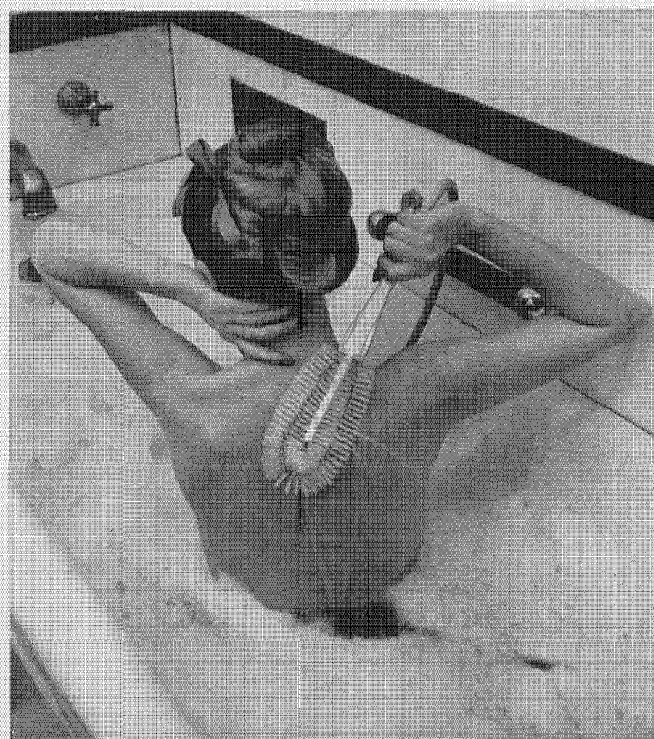
What's New



• **"LISTIK" ADDRESS AND PHONE INDEX.** Here's a new office and home use for durable pyroxylin coated cloth. A ruled sheet of this cloth, lettered from A to Z and with room for 130 names and addresses, pulls out from a small brass case. Press a release button and the sheet snaps back in. You can write on this coated cloth with pen or pencil, make as many erasures as you like, and then clean with soap and water when soiled. Manufacturer: Zephyr American Corp., 537 W. 53rd St., New York City.



• **FISHING LURE.** Sportsmen who fish for such salt-water gamesters as striped or channel bass, bluefish, pompano and many others, now can troll or cast with a new bait that simulates an eel. This lure has a crimped nylon monofilament tail that glistens in the water to attract the fish. John C. Kremer, Inc., West Palm Beach, Florida makes this "No-Alibi" lure.



• **BRUSH FOR BATHING.** Nylon bristles feature a shower bath-brush made by Better Brushes, Inc., of Palmer, Mass. Long flexible nylon bristles, which can withstand soap and water without losing their resiliency, are formed into an oval face. Water is sprayed to all parts of the brush surface through 18 holes in a thin plastic tube set in the middle of the brush. The product is a boon for those who want a quick bath.



• **PACKAGED BY THE YARD.** This handy container holds 250 samples of "Boraxo." Each one—enough for one hand wash—is individually sealed in Cellophane and all joined together end to end. A similar package is used by Pacific Coast Borax Company to promote "Luron" hand soap. The transparent, moistureproof film protects the product and shows it to advantage.

• **PATENTS.** Now available for licensing are 730 more Du Pont patents, making the total number registered to date for that purpose approximately 5,000—nearly three-fourths of all the patents this Company owns. The new listing will be published in the Official Gazette of the Patent Office. It may be noted that patents not listed are not necessarily withheld from licensing consideration.

• **CAVALCADE OF AMERICA,** Du Pont's radio program, received an award from Freedoms Foundation for "outstanding achievement in bringing about a better understanding of the American way of life." The award was made at Valley Forge, Pa. by General Dwight D. Eisenhower. Advertising Director William A. Hart accepted the award for the Company.

CORRECTION: *In the February-March number, a picture legend incorrectly stated that "Acele" acetate rayon was made from Cellophane. "Acele" is made from purified cellulose, and not from Cellophane.*

Why Drain Antifreeze?

You might save a few dollars by *not* draining antifreeze from your car's cooling system this spring, but "... it is certainly cheaper in the long run to use new solution each year," says the National Bureau of Standards Circular 474.

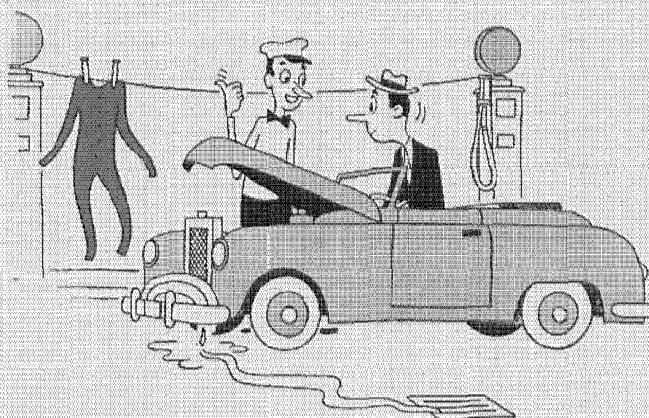
The risk you take by keeping antifreeze in during the summer, or reusing it again next fall just isn't worth while.

Reputable brands like "Zerone" and "Zerex" antifreezes are made to do two things—prevent your car's cooling system from freezing and, by the use of inhibitors, protect it from acid, rust, corrosion, and scale. The life of these inhibitors depends on the condition of the cooling system.

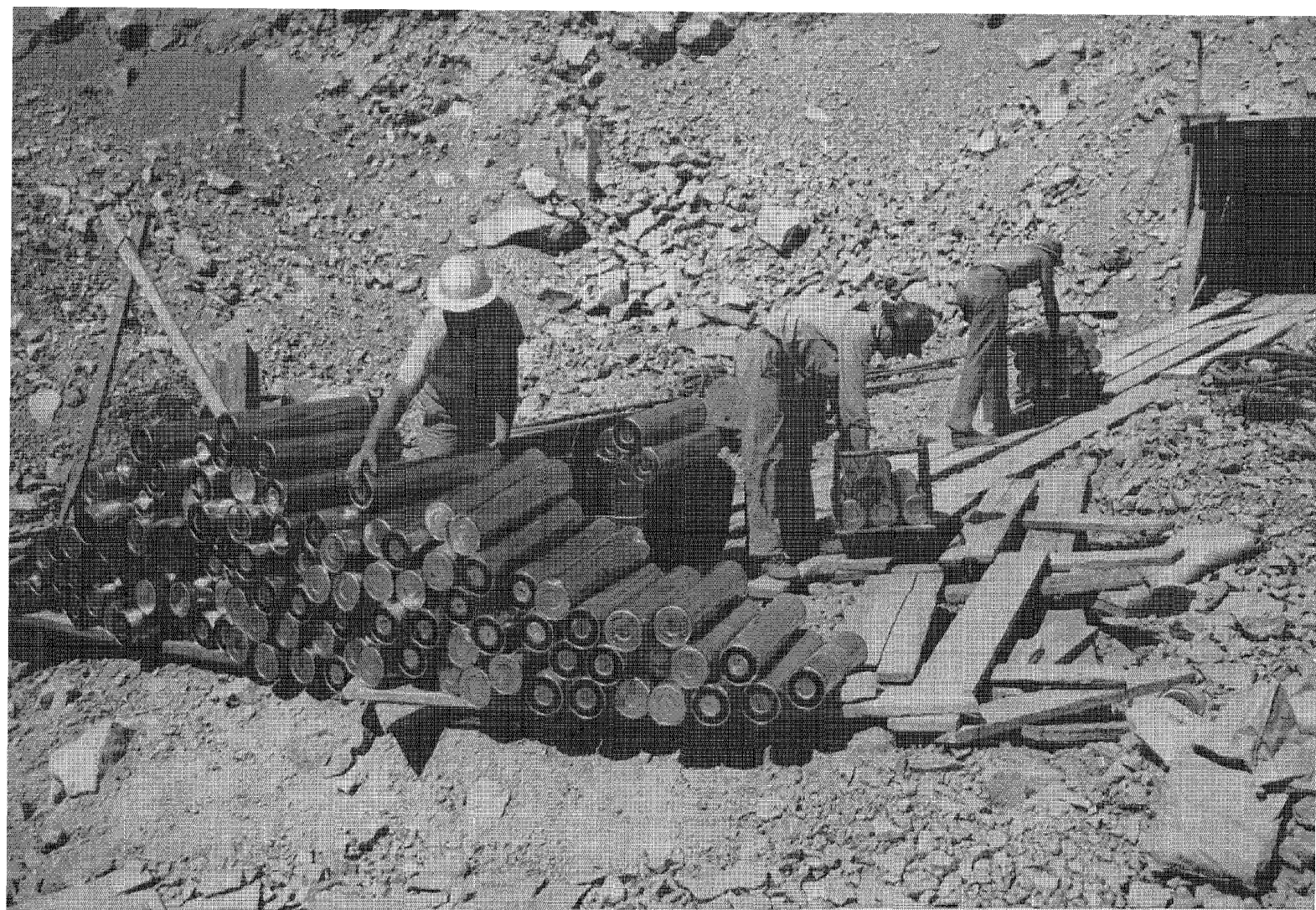
Under the best operating conditions, the inhibitors retain their effectiveness a long time. But when a leaky water pump, hose connection, or cylinder-head gasket lets air or corrosive exhaust gases into the antifreeze solution... Driver, watch out! These gases reduce and may destroy the effectiveness of the inhibitor. Then you can be in for trouble that might take real money to fix!

As the National Bureau of Standards points out, "Under some conditions, it is possible to use a solution

for more than one season without harm. The requisite chemical analysis to determine whether a solution is capable of further use, however, is much more expensive than new antifreeze. In view of the comparative cost of the antifreeze and of even so minor a replacement part as a water pump or radiator, it is certainly cheaper in the long run to use new solution each year."



"Now we're both ready for spring."



Work scene outside one of the three tunnels near Corona, California, before the big shot.

The West Finds "Nitramon"

This blasting agent for quarry use has now worked its way from coast to coast

By F. D. BICKEL and H. G. BOSTICK

You know what happens when you throw a large stone into a quiet millpond. After the first big splash, waves begin to spread out until they reach the far shoreline.

When Du Pont first announced "Nitramon" blasting agent, there was a news splash, with waves moving outward in all directions. This product got off to a strong start when eastern dailies broke the news with double-column headlines. "Du Pont Finds New Explosive Fire and Bullets Can't Set Off," declared the *New York Herald Tribune*. Readers were told that "the new stuff had been shot at with rifles, thrown into fires, bored with red-hot irons, subjected to blowtorches and trip hammers—without exploding." An Associated Press writer reported that even the strongest com-

mercial blasting cap wouldn't detonate "Nitramon". An extra large dynamite cartridge was needed to goad this product into action, but it would then explode with 20 per cent more force than TNT.

The outstanding fact about the new blasting agent was that it could be loaded with safety in large-diameter well-drill holes where only dynamite had been used before. There were other advantages: "Nitramon", packed in tight-sealed metal cans, was non-freezing and waterproof. It contained no nitroglycerin; workmen could handle it without getting headaches. Holes could be loaded quickly and rock blasted more economically than before.

Within three months after the announcement, the new product had demonstrated its effectiveness in 60 representative blasts in quarries and strip mines along the Atlantic Seaboard. Reports showed that in most cases blasting costs had been substantially reduced. Meanwhile, another technical improvement

had been announced. Instead of dynamite to set off "Nitramon," a new, specially-designed insensitive primer was used to further minimize the risk of accidental explosions. That also helped to stimulate trade interest in ever-widening circles.

Since then, this product has been progressively improved as the result of continued research. Now there are six different types. The fields of their use have broadened out, always with safety spearheading the advance, with economy and efficiency also major considerations.

To mention all the raw materials quarried from cliffs or dislodged in open-pit mines with this blasting agent would not be possible here. But typical among these are limestone for cement manufacturing, and various kinds of rock for railway, highway and construction uses. Earth and rock masses covering coal seams and metallic ores are also blasted to expedite strip mining operations from coast to coast.

The role of "Nitramon" in the Far West calls for special mention because it is new out there. More than 500,000 pounds of it were used last year. In Washington and Oregon the materials produced to date consist largely of basaltic rock. In California's Temescal Canyon, quarrymen are working in dacite porphyry. Indians once fashioned chips of it into arrowheads. Today, industry's end use for it is, oddly enough, roofing granules. But we'll come to that later.

"Nitramon" figured in 25 different operations in the Pacific states last year. It so happens that instead of using well-drill holes, small "coyote" tunnels were driven into the hillside for placing the charges. The product is especially suited to this purpose because

of its characteristics. It permits the men to work in restricted quarters with the maximum of safety and freedom from headache. The blasts ranged in size from 2,000 pounds in a cement gravel pit in Washington to 156,000 pounds in a big porphyry quarry operated by the Minnesota Mining & Manufacturing Company near Corona, California. Here the "Nitramon" was loaded in some 30 pockets in lateral wings which had been driven from three tunnels at different elevations in the 400-foot quarry bank. Du Pont technical representatives assisted in planning and executing this "coyote" shot, one of the largest blasts of any kind ever made on the Pacific Coast. It produced approximately 500,000 tons of well-broken rock.

This huge mass, when crushed, heat-treated and colored at the nearby "3M" roofing granules plant, will provide serviceable coatings for a tremendous tonnage of roofing products. Incidentally, the production and sale of these granules, quarried from the cliffs of California and other states, constitutes only one branch of the business of the St. Paul organization. It manufactures hundreds of varied products, but is perhaps best known for its "Scotch" brand pressure-sensitive tapes, coated abrasives, and "Scotchlite" reflective materials.

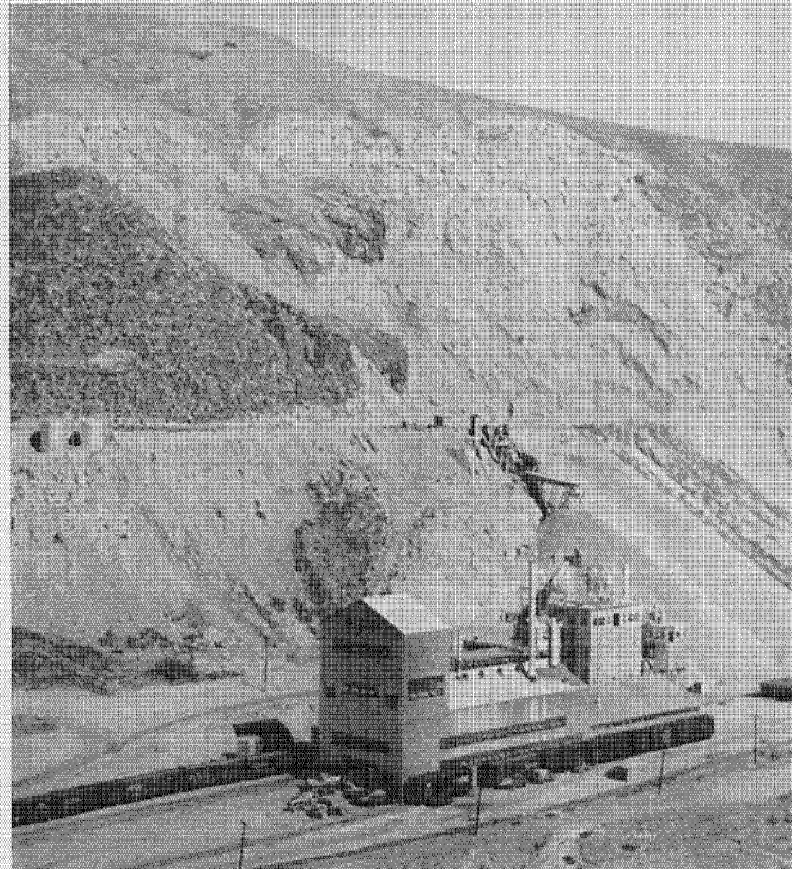
We'll wind this up by saying that the blasting agent, which was put to such good use in the Pacific states, was manufactured at the Repauno Works in New Jersey. In November last year, Du Pont began operations at its new "Nitramon" plant at Seneca, Illinois. You might call that a preface to a continuing story of Du Pont explosive progress and service.

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"Nitramon" can be loaded in the cramped space of a tunnel wing safely and without incurring any risk of a headache.



Scene of the big quarry shot that brought down something like 500,000 tons of porphyry for the mill in foreground.





Across the face of the nation, signs are silent salesmen for everything from soap to safety.

Everybody Reads Signs!

Highspots in the history of signs, including modern metal ones finished with "Dulux" enamel

By GEORGE P. NEILSON, JR.

Angry murmurs rumbled through the town of Canterbury, England, in 1863. Petitions were signed. Newspaper columns were filled with protests. Why? In conformance with an old law, a weather-stained wood carving of Sir John Falstaff had been ordered removed from the front of the tavern it had decorated for generations.

The authorities, fearing a riot, ordered the sign taken down at three o'clock in the morning. But it was only with great effort—and the incentive of several

mugs of beer—that men could be found to pull down the old sign.

Today, few Americans would be tempted to start a riot over the removal of a roadside billboard. Yet never have outdoor signs been so varied or so numerous. They are the backbone of the outdoor advertising industry with a capital investment of more than \$125 million and a total yearly billing between \$50 and \$60 million.

How did it all begin? What were the forerunners of gas station signs . . . the animated displays of Times Square . . . night streets gaudy with neon displays, and circus posters on barn walls.

In cities of the Far East, people could see at a glance what was sold in the open-air shops. It was

probably some Egyptian shopkeeper who first displayed a picture of his wares. But the only real evidence of early signs comes from the Romans. Among the ruins of Pompeii have been found signs representing dairies, shoemakers, wine merchants and perfumers. Some were painted on wood; most of them were carved from stone and set into walls.

As competition grew, it was not enough to have a sign denoting the trade. Shopkeepers wanted people to know whose tavern it was. In some cases, they represented their names by a rebus, for reading was still a rare art. For example, Mr. Cox, of early London, might show two fighting cocks; Mr. Harebottle might use a rabbit and a wine bottle.

Symbols for certain trades became accepted: the three globes of the pawnbroker, the mortar and pestle of a druggist. Many of these symbols still exist, ranging from giant eyeglasses in front of an oculist's store to barber poles. Some, like the old cigar-store Indian, have passed into history.

Signs came to their full popularity in 17th century England. They crowded across narrow streets, and some Londoners complained that hanging signs interfered with good ventilation. Sometimes they fell, injuring pedestrians. The situation became so acute in 1762 that an act of Parliament abolished most hanging signs. They were replaced by sculptured ones set flush with the wall, but soon the painted wooden signs appeared again.

Most familiar of all were tavern signs with their improbable names and fantastic pictures . . . *The Bull and Mouth* . . . *The Griffin and Chair* . . . *The Angel and Gloves* . . . *The Bear and Ragged Staff*. These signs were cherished possessions, handed down from father to son. They were symbols of the character of the place and its proprietor.

In America too, signs were slow in coming of age. Some craftsmen, such as Duncan Phyfe, considered themselves too famous to advertise their shops by signs. But most tradesmen relied on them and sought new and better materials and methods. Before 1900 oil-base paints were used on coated metal; after the turn of the century they were slightly improved, due probably to the development of new finishes for the coach and buggy field. These signs didn't look well for more than six to twelve months. From then on the

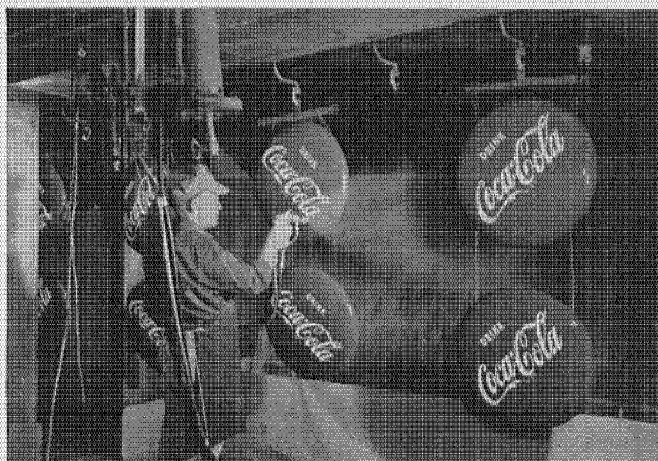
surface would crack and peel while the colors lost brilliance and luster.

Signs were hand painted in those days. And if a tradesman wanted two or more similar ones, he couldn't be sure of the results. Shopkeepers faced the fact that the initial attractive appearance would soon disappear.

Today, all that has changed. Modern metal signs are good silent salesmen for real estate agencies, groceries and a thousand other products and services. They shed the rain and resist rust. Strong sunlight leaves their colors unfaded for a long time. They are designed so that the sign will tell its story at a glance. A soft drink manufacturer can have hundreds of identical signs displayed wherever his products are sold. The difference: mass production made possible by new finishes, such as Du Pont "Dulux" enamel.

Even before a sign is exposed to weather, its finish must take severe punishment. After it is applied to the metal—by one of four processes—the enamel must withstand embossing and bending operations that turn it into an eye-catching display piece. It must stand heat, pressure and flexing without chipping or cracking. Sign manufacturers like "Dulux" finishes because they have these properties.

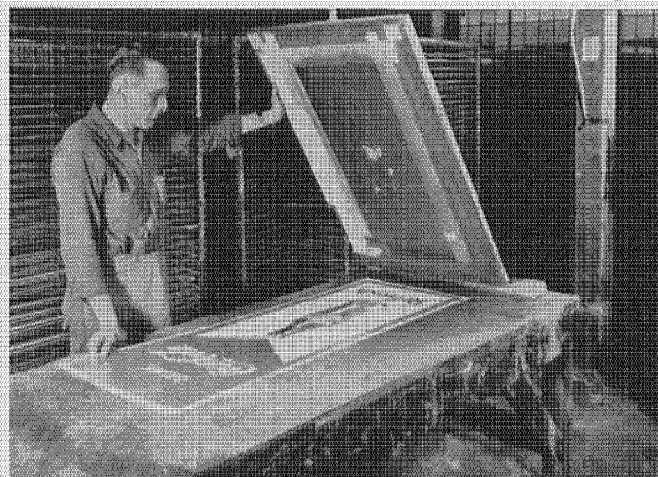
The finish of a sign, once it is placed in service, is vitally important to the person whose wares it advertises. A piece of rusting metal, faded color and illegible letters, is of no value at all. In a very real sense, the finish is the sign.



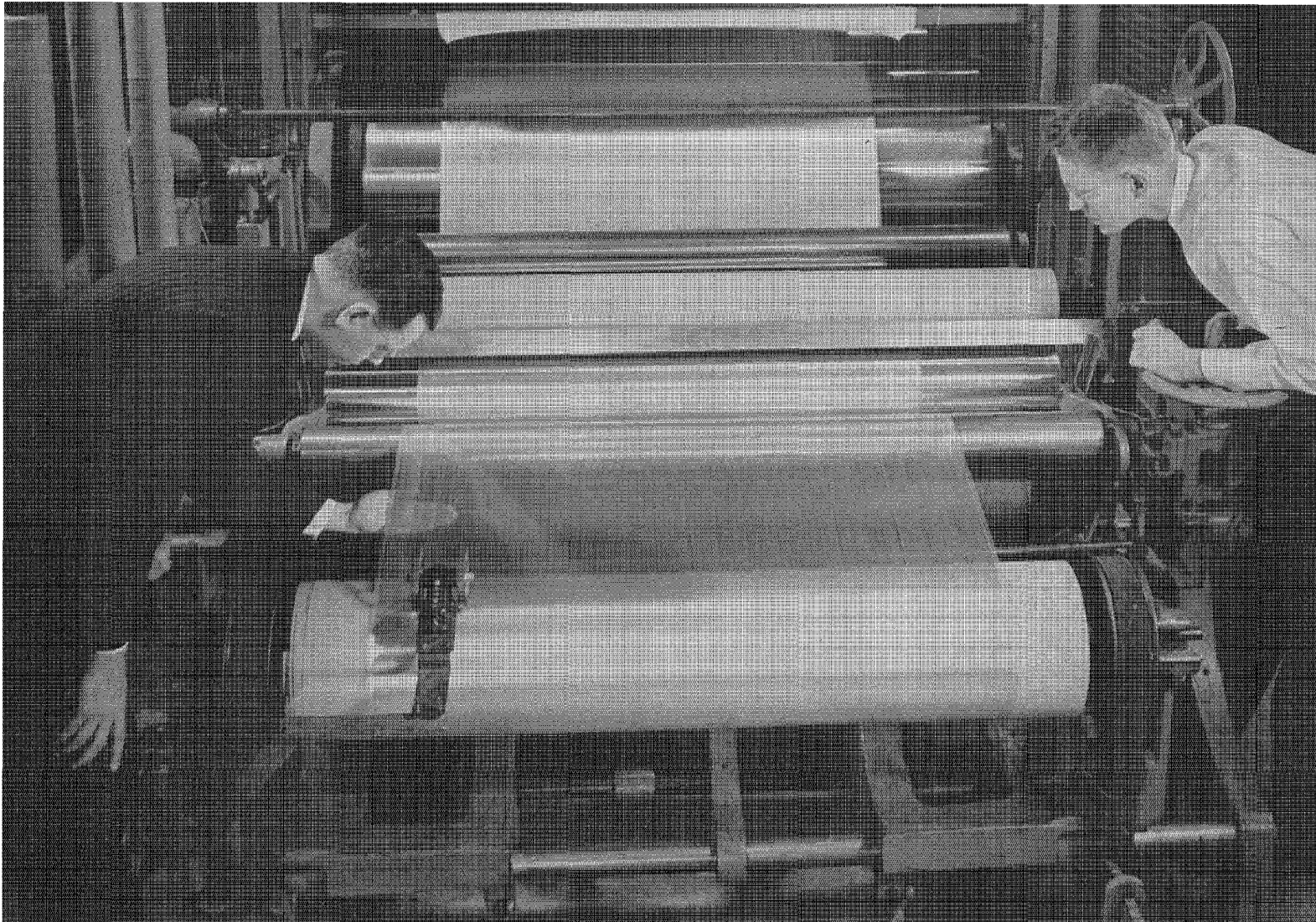
After the copy has been applied, final coat of clear "Dulux" enamel gives added brilliancy, insures lasting colors of signs.

[35]

Silk screen process is one way to apply colorful designs and lettering to signs. It is essentially a stenciling operation.



Resistance to marring, chipping and weather makes Du Pont "Dulux" enamel an ideal finish for outdoor metal signs.



The job of a size is to protect yarns against the wear and tear that occurs during weaving.

From Suds to Size

Familiar to many as a detergent ingredient, Sodium CMC is branching out

Keeping "fattle-tale gray" out of clothes in laundries and home washers was the first important job for Du Pont Sodium CMC—short for sodium carboxymethyl cellulose. Now this product is helping make fabrics, as well as clean them.

"The biggest news these days on Sodium CMC," say its godfathers, "is its use in textile sizing." Warp yarns need protection while they're going through textile mill operations. The job of the size is to provide a protective coating for the tiny individual filaments that make up a yarn, and then bind them together so that the yarn will withstand the abrasion of loom parts. Later, the coating is removed.

"For years," we were told, "textile mills had only natural products for this purpose. Then synthetics

began coming to the fore. Sodium CMC, made by the Explosives Department, is one of them. It is more uniform—won't vary from batch to batch—and it provides a tougher, more extensible size film."

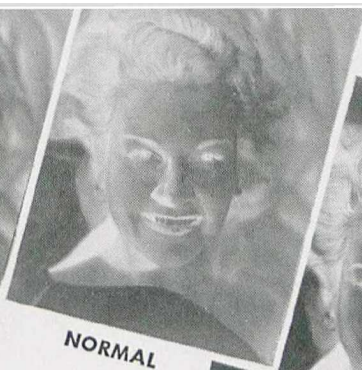
When we looked somewhat blank about the term "extensible" film, we were informed that a loom pulls on the yarns, and they stretch. A brittle size will crack off, but not Sodium CMC.

Today, this product of chemistry is being used on continuous filament viscose yarn and spun rayon. It is unusually good on the spun yarns, particularly combinations of acetate and viscose rayon, which have always been hard to size and weave. There also seems to be a promising field for it on cotton.

Textile manufacturers like Sodium CMC because it makes their operations run more smoothly. It's saving them money, too—and that's a strong recommendation for any product.



THIN



NORMAL



DENSE



more
**IT'S A FUN TO
 MAKE ENLARGEMENTS
 OF SALON QUALITY**

FROM ANY NEGATIVE

with

Du Pont "Varigam"

variable contrast photographic paper

IT'S EASY—"Varigam" provides the exact grade of contrast your negatives require . . . whether dense, normal or thin. No trick . . . you use filters for different negatives instead of different paper contrasts. Ten filters are available, each producing a different degree of paper contrast. You can even vary contrast in single prints by dodging

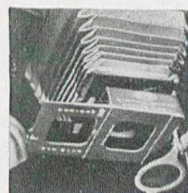
with filters. And—"Varigam" is processed exactly the same as ordinary enlarging paper.

IT'S ECONOMICAL—Avoid risk of outdated paper or of running out of the grade you need . . . eliminate wastage. Save time and money . . . side-step trouble. Save darkroom shelf space by stocking one enlarging paper instead of several grades.

THE ONLY VARIABLE CONTRAST PAPER, Du Pont "Varigam" is enthusiastically used by meticulous amateurs,

commercial and professional photographers just about everywhere. Its variable contrast helps them . . . and can help you . . . to make consistently better prints.

TRY "VARIGAM" in your own darkroom. You'll be enthusiastic about it, too. Ask your dealer today for Du Pont "Varigam" in the distinctive blue and yellow package. Available in various surfaces and sizes. E. I. du Pont de Nemours & Co. (Inc.), Photo Products Dept., Wilmington 98, Del.



**HOW
 "VARIGAM"
 FILTERS
 ARE USED**

Filter holder is readily held in position over enlarger lens. Card-mounted "Varigam" filters of lacquer-protected water-resistant gelatin are inserted into holder . . . stay in place . . . and allow use of both hands for dodging and light control. Filters are supplied for ten degrees of contrast: Basic set 5A, supplementary set 5B, complete set 10C. Exposure time is same for each filter, except in printing very soft negatives.

Listen to "Cavalcade of America"—Tuesday evenings—NBC

Du Pont Photographic Products

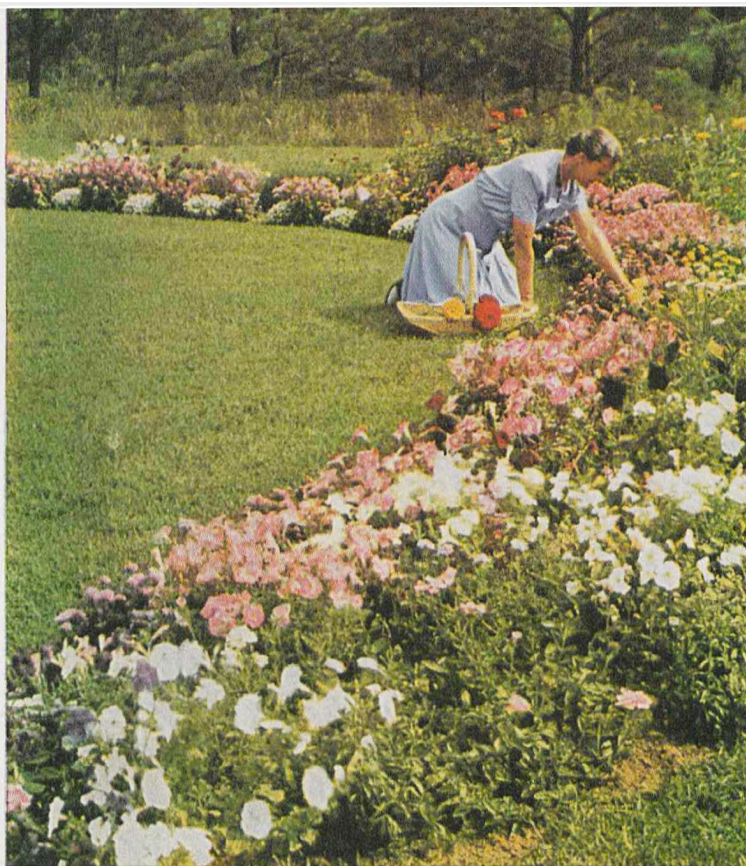


FILMS

PAPERS

CHEMICALS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



Better Vegetables and Beautiful Flowers with

Du Pont Floral Dust

and

Vegetable Garden Dust

Modern chemicals are combined in Du Pont Garden Products to give effective control of insects and diseases—all-in-one protection for the plants growing your beautiful flowers and the luscious vegetables you serve with pride . . . "from our own garden."

VEGETABLE GARDEN DUST—Designed to give effectiveness in disease and insect control with safety to plants and people. Safe even on sensitive crops like cucumbers and melons, and with low toxicity to humans so it is safe to use close to harvest time. Effective even on early and late blights of tomatoes.

"AMMATE" WEED KILLER—One application kills poison ivy. Also use on tree stumps, woody weeds and brush—kills roots and all.

LAWN WEED KILLERS—Highly effective 2,4-D formulation, destroys broadleaf weeds readily. In a half-pint can with measuring cap for small lawns; Du Pont Lawn Weed Killer No. 2 in quart size for larger areas.

FLORAL DUST—Dust it on roses and other flowers, or spray it if you prefer. It provides protection against most common insects and diseases, with safety to tender foliage.

ROSE DUST—For use where only diseases of roses are the problem.

For the Garden Specialist, four farm-proven products in home and garden size packages: Du Pont 50% Technical Methoxychlor and 50% DDT Wettable Powder insecticides; Fungicide-A ("Parzate" fungicide), and "Fermate" fungicide.

These products are sold in leading garden supply stores and departments. If your dealer cannot supply you, write Du Pont, Garden Products Section, Grasselli Chemicals Department, Wilmington 98, Del.



Garden Products

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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