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August • September, 1950



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... THROUGH CHEMISTRY

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DU PONT

MAGAZINE

Vol. 44 No. 4



BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. R. Manchester, Editor

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COVER: When kids, we used to be fascinated by the color change you could get by mixing chemicals together. Add some acid to a solution containing an indicator, and you'd get one color. Add enough alkali and, presto, another shade.

This "Paper Industry" cover reminded us of that. At the top, you notice the felled tree. Next you see it transformed into a roll of paper by chemicals. (Du Pont supplies papermakers with dozens of them ranging from pigments to peroxides). Then you observe the small model of the cover—with the background switched from blue-green to red, just like the colors in those chemical experiments. But that seems appropriate, for changing wood to paper is certainly a chemical process. Printing inks, too, are chemically made.



The Perfect Insecticide



In a laboratory at the edge of Wilmington, Delaware, scientists raise 1,500,000 flies a year, and about as many aphids, cockroaches and carpet beetles. These insects are hatched to be squirted with liquids, dusted with powders, and otherwise exposed to chemicals being tested as insecticides.

Such studies mean dollars and cents to you. Farmers who raise our food use many chemicals to protect their livestock and crops from insects, and their success or lack of it affects the price of food.

Any successful pest control compound represents years of research and testing. You might think that scientists would sooner or later develop a "perfect insecticide." Probably there is no such thing. But it is the goal of Du Pont and others—a chemical that will kill more insects, last longer, cost less, and above all, be safer to plants, animals and humans. Each new year finds them closer.

Du Pont "Marlate" methoxychlor insecticide is a good example of this quest. Between a chemist's first flash of inspiration and marketing of the chemical, more than \$1,000,000 was spent in research over a five-year period. Tests were made for killing power, and for toxicity to those handling it. There were still more tests for possible chronic effects that might cause a creeping illness. Finally, before being sold, scores of field trials throughout the land had to prove in practice what had been demonstrated in the laboratory. For every product like "Marlate" that reaches the market, about 2,000 compounds are tried and rejected.

Obviously, then, Du Pont or any other company seeking a new, better and safer pest control chemical, must risk its money and face the chance of losing its investment, whether it be a thousand dollars or a million.

Even if a good product like "Marlate" is found, and a plant built to make it, there's no assurance that a competitor may not soon develop a still better one. The chemical industry gladly accepts that challenge. It's in accord with our system of free enterprise—and it's insurance for you that competitive research will make tomorrow's products better.

Revolution in bookbinding

"Give us a good adhesive," said the bookbinders, "and we can break our worst bottleneck." Du Pont chemists obliged with new hot-melt adhesives

By PEG MINER

When the art of bookbinding fell into step with machine methods, a new idea was born. About 50 years ago, companies in that industry started wondering: "Do we really have to sew or staple the pages together to make books? Why not glue them together using assembly-line techniques?"

The available glues, however, were bad actors. In the bindery, they were temperamental to handle. It took hours for them to dry, and millions of books were standing around in American binderies every day. That meant extra space, extra handling, and a costly delay in the flow of operations. In service, they picked up moisture from the air, weakened, and books started to fall apart. Or in dry climates, they dried out, got brittle, and failed just as badly.

Then in 1944 the W. F. Hall Printing Company of Chicago wrote to the president of Du Pont, saying in effect: "With your research facilities and background in bookbinding and adhesives, we think you can help us with our problem. Can you develop an adhesive that will dry quickly, so we can trim our books right after binding? It's got to be strong and flexible—and stay that way under all climatic conditions."

Here was a chance for the Fabrics and Finishes Department to make an original contribution to bookbinding. So its technical men set to work.

After an intensive research program and construction of a special pilot plant, they presented Hall and other firms, both large and small, with a completely

new type of product—hot-melt adhesives based on a new synthetic resin.

Here were materials that were melted at high temperatures, applied to the backbone of a book, and would set immediately on cooling. Books could be trimmed right away, and the flexible bond was unaffected by humid weather. It looked like the old bottleneck could be broken.

Cooperating with the T. W. and C. B. Sheridan Company of New York, Du Pont engineers then worked on the problems of adapting machines to the new adhesives. To help iron out difficulties, Du Pont even built a complete bookbinding machine—a smaller replica of the giant units used in industry—in a laboratory of the Finishes Division at Parlin, N. J. The lessons learned from this engineering and chemical research made it possible for the binderies to swing into high gear.

The first widespread use of the new products was in the familiar "Pocket Books." More than a quarter of a billion of these economical little volumes are now in circulation. Says the director of manufacturing of Pocket Books, Inc.: "The use of Du Pont hot-melts has resulted in books that are more attractive to our readers, since they open flatter. We're very happy the adhesives don't change with changes in climate—and have the permanence and flexibility that were lacking in previous ones."

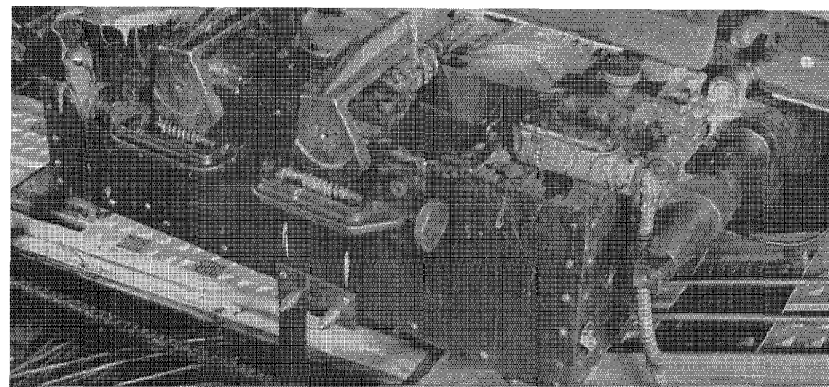
Next came certain types of catalogs, magazines, such as *Fortune*, and larger paper-covered books such as the \$1.00 edition of the best-seller, *The Cardinal*. Even some makers of hard-back or "edition" books began to replace their time-honored stitching process with hot-melt adhesives. The trend in that direction seems to be growing—and may someday be industry-wide.

Large sheets of paper are printed, folded into so-called "signatures," then gathered together by this machine.

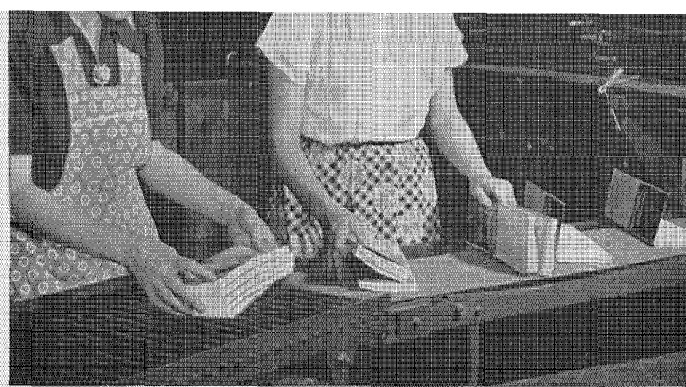


Here the adhesive is put in a heating unit, which will melt it so it can be applied to the backbone of the book.





Passing over rollers, the books pick up Du Pont adhesive. Then the covers, seen at the bottom of picture, are stuck on.



As the covered volumes come off the binding machine, they are stacked. Next, "double" books will be cut into single ones.

Where stapling is still used, Du Pont hot-melts are now being substituted for old-style glues to bind the cover to the book. In this use, they give faster operation, greater strength, and better appearance. When they're used with sewn books, they contribute again to quicker drying and more streamlined operation. Leading this change-over are the binders of magazines such as *Reader's Digest*, *McCall's*, and *Redbook*, and books including the novel, *The Egyptian*.

Many binderies using staples or sewing today may be on the road to hot-melts via so-called "notch binding," a recent development of Du Pont and other companies.

NEW ADHESIVES RAISE PROBLEM

When the new hot-melts first came out, they had one serious drawback. The binders had asked for moisture-resistance—so that's what they got. Then they found themselves impaled on the saying, "Be careful what you pray for—you might get it." During trimming, a little adhesive was sliced off along with the paper, and got into the scrap sold to paper or paperboard mills.

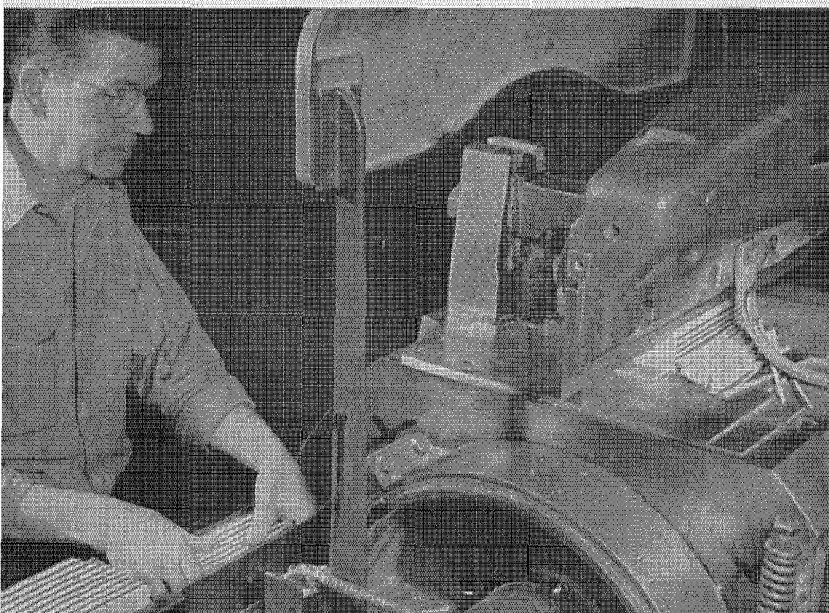
Of course, the old water-sensitive glues dissolved with no difficulty in the paper beater. Not so with the

hot-melts. When Du Pont chemists saw the paper-makers tearing their hair over the gummy deposits that were fouling their machinery and spoiling their paper because of the new adhesives, they got busy. The result of further research was an improved type of product. It was just as moisture-resistant as the earlier ones, but in a water solution that contained only about 1/10 of 1 per cent of alkali solutions in their operations, the situation was well in hand.

The future is full of interesting possibilities—especially in the light of increased amounts of improved hot-melt adhesives soon to come from new equipment being added at the Parlin plant. New developments—like those of the past—will be possible because of the cooperation of progressive bookbinders such as the following who played a part in bringing hot-melts to their present commercial success: W. F. Hall Printing Company, Colonial Press, Inc., J. W. Clement Co., McCall Corporation, R. R. Donnelley and Sons Co., Inc., and Kingsport Press.

Speaking only for the present, though, we can say that hot-melt adhesives are filling a need of long standing. They are giving faster, better operation in industry—and the reading public can enjoy sturdier, more attractive books and magazines.

In trimming, some adhesive is cut off with the scrap that goes to paper mills. New hot-melts don't cause trouble at the mill.



After the edges are colored, the attractive little books are ready for shipping. In use, they will take lots of punishment.



Brakes relined with a "Bang"

New Du Pont explosive rivets have proved to be a practical solution to an old problem

Heavy-duty trucks, highballing over our nation's highways, put brakes through real punishment. They do wear out. And the work of relining them has been costly and time-consuming for truck operators and motor transport companies. Why? Because it is necessary to remove the brake shoes, rivet on new linings, and reinstall them.

Was there another—and better—way? Could adhesives be used instead of rivets? Years ago that possibility was explored and methods were perfected. But the process involved increased tooling costs and the services of specially trained operators.

About 18 months ago Du Pont technicians thought this work could be done by using explosive rivets. After talking to brake-block manufacturers, field service men and automotive engineers, who liked the idea, it was decided to find out if the proposed method was practical. A long series of laboratory and field tests has since proved that by using explosive rivets the over-all cost of replacing brake linings can be reduced by approximately 50 per cent. In most cases, explosive riveting can be done without first removing the brake shoes from their anchor plates. By eliminating that item of expense, operators of trucks and buses can save a lot of time and money each year—and this without sacrificing the quality of the brake lining work.

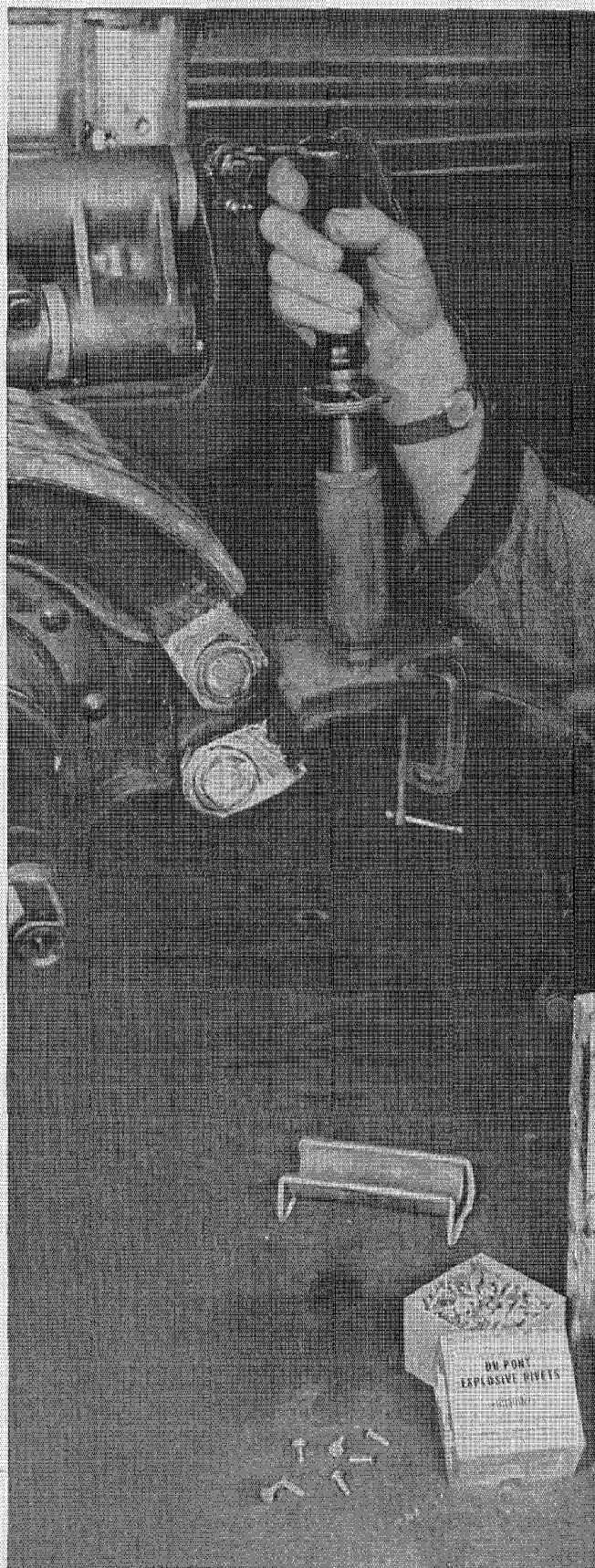
There are other advantages to be reported on that score, too. Dynamometer tests have proved that explosive rivets in service outperform the conventional ones set by hand. What's more, road tests show that linings fastened the new way are free from objectionable "brake squeal."

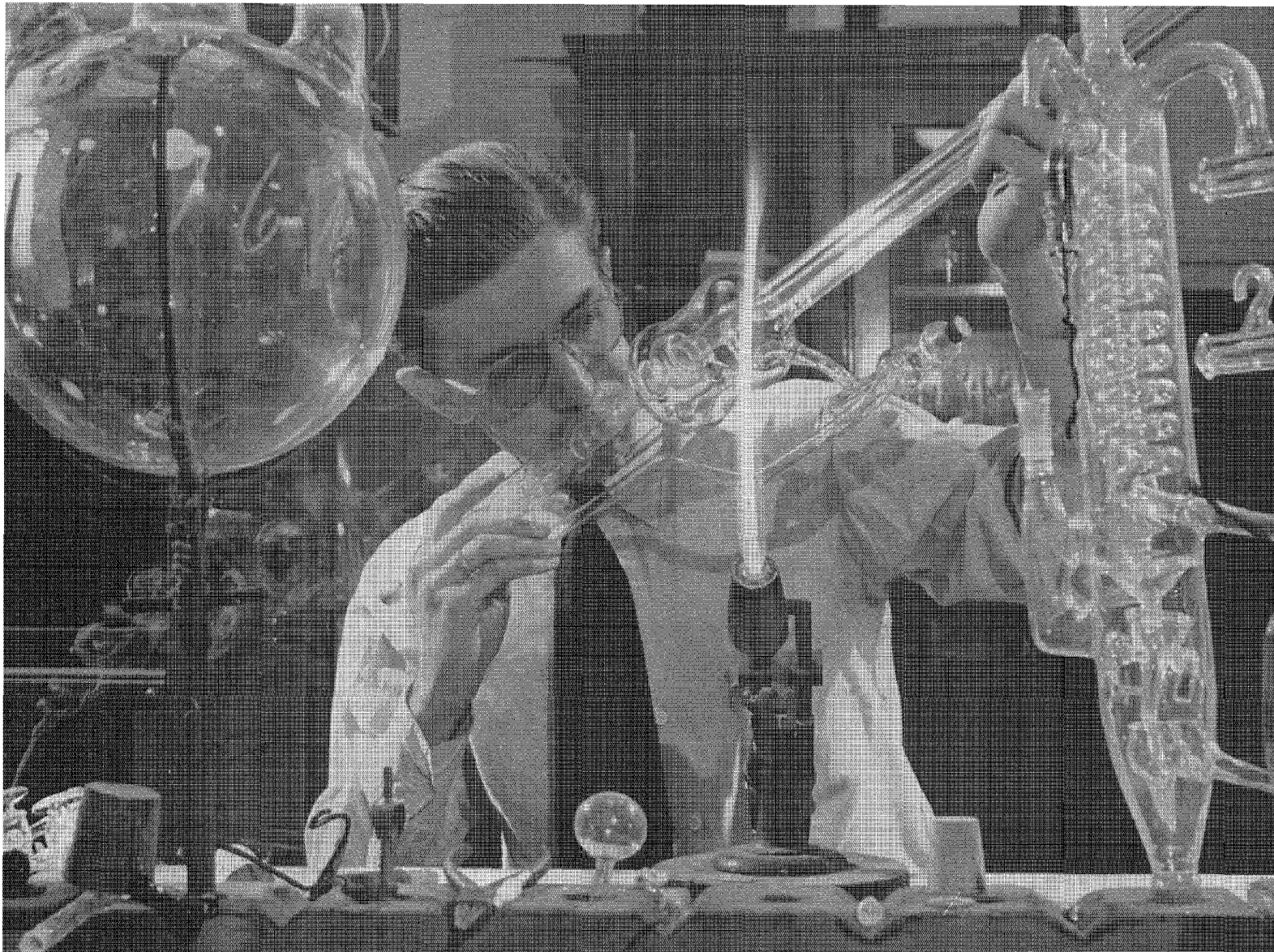
Manufacturers of brake equipment, proprietors of automobile repair shops, service managers and maintenance men, who have adopted the Du Pont method are enthusiastic about the use of these rivets. Following are a few typical comments:

A midwestern repair shop manager says: "We're getting more brake relining business since we began using Du Pont Explosive Rivets—nearly three times as much as before."

And this from a factory branch manager: "By doing my own relining, I save transportation charges. And I can give my customers two-to-three-hour service. That pleases a trailer operator who wants his equipment hauling pay loads nearly 24 hours a day. Soon I may have to keep open around the clock to take care of new customers."

Use of explosive rivets makes it possible to attach brake linings without removing shoes from anchor plates. This results in savings of time and money for operators of trucks and buses.





Ideas in glass

Glass blowers furnish scientists with the tools they need to search for new products

By JAMES H. McCORMICK

The glass blower's fires are as old as the Sphinx. Today glass is blown by hand for only a few uses, but this skill is still essential in the field of scientific research. Intricate equipment for the modern laboratory represents the highest peak of the glass blower's art.

More than 3,000 pounds of glass were used last year by the eight glass blowers at the Du Pont Experimental Station. That represented 5,107 jobs—about 600 for each man. One day the men may create equipment the size of your fingernail, and the next day turn their attention to towering high-vacuum distillation

units. They repair simple flasks and mend complex oxidation apparatus. They may blow and shape a piece of equipment in a few minutes, or work 50 or 60 hours on it.

Actually, a distillation unit like the one we have mentioned is not complex, in a glass blower's estimation, yet it takes 24 hours of working time to complete the 125 or so steps involved. Contrary to the popular notion, such objects are not blown from a mass of molten glass on the end of a long blowpipe. Glassware, purchased in the form of rods and tubes, is shaped, bent and blown to produce the finished apparatus.

For 20 years the glass shop at the Experimental Station has supplied specialized equipment for Du Pont scientists. However, its workers still face new prob-

lems. It is literally true that much of their work has never been done before. A project often requires some new combination of the art of glass blowing and the principles of applied physics. Much of the work done is of an exploratory nature, and strange-looking pieces are made to probe for fundamental information.

A frantic phone call or a scribbled rough sketch usually heralds the start of a new job. As one Ph.D. researcher explained, "I don't pretend to know any-

thing about making glassware. Sometimes I don't even know what the thing I need will look like. But I know what I need to do, and I rely on the glass shop to produce it."

Painstakingly the rough sketch evolves into a workable blueprint. Then, if the scientist's idea can be fashioned in glass, another tool is made to aid in the search for new products or ways for improving old ones.

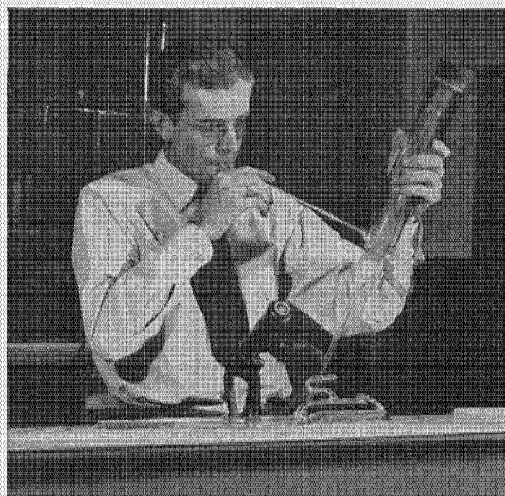
Through close cooperation between workers in glass and in research, apparatus for a job can be made quickly. Here a scientist goes over his rough sketches with a glassblower.▶

• • •

In creating a distillation unit to study a new chemical, a glass tube is first drawn or blown to the proper size. Rods and tubes of many sizes are raw materials of glassblowers.



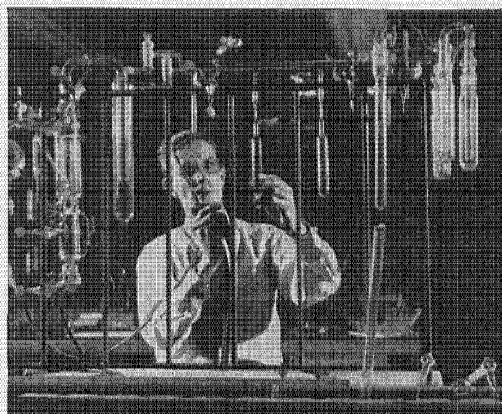
Workers know by the color of heated glass when piece is ready for shaping.



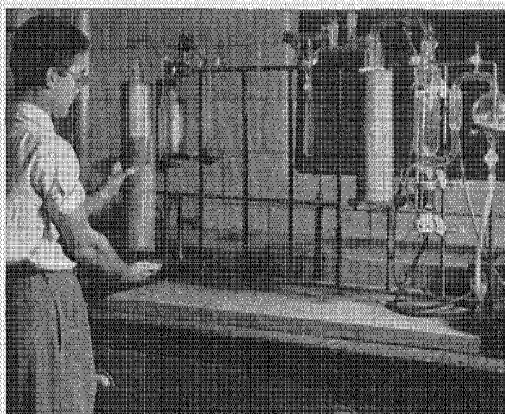
Here glassblower pulls a stem from tube. Such work requires care and experience.



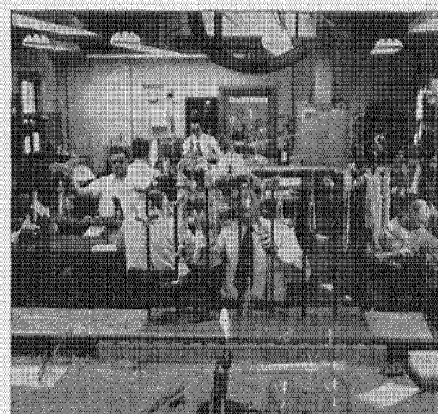
Annealing the tube to reduce stress and strains in the glass is essential.



Distillation unit almost finished. It has taken about 24 hours to complete.



In his research lab, a scientist soon puts the new piece of equipment to use.



An overall view of the glass shop, which was started in 1929, now employs 10 men.



Paint is his business

Service and good quality paints have brought success to T. P. Alexander, a typical paint dealer

Down in Owensboro, Kentucky, there are some twenty stores that sell paint . . . and Owensboro is typical of communities all over the country. There are thousands of retailers whose business is devoted to satisfying the paint needs of the nation, bringing beauty and protection to American homes.

In this field of healthy competition you'll find an outstanding example of the interdependence of manufacturers and retailers—for here teamwork is essential to success. Paint is a product of chemistry, and to make good paint requires a sizeable investment in plants and equipment. Constant laboratory control is necessary to maintain high quality. And painstaking research assures the public of a continuing flow of new and better finishes.

Because paint is a complex material, and because

different kinds of paints are required to do all the many jobs demanded of them, the man who sells these products in your community must be much more than just a storekeeper. The best paint in the world, if used on the wrong surface or in the wrong way, won't give you the results you expect. A good dealer must be a "paint expert." He must know his subject thoroughly, and it is his responsibility to see that you get the *right* paint for your particular job, and that you understand how to prepare the surface and how to use the paint properly. When you buy a suit, you can feel the material, try it on to see how it fits. When you buy a car, you can try it out to see how it drives. But you don't really buy a *can* of paint; what you do buy is an ultimate effect that will be evident only after the paint has been applied. Your satisfaction, therefore, depends on the integrity of the manufacturer, and the knowledge and helpful advice of your retail paint dealer.

There's a lot more to paint retailing than merely

selling Mrs. Brown the right kind of finish for her porch floor. Good customers of the paint dealer are local painting contractors—those master craftsmen on whose services it is always wise to call for any sizeable job. The dealer must be able to talk their language and give them technical information on products and new developments.

Then, too, there's the broad field of maintenance painting with which he must be fully conversant—the proper products and techniques to meet the special requirements of schools, hospitals, hotels, industrial plants, and the like.

Just being a good technical man, however, won't make him a successful paint dealer. He must be a good businessman with a sound working knowledge of advertising and merchandising. He must tell you and your neighbors about the paints he has to sell, or his competitors will get the business. By personal contact, or through group meetings, he keeps the painters informed of his services. And if he is a Du Pont dealer, he shows his maintenance customers the benefits obtained through Du Pont Color Conditioning.

Just such a businessman is T. P. Alexander, Du Pont paint dealer of Owensboro, Kentucky. Alex, as he's known to all his friends, has a store a couple of blocks from the Ohio River. There he retails Du Pont finishes, some products of competitors, and supplementary lines like paintbrushes and wallpaper. His business is good. "I've got about 20 stores competing with me right here in town," Alex says, "but I count on the service I give my customers and the well-known

quality of Du Pont paints to help me keep ahead."

Like most of America's store owners, Alex had to plan and save for his store. Soon after he went to work in 1921, as a \$125-a-month bookkeeper for the wholesale drug house of Mullen and Haynes, in Owensboro, he began investing his savings in the company's stock. As a sideline, the company operated a paint and wallpaper store that had handled the old Harrison "Town and Country" line, the forerunner of Du Pont finishes, and Alex sensed a real opportunity in this business. In 1942 he struck out on his own, taking over the paint and wallpaper business, even though he had become vice-president of that organization. In his first year as an independent merchant, Alex increased his business about 15 per cent, and it has continued to show a steady, healthy growth. But Alex doesn't take full credit for that.

"Be sure to mention my staff," he said. "They do most of the work." Today, 11 others help him run the store.

A ballplayer in his younger days, Alex still loves baseball. Occasionally he takes in a World Series game, attends many business conventions, and takes motor trips for his summer vacation. And, like all good businessmen, he has a sincere interest in civic affairs. But he doesn't neglect his paint store or his friends; he values them highly.

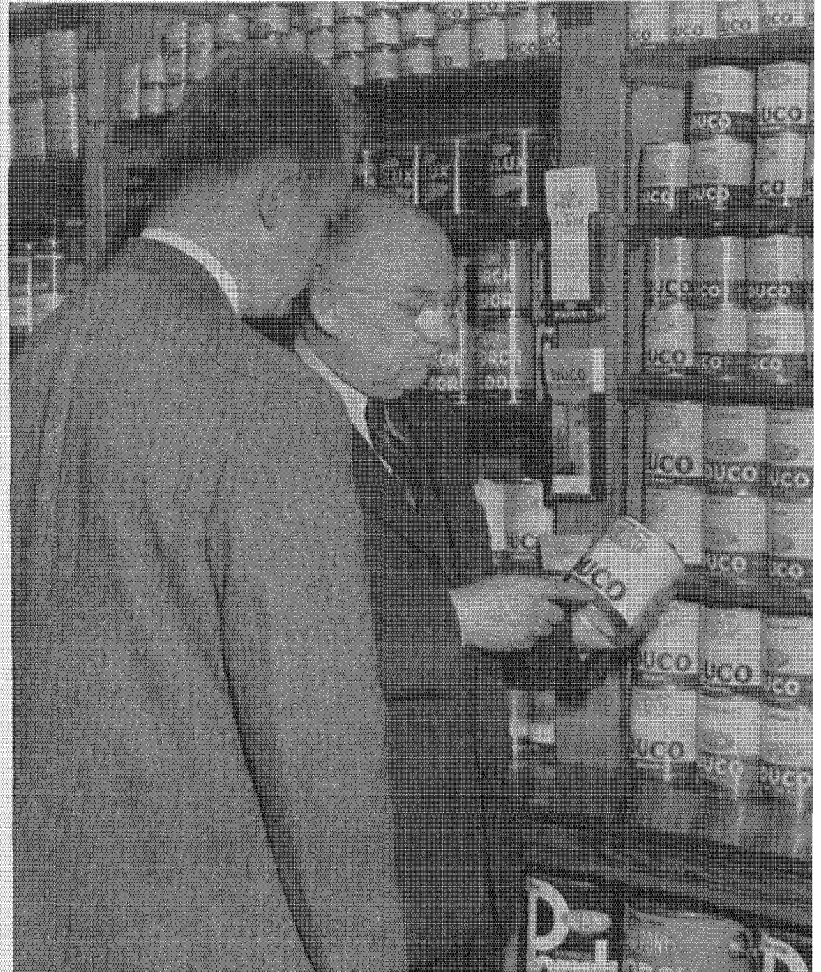
Yes, the successful paint dealer wins friends and customers by giving them the kind of service that will assure each one full benefits from the many fine finishes that modern chemistry has made available.

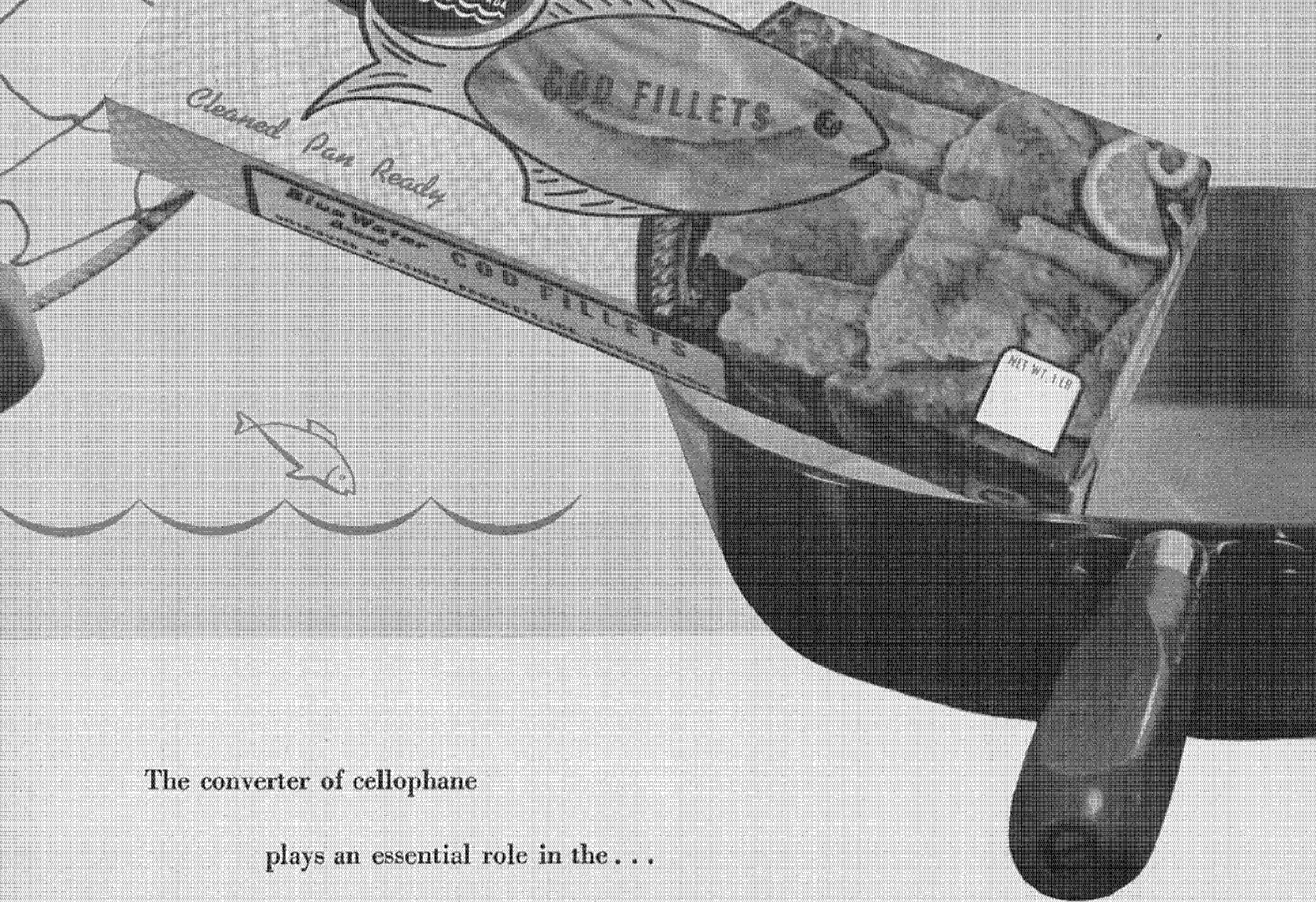
Alex, as his friends call him, gets his supper at a nearby boarding house. Catfish and fried chicken are his favorites.

Supplying a good product is only part of a paint dealer's job. He must also advise customers on proper way to use it.



Eleven others help Alex run his paint store. He is shown planning with managers of his paint and wallpaper sections.





The converter of cellophane

plays an essential role in the . . .

Birth of a package

By GENE BURKE

From the depths of the blue waters off Newfoundland to the skillet in your kitchen, this package over-wrapped with cellophane brings quick frozen cod fillets to your table with all their original ocean-fresh flavor. Though you may not recognize it, these packages are wrapped in the same protective cellophane that you are accustomed to find on such products as baked goods, nuts and candy.

However, there are two important differences. First, the film used, called MSAT 87, is especially tailored for frozen foods. Second, this transparent cellophane—one of the more than 50 types made by Du Pont—was transformed into a printed opaque wrapper by a middleman called a converter. The result is a protective wrapper with eye appeal plus.

Not many people might stop to think about it, but the converter helps to make shopping easier.

When your eye falls on a wrap he has printed, you immediately see the brand name and name of the product, and often a lifelike, colorful picture of the prepared food. Pick the package up and examine it more closely. You now see additional useful information—such as weight, number of portions, directions for cooking, and interesting recipe ideas.

PRINTING PROBLEMS SOLVED

To all outward appearances, this converter's plant, roaring with giant presses, looks like any other printing plant. The essential difference is that he has special presses to print on cellophane.

Printing on paper is an old art, dating back to one of the first known books published in the China of 868 A.D. But printing moistureproof cellophane presented new problems. Early in the days of their

development work, converters knew that this film, unlike paper, would not absorb ink. Since the ink would not dry quickly, smudging resulted and presses could not be run at high speed.

Quick-drying inks were finally developed to print the film successfully on high-speed presses. Among these are aniline inks which provide an inexpensive method of printing one and two colors.

—AND STILL MORE COLORS

Rotogravure, the method used to print the magazine section of many Sunday newspapers, produces one of the most beautiful cellophane packages possible. The wrap at the left was produced through the roto-

gravure process. With this method, so-called "reverse" printing is possible. Or, in other words, the illustration shows through the cellophane, imparting luster and life to the package.

You'll find that your local food store displays numerous packages printed in as many as seven different colors. The next time you go shopping, take a good look at one of them and note the rich, brilliant colors and the clear, sharp pictures and type.

Through their technical skill, the converters of cellophane have brought a touch of sparkle and glamor to products on grocery shelves. Their work plays a big part in making your shopping jaunts a quick, simple job instead of a chore.



First step in producing a printed cellophane wrap is taken by the creative artist who makes a decorative design. Colors, size, and form are carefully considered.



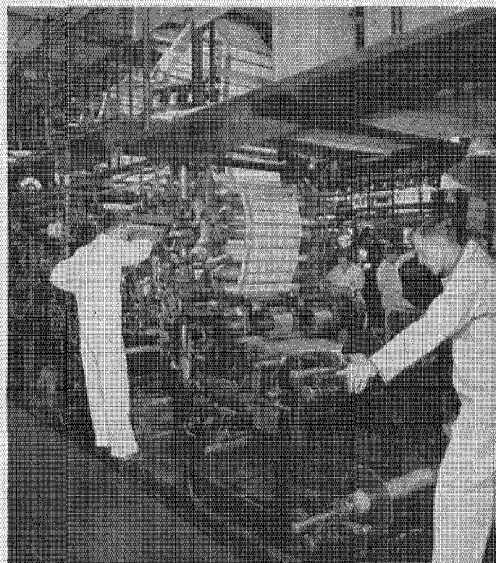
Next the laboratory technician checks the type of cellophane chosen. He makes sure that the packaging material is functionally correct for the product to be wrapped.



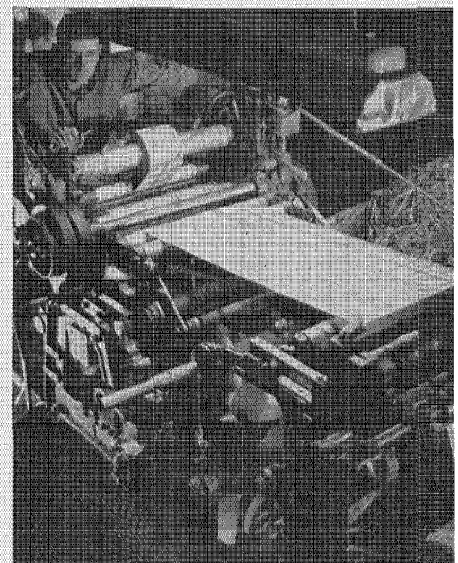
Production gets under way after design and packaging materials receive final approval. Here printing cylinder is prepared for etchers. Seven may be needed for job.



Now the design is etched on the printing cylinders. Microscopic accuracy is needed to insure proper reproduction. A separate cylinder is etched for each color.



These roaring high-speed rotary presses, specially built for the converter, transfer the design from the etched cylinders to rolls of the glistening cellophane film.



After printing, the film is wound on rolls for the manufacturer to use on automatic packaging machines. Finished packages make their debut in thousands of food stores.



Peroxides war on waste

How a Du Pont bleaching process saved about \$2,500,000 worth of wood last year

"In every decade, the paper industry hits on something big that helps improve its operations," says an official of the St. George Pulp and Paper Company. "We believe that today's new page in the history of our industry is the peroxide process for bleaching groundwood."

This gentleman's firm—a large producer of pulp for facial tissues and other uses—was the first in Canada to install the relatively new Du Pont process. It is typical of a number of mills here in the States that have discovered this route to more and better paper from the woodpile.

The idea of using peroxides on groundwood was in the air back in the '30s. There was a serious need for such a process. Many newsprint mills and other producers found they had to make higher grade papers. They wanted to do it economically, of course, and the grinding up of the whole log into so-called groundwood pulp is much more economical than chemical cooking processes which destroy about half the wood.

It was common knowledge that groundwood made

paper more opaque and gave it fine printing properties. But it wasn't white enough for higher quality papers. It carried all the natural discolorations of the wood, which were hard to remove. So it had always sat, Cinderella-like, at the hearth of the paper industry expecting to be assigned to coarse cheap products.

Then Du Pont research workers tackled the problem, and found that peroxide bleaching would increase the brightness of the pulp considerably. It also gave the finished paper a smoother, more velvety feel, and greater absorbency for water as well as the oils in printing inks. After a four-year study of the process, they drew up recommendations for operating conditions in the mills.

The first large-scale trial was made in 1941 at the Norfolk, N. Y., mill of the St. Regis Paper Company, where magazine stock was being prepared. The sheets, containing 60 per cent bleached groundwood, passed the quality test at a very welcome reduction in cost. They took inks well, and had less tendency to fuzz or lint.

Following a delay caused by wartime restrictions, the process was extended to other mills. Bleached

groundwood paper began appearing in more and more books, magazines, catalogs, telephone directories, tissue, toweling and other uses in which extreme strength and durability are not of prime importance.

How a mill uses bleached groundwood depends on what it's after. One company may use the same percentage of groundwood it always did, changing from unbleached to bleached pulp to get added brightness and other advantages. That's what leading companies did for the papers that go into *Time*, *Life*, *Reader's Digest*, *Business Week*, and other magazines. Blandin Paper Company reports: "The printing industry has reacted favorably to bleached groundwood in our grades, because of the improvement in color and cleanliness."

Other companies may be chiefly interested in reducing their costs, which they can do in two ways. First, they can make lighter-weight sheets. To quote *Paper Trade Journal*, "Lightweight sheets, which can now be made both opaque and good in appearance and stability, are in a position to take full advantage for the first time of their natural economies over heavier papers." Second, the paper formula can be changed, increasing the amount of groundwood. Savings of 10 to 20 per cent in fiber costs are possible in this way. Even some chemically-made pulps are now bleached with peroxides. For example, at the Bucksport, Maine, mill of St. Regis, sulphite pulp is combined with

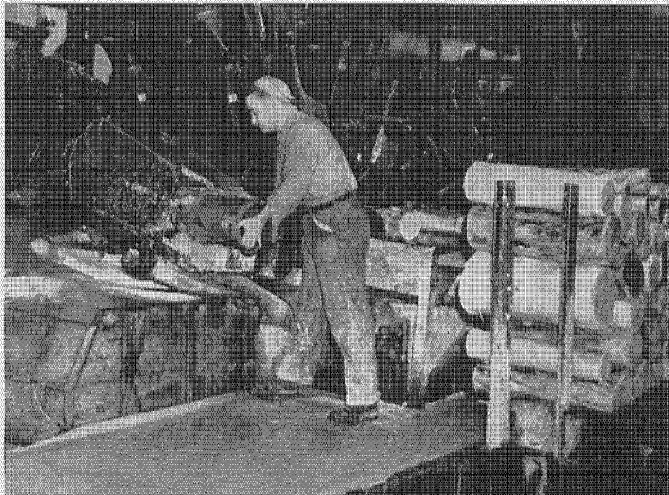
groundwood and the book-paper mixture is treated by a continuous peroxide process.

The need for conserving natural resources is adding its push to the increased use of bleached groundwood. Take the pulp from one log, for example. As it goes through chemical treatment, it loses 45 to 55 per cent of its fiber. But turn it into groundwood pulp, and you retain 95 per cent or more of the fiber, with a weight loss in bleaching of 1 per cent or less. Apply that to a forest full of trees, and you can see the tremendous possibilities. A St. George official says: "Raw wood is coming to be very limited in a lot of places, and the Du Pont peroxide bleaching process will help in the conservation of forests."

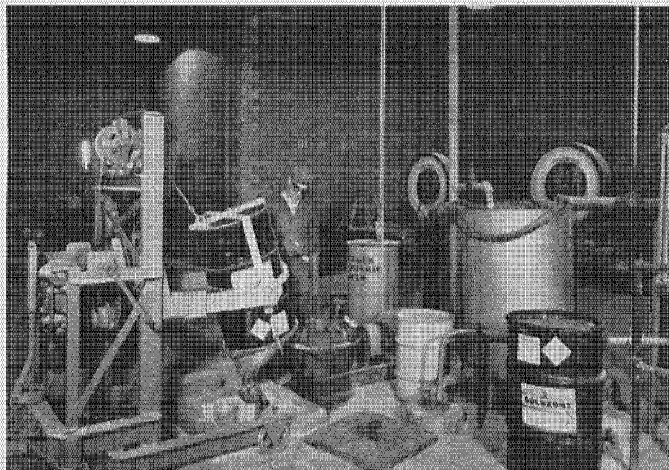
About a dozen companies like this one have earned considerable credit for the success of groundwood bleaching. Working side by side with Du Pont technicians, their technical and production men have had an active part in bringing the process to its present state, and finding ways to use this pulp in a wide range of papers.

The printing trade and publishing industry can take a curtain call, too, for their valuable help in improving the printing properties of the new types of paper. Wholesome cooperation like this among several industries brings you better paper in the most economical way possible.

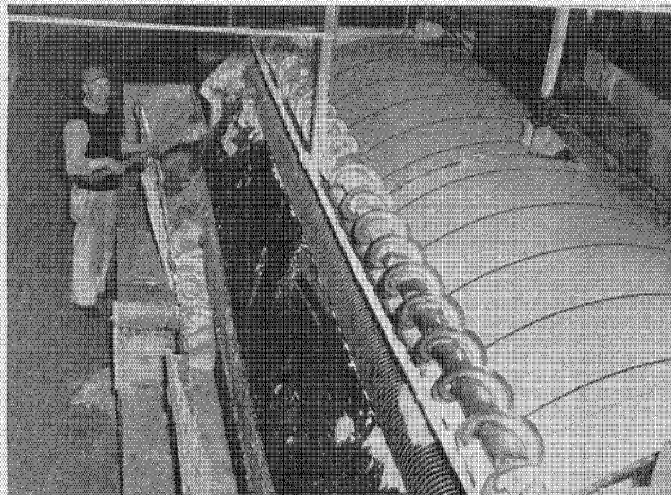
After being debarked and sawed into convenient lengths, logs used in paper manufacture are ground up into small pieces to convert them into mechanical pulp.



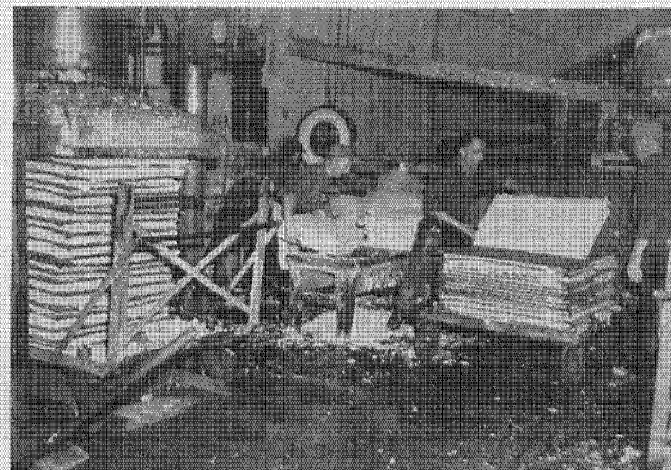
Hydrogen peroxide, in a form suitable for bleaching, is prepared from sodium peroxide and sulfuric acid. Here an operator charges a mixing tank on the floor below.



Next, the groundwood goes to this "vacuum thickener," a porous revolving drum that reduces the water content of the pulp in preparation for peroxide bleaching step.



Now "laps" of bleached groundwood have water pressed out of them before they are shipped to paper manufacturers. Practically no pulp is lost in the operation.



The U. S. produces 4,000,000 tons of tinplate a year.

The "Halogen Process" has helped set the record for the...

World's fastest tinplating

By J. A. JONES and W. R. HUEY

In Bohemia during the Middle Ages, the idea was conceived of "combining the strength of iron with the nobility of tin"—and the tinplate industry was born.

Today, in the world's largest tin mill in Weirton, W. Va., a strip of steel races through an electrolytic bath at speeds up to 2,000 feet per minute, producing high quality tinplate faster than it has ever been produced before. Speed is essential in electrolytic tinplating. Other things being equal, the plant which whips strip steel at greatest speed through the many and complex phases of the plating equipment will sell the most tinplate. Since the war, when the electrolytic process really got going, steel companies have been spending large amounts of money in developing high-speed lines.

Weirton Steel Company is the pacemaker.

In the late '30s, the steel industry discovered how to make electrolytic tinplate continuously, but it faced a difficult production problem: operation must be economical. To solve this, a high-speed electrolytic

solution was needed that, with a minimum of control and inspection, could take a "terrific beating" without loss of quality.

Acid and alkaline processes had already been fully tested. Demerits in each case far overshadowed the merits for high-speed plating. Then Du Pont electrochemists joined forces with the Weirton Steel Company to place in production the Du Pont Halogen Tinplating Process—the only electrolytic solution to meet the requirements of Weirton's high-speed plating lines.

A small pilot plating plant was installed in a corner of the Weirton tin mill in 1938. By 1942, a commercial halogen bath was "in action," and played a vital role in helping to win World War II. Tinplate

Tin bars are placed in Halogen Tinplating Process electrolytic bath.

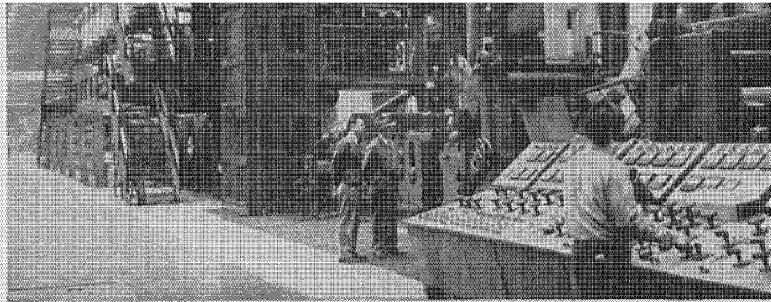


made by this electrolytic process uses only about one third as much tin as the older "hot dip" method, and helped this country to squeeze through with the limited supply of tin available.

This bath, originated in Du Pont laboratories and first applied commercially in the Weirton plant, overcame most of the difficulties experienced with the sulphate system; but it had some undesirable characteristics. Additional research and production experience have since eliminated most of these.

The halogen solution was selected for the "big job" at Weirton because of its excellent conductivity, which means minimum plating power consumption. The bath is easy to control for quality and top performance. A unique feature is its low brightening agent requirements. This contributes to the freedom of organic material in the deposit obtained from the solution. Experts agree that deposits of high purity have greatest corrosion resistance.

Needless to say, the halogen solution plays a vital role in the highly-efficient, new No. 4 line at Weirton. This huge electrolytic line, the largest in the world, officially went into operation in April 1950, only 14 months after construction was started. From the entering end of the line, steel strip travels through a series of cleaning and pickling tanks in preparation for the plating operation. Finished tinplate rolls off the exit end of the line at approximately one mile every two minutes. The halogen bath is contained in 24 plating cells, 12 on each of the first two decks of the three-deck plater. The band of steel weaves through these three decks much as a sheet of newsprint races through a modern printing press.



Control panel and overall view: Weirton's No. 4 electrolytic line turns out tinplate at world record speed.

The strip moves through the cells on the first deck to plate the underside and reverses direction passing through the plating cells of the second deck. On the trip through the second deck, the opposite side of the band is coated and, switching direction again, the strip is rinsed and washed on the third deck as it resumes its original direction of movement.

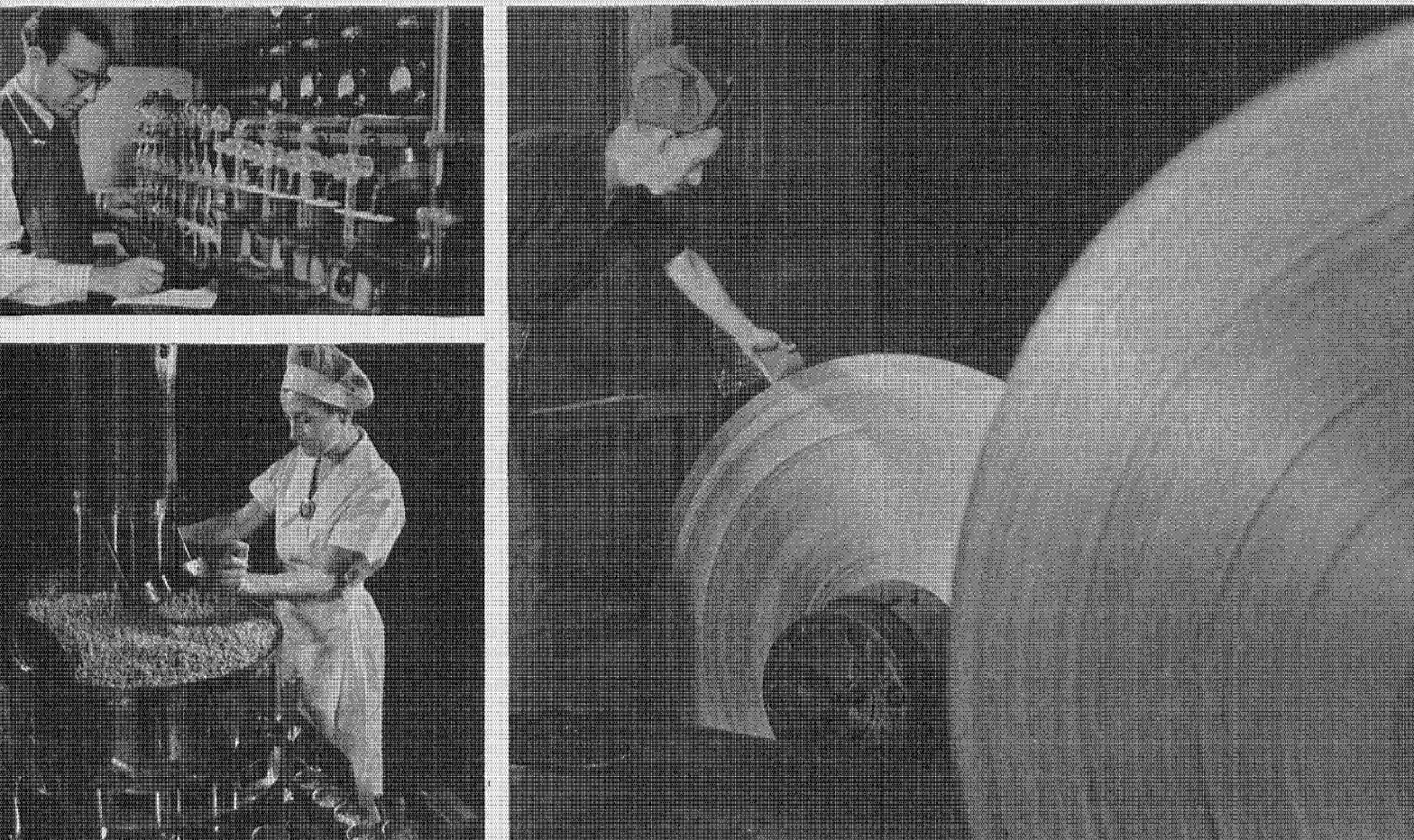
The plating solution is pumped into each cell from a 15,000-gallon storage tank. Weirton buys some of the stannous chloride and other chemicals that make up the plating solution from Du Pont.

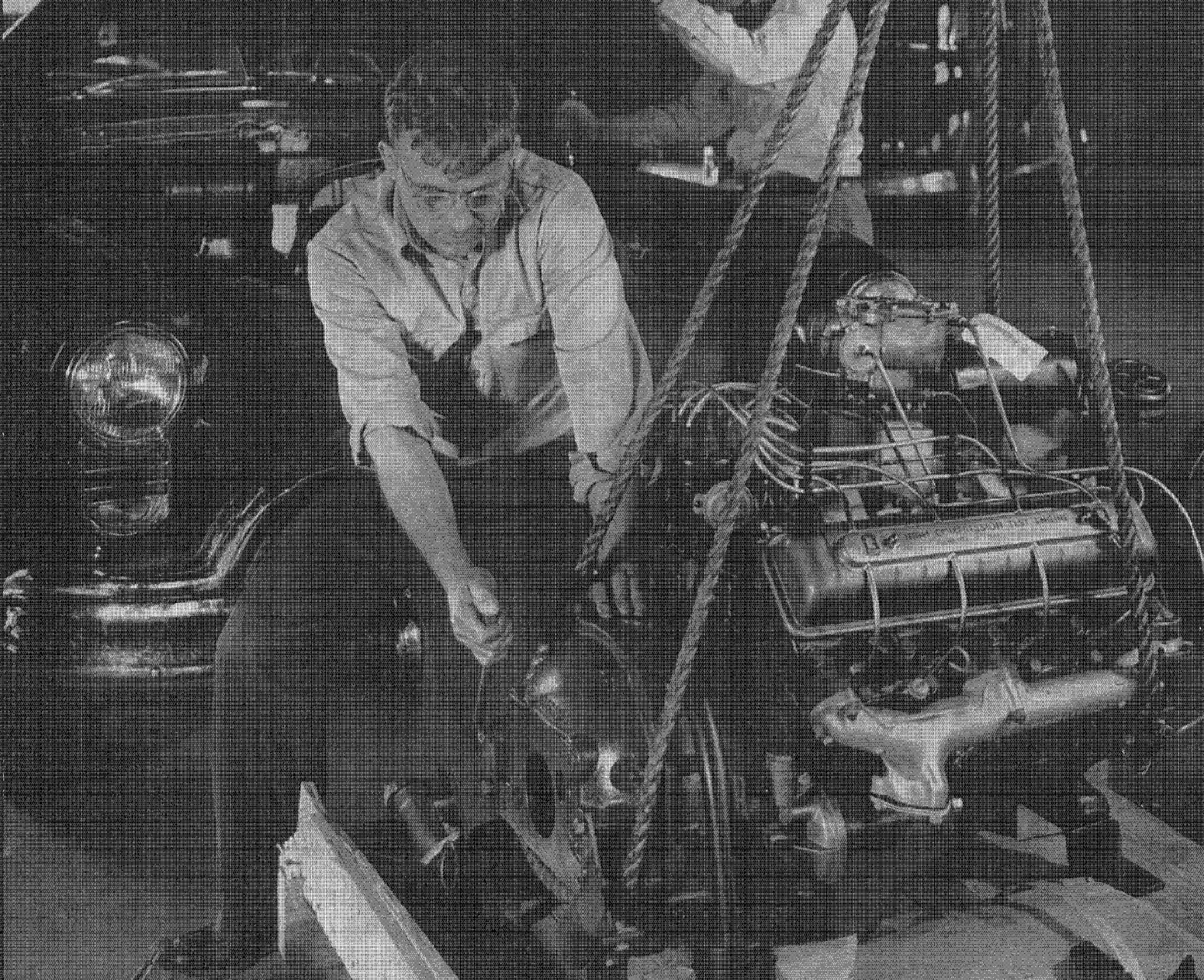
For the first time in history, electrolytic tin-coating processes, born of chemical and engineering science, have accounted for more than half of all tinplate tonnage. Last year, 54 per cent of total tinplate production was electrolytically coated, according to statistics of the American Iron and Steel Institute. Only nine years ago this production was so small that the Institute did not report it. It is anticipated that the electrolytic process will continue to gain.

Weirton chemist checks amount of tin on plate. Tinplate is used for making tin cans.



These coils were plated with tin at high speed in the halogen bath originated by Du Pont chemists and first applied commercially in the Weirton Steel mills.





Here, an experimental engine is being installed in a Du Pont fuel-test car.

They work on tomorrow's problems

By J. J. MIKITA and D. C. McSORLEY

Engineers of Du Pont's Petroleum Chemicals Division are at work now checking fuel requirements of tomorrow's car

If you have traveled on the roads of Southern New Jersey recently, you may have met two cars which, to all outward appearances, look to be standard 1949 Oldsmobile Sedans. But if you could have lifted the hoods, you would have seen that these cars had special research engines. They are high-compression-ratio en-

gines, hand-made by the Research Laboratories of the General Motors Corporation. These two cars are part of the road-test fleet maintained and operated by Du Pont's Petroleum Chemicals Division for research on fuels, tetraethyl lead compounds, and other chemicals for improving gasoline.

Throughout the country, research laboratories of the petroleum companies are also operating road-test cars with similar research engines. And the automotive industry, too, is experimenting with many new designs in its never-ending effort to improve the engines of the future.

Since the first automobile engines were built, research has resulted in continually improving their performance and efficiency. During the past 20 years the gasoline mileage of the average passenger car weighing 3,200 pounds has increased from 17.6 to over 23 miles per gallon at 40 mph. This means that the fuel bill of the average motorist driving a post-war car has been reduced more than 30 per cent. Not only is today's car more economical to operate, but its power and performance has been greatly stepped up over its counterpart of 20 years ago.

What has made this possible? To whom should the credit go for these improvements in economy and performance? The answer is the research and development laboratories of the automobile industry and of the petroleum industry. Working cooperatively, they improved both the engines and the fuels. Half of the saving has been the result of engineering-design improvements made by the automobile industry. The other half can be directly attributed to better fuels which have been developed by the petroleum industry.

The chemical industry also has played an important role in making these gasolines perform better by supplying tetraethyl lead compound. Refiners add it to step up the antiknock quality. Du Pont was the pioneer producer of this important fuel ingredient. Since 1923 it has produced over 2,000,000,000 pounds—enough to treat more than 250,000,000,000 gallons of gasoline. This Company also supplies antioxidants and a metal deactivator for improving gasoline quality, as well as dyes for product identification.

Although cars and fuels today are at a high stage of development, progress has never ceased. As in the past, the fuels of the future must be tailored to the engines, and engines must be designed to utilize these fuels most efficiently. So, in dozens of laboratories, engineers and chemists are now working toward better fuels and engines for tomorrow.

The two Du Pont test cars are equipped with the type engines which may power the 1955 or 1960 model cars. They are testing fuels such as motorists have



Years of careful testing and development are required before new engines and fuels are approved for commercial production.

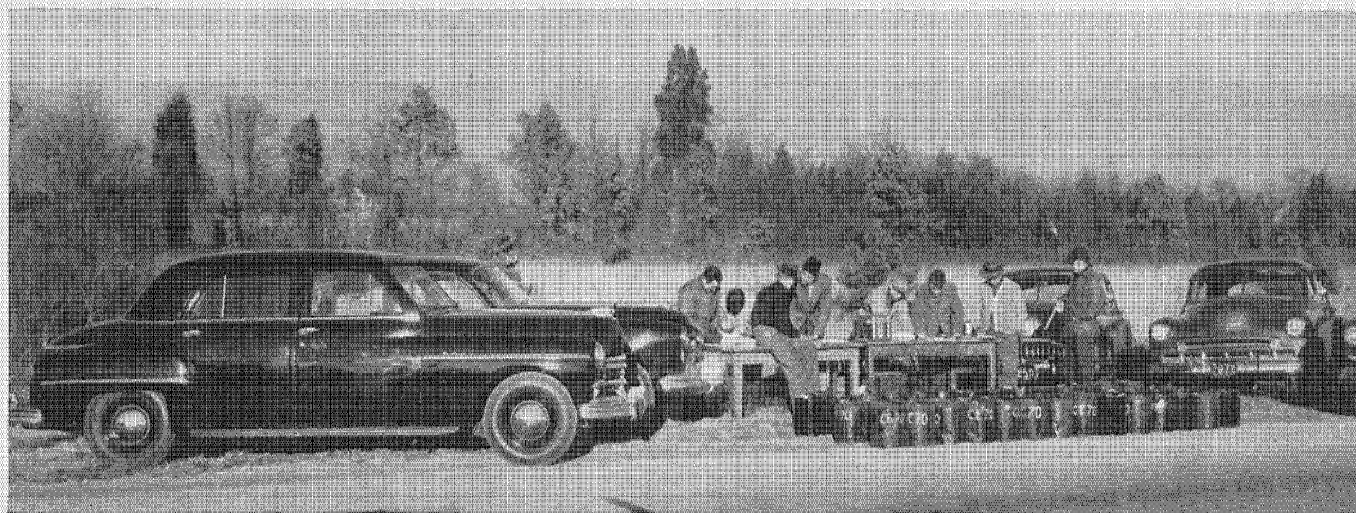
never seen or used. The engineers want to know what type of gasoline and fuel additives will perform best in these engines.

This is an exciting, modern game. What are the rewards? Ask one of the engineers, and he will tell you: "We want to develop fuels and fuel additives that will permit engines to operate at higher thermal efficiency."

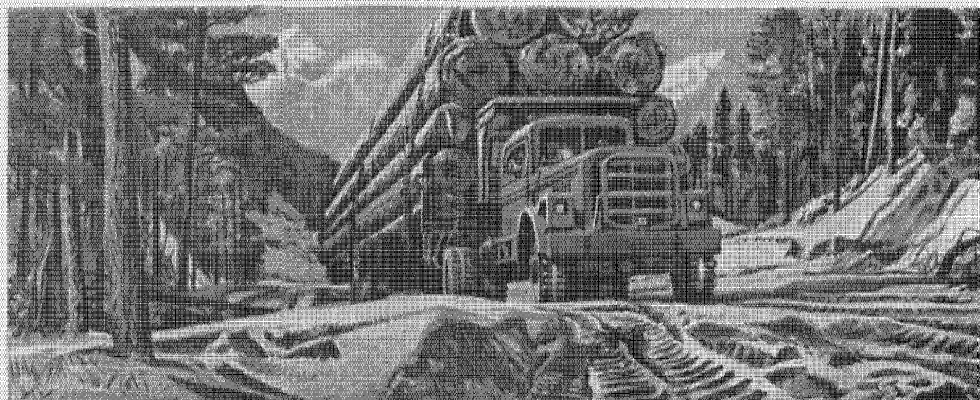
What does this mean to the motorist? Simply that with efficiency again stepped up, mileage will again be improved over the present new-car average of 23 miles per gallon.

Exciting? Yes, indeed, as exciting as any game of skill. The problem is there and the lines of attack are more carefully planned than any maneuver in a chess game. The rewards will go to the motorist in better, more economical transportation.

The two 1949 Oldsmobiles, with the research engines, are being used as part of this test fleet.



Paper is better now



Paper itself is fundamentally a chemical product, but it has been greatly improved by the use of today's better chemicals



"Improved paper products—and the many new ones—are largely due to new techniques plus better chemicals," said an eminent papermaker. Let's look at some of these better chemicals to see how they benefit you and me.

If you hold up a sheet and see holes or transparent spots, it's a good bet that deteriorating micro-organisms have gotten into the paper pulp during manufacture. Du Pont "Lignasan" X bactericide and fungicide can kill these organisms, thus eliminating a serious slime problem, speeding up production, and making a better grade paper. The whole clean-up job can be as simple as tossing a tiny bag of "Lignasan" X into the pulp. Four ounces will treat a ton of fiber. This compound will also keep organic paper-coating compositions from spoiling.

Dyes are a "must" in papermaking, even for white paper, and Du Pont is a large supplier. Just as a

housewife adds bluing to her wash to make white things whiter, so are white papers tinted to obtain a more pleasing white. Our daily newspapers would be gray, drab and difficult to read were it not for the tiny amount of tinting that is added to the pulp in the beater. Actually, one can select from about 200 different blues and violets to produce just the tint or shade, brilliance and light fastness desired.

Colored paper adds eye and sales appeal to the things you buy. Examples are numerous. The brown fluted candy cup makes the ideal setting for fine chocolates; lemons are usually wrapped in attractive yellow paper, and red glassine cups used for baking cup cakes catch the shopper's eye.

COLORS FOR IDENTIFICATION

Paper is dyed for purposes of identification. Race-track betting tickets are printed on many distinctive colors and shades to minimize counterfeiting, and business stationery and forms are in different shades to aid in filing and handling.

Colors are often recognized as trade-marks. You look for a green wrapper on one soap, and blue for another. Colored cigarette packages proclaim almost all of the popular brands. Leading stores, too, use distinctively-colored wrapping paper, boxes and bags.

Du Pont furnishes the paper mills with a practically endless list of colors for many types of jobs.

Fairly recently a packaging problem arose in connection with fresh produce. Many vegetables, packed in ice and shipped across the country, are wrapped in dyed paper for added eye appeal. The problem here was to color the paper so it would not stain the food, or make it unsafe to eat. Special dyes were developed to meet these requirements.

Other Du Pont materials, too, improve paper products. The Grasselli Chemicals Department is proud of "Quilon" stearato chromic chloride as a water repellent and sizing agent for paper.

ICE-MAKERS TRY PRODUCT

"Let me tell you about an ice company using paper bags treated with Du Pont 'Quilon'," a Grasselli spokesman said. "It was started on a test basis. Their officials are now so sold on containers treated with 'Quilon' that one of them listed for us 10 advantages of the coated paper containers. He said the customer, for instance, appreciates the convenience and ease of handling of ice delivered in a sealed paper bag, and he knows the product has had no chance to become contaminated."

Another use of "Quilon" is for coating poster paper for outdoor advertising. Here again, as in butcher's wrap and multi-wall containers for cement,

fertilizer and the like, water-repellency is the prime function of the product.

Another interesting family of Grasselli Chemicals at work in paper mills are the amine sulfamates. Primarily, these are paper softeners, improving the appearance and characteristics of household items such as paper draperies. The chemicals also make paper less flammable, and reduce cracking of paper containers.

AROMATIC FOR GUM TAPE

A New England gum-tape maker told of one of chemistry's latest contributions to the paper industry. "For years," he said, "our gum tape had a disagreeable odor because of the animal glue we used, and other adhesives cost too much. Now we add a Du Pont industrial aromatic to improve the odor. We can reodorize about two tons of glue for something like a dollar. That's really adding nose appeal without hurting your pocketbook." Samples of the glue and paper actually used were tested in Du Pont's Fine Chemicals' laboratories to find the best aromatics to recommend.

American mills, all told, use hundreds of chemicals to help them turn out products at the rate of 20-odd million tons a year. It's the chemical industry's contribution to better papers.



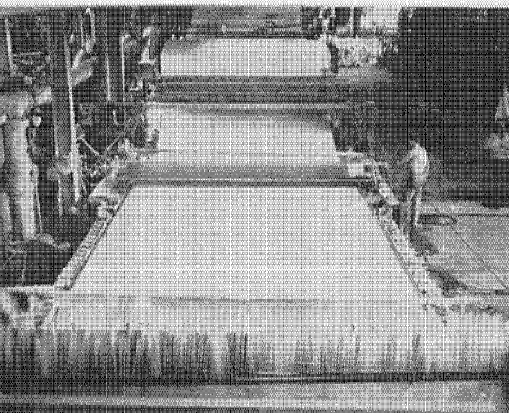
This supply of domino-sized wood chips will supply a big paper mill for only a few hours.



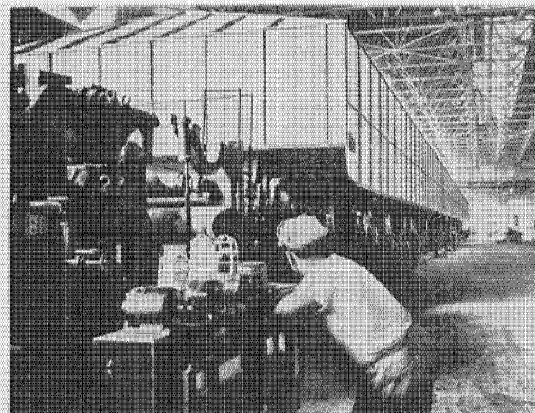
In this beater, a revolving wheel separates the wood fibers. Du Pont dye is being added.



To make good papers, mills run a great number of tests. Here a sample is taken.



Wood pulp and water flow onto this moving Fourdrinier wire, and paper forms quickly.



Heated drums in this unit remove the excess water from the newly-formed sheet of paper.



Du Pont chemicals for paper mills are as varied as formaldehyde and sodium CMC.



Stop, look, listen

There are hundreds of useful products worth seeing in the Du Pont Exhibit at Atlantic City

In the early '20s when Owen D. Young accepted the post as board chairman of the General Electric Company, he said: "Only one danger confronts us. The future electric development of the United States is bound to be enormous. No one can prevent it, and all must profit by it. The danger is that the growth of our industry will outrun public understanding; that people will see and fear our size without understanding our service . . ."

The American chemical industry, too, was then growing rapidly. And this Company was expanding and diversifying its manufactures. The public didn't know much about Du Pont's new products or their industrial uses. Advertising and publicity helped some, but it wasn't easy for people to visualize chemical products in their service role. So, as an educational aid, it was decided to establish an exhibit where the public could see a representative collection of merchandise—finished articles made wholly or in part of Du Pont materials.

Atlantic City seemed a good place to stage this show. Millions of people from coast to coast—a good cross-section of our nation's population—visited this seaside resort. Many business, trade, professional and civic organizations held their annual meetings there,

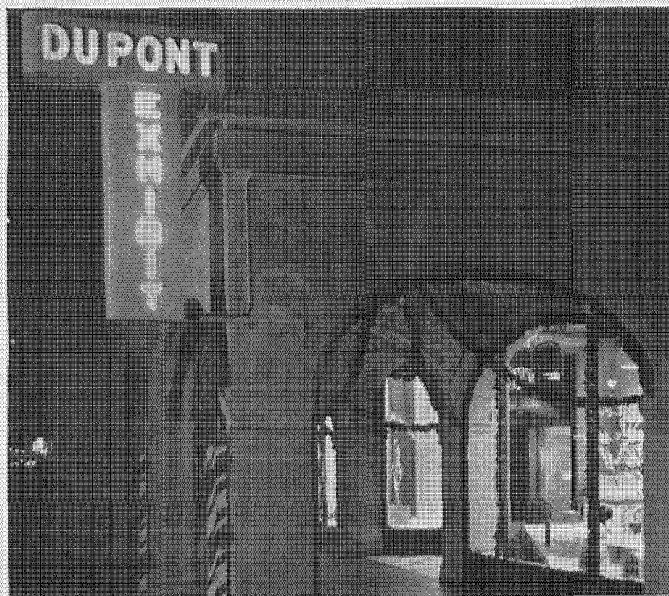
and great crowds night and day strolled up and down the Boardwalk, carefree and in the mood to stop, look and listen. So in the spring of 1916 this Company leased a small Boardwalk store not far from Heinz Pier, where those "57 varieties" were displayed.

Soon it was obvious that Du Pont's little showroom was too small to house the chemical exhibits and the crowds that came in to see them. But three years passed before more spacious quarters could be obtained in the "Haddon Hall Block." Today, with 6,000 square feet of floor space, as many as 50 individual exhibits can be shown at one time—and they are changed frequently. Always there are new things to see at this Exhibit, now in its 34th year. That's why it continues to grow in popularity.

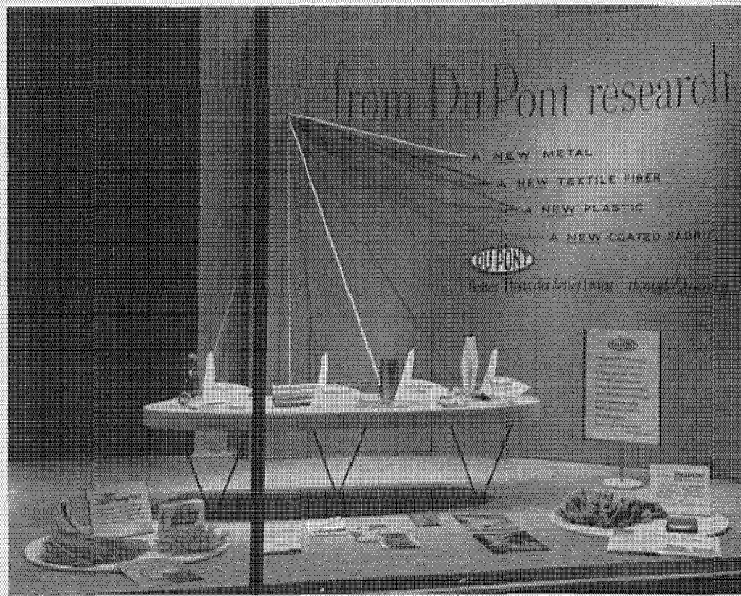
Nearly 20 million people have learned by seeing how Du Pont materials and services figure in those "Better Things for Better Living . . . through Chemistry." The average annual attendance has been well over a million during the past ten years, and as high as 1½ million in a single year.

Casual visitors usually are astonished to learn that of all the materials Du Pont makes, only about 12 per cent of them are prepared for the ultimate consumer's use—products such as plastic combs, toothbrushes, cellulose sponges, paints, antifreeze compounds, chemical specialties and the like. But the processing chemicals and products—such as ammonia, rayon, pigments, synthetic resins, neoprene and so on—constitute some 88 per cent of the total. Large and small manufacturers

Midnight under the portico in front of the Du Pont Exhibit. As you'll note from the window displays, it's Christmastide.



What's new in Du Pont research and development? That's the theme presented on the Boardwalk for public information.





Informative lectures and interesting demonstrations point out to visitors how chemistry fits into their daily lives.

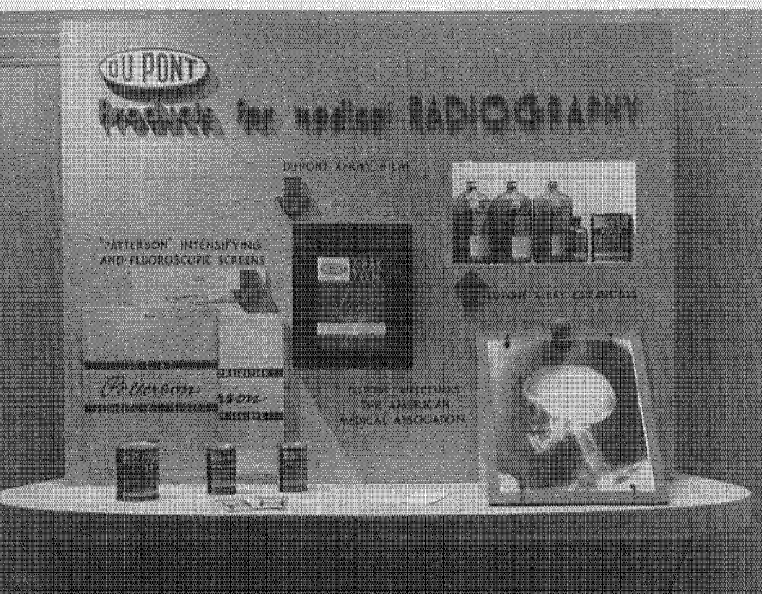
and fabricators buy and use these materials in making their own products.

While representative items in both groups are displayed, those of the "submerged" 88 per cent, because of their industrial importance in our nation's economy, are given a prominent place in this Exhibit. The fact is, many Du Pont chemicals are entirely consumed in manufacturing processes; you cannot see them. But a lot of the other materials can readily be visualized on and in the finished products of this Company's customers. Documented exhibits of this kind are of general interest to the public at large and to technically-minded visitors as well. Thus, the part chemistry plays in our nation's industries can be seen effectively, and the services rendered can be more completely understood by the public.

Many displays are arranged primarily for the benefit of delegates attending conventions. For contractors, explosives and blasting accessories; for textile manufacturers, rayon and nylon yarns, water repellents, chemical bleaches and finishing agents, dyes, and so on.

Often trade-show displays, designed for expositions in other cities, after serving their original purpose, are

Delegates to the American Medical Association convention were attracted by special products for radiographers' use.



Guest lecturer Peter Hunt of "Transformagic" fame explains how old furniture can be made artistically into new things.

brought to Atlantic City and restaged for the public at large to see. For example, a large Du Pont display recently prepared for the Society of the Plastics Industries Exposition on Chicago's Navy Pier, was later shown in its entirety at 1121-23-25 Boardwalk.

Du Pont's industrial departments are continually developing new products and collaborating with customers in finding applications for them. Departmental displays of these new products and better uses for old ones are shown to advantage here.

Seasonal considerations also influence the selection of materials for display. Each spring and fall, for example, house paints get the nod. Textile products predominate at Eastertide, and refrigerants and nylon bathing-suit displays are appropriate in the hot summer months. Before the first frost, antifreeze compounds, hunting apparel, Remington guns and ammunition fit into exhibit schedules.

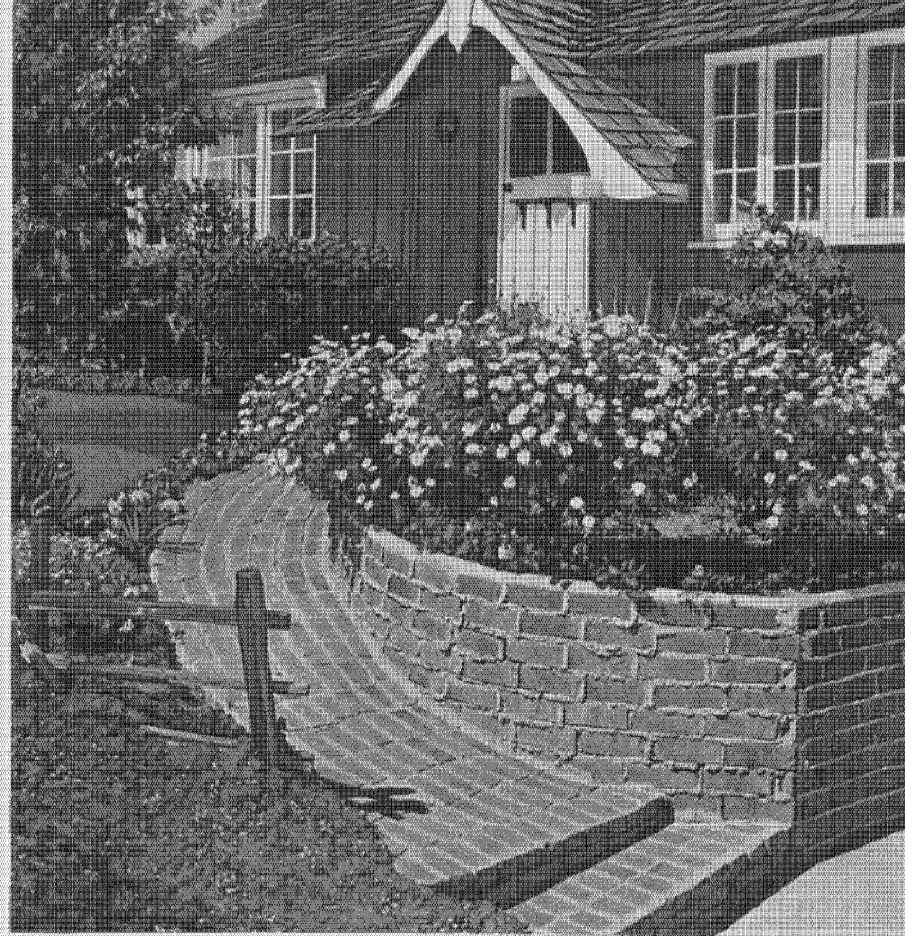
At the rear of the Exhibit room, visitors witness demonstrations and motion pictures, and hear brief lectures pertaining to Du Pont's research and manufacturing activities.

If you plan a trip to Atlantic City, accept our invitation to visit this Exhibit. Stop, look, and listen.

Window displays of high-style fashions and dress goods are seasonal and of sure-fire appeal to women the year 'round.



Selecting paint for your home needn't be difficult. For gaiety, charm and spirit, choose



Colors you can live with

By GORDON WARE

Once upon a time, folks painted the door a blue or red to let the swains of the neighborhood know that they had a daughter of marriageable age. Now we do it simply because it strikes a happy note. So, dare to use the color you feel will give your home its proper spirit.

It is wise to fit your house to its community. We

must bear in mind how it looks among its fellows. A house will have greater monetary value—and will look better, too—if it is painted in colors that blend or contrast harmoniously with those of neighboring houses.

The charm of a New England village with its white houses, white fences and whitewashed tree trunks is due in large measure to its bright, clean look. Over the years white has held its place as a universal favorite. But don't think for a moment that every white house need look like every other white house! It needn't—because you can give it that little added sparkle of your individuality by your choice of a contrasting color for the roof, the trim, and the doors.

There's a lot more that you can do with color, too. For instance, the correct paint styling of your home can emphasize its good architectural features, and subdue those less desirable. Perhaps you feel that your house is too tall; you can make it appear to be lower by painting the roof a dark color. Or maybe it is too



Pastel colors, particularly on stucco houses, are found most often in warmer climates. This California home is typical—coral stucco, light roof, and cream trim with maroon shutters.

low and spreads on the landscape. Then paint the roof a light color and a bright one, to draw the eye upward. Then you can paint the shutters, trim, and front door a lighter or darker value of the roof color. A contrasting color will emphasize and dramatize these areas.

Right as a white house can be, occasionally it is a relief to find a house painted *other* than white. Our best community planners do this deliberately—dropping in a barn-red house here, a soft gray house there. Where your home is located will, of course, have something to do with your choice. Experience proves that the percentage of yearly hours of sunlight has much to do with it. Yellow houses, with a high degree of visibility, are found in sections where there is less sunshine, and white houses predominate where the percentage is about fifty per cent. But the more sunlight, the more you will find houses painted in colors.

Also, the materials used in building a house influence the choice of color. Plaster and stucco houses, for instance, take pastel colors beautifully. Perhaps if our forebears had had today's durable, self-cleaning tints, there might have been a wider original variety in the "traditional" colors for an architectural style. Now new colors, available in Du Pont house paint, are an interesting example of the part modern chemistry has played in providing new and better colored paints for home exteriors.

The new Du Pont colors are made with pigments that are solid color all the way through. This means less possibility of fading and streaking. So once again, the best rule is—be guided by the colors *you* like . . . and paint your home in those that you find "liveable."



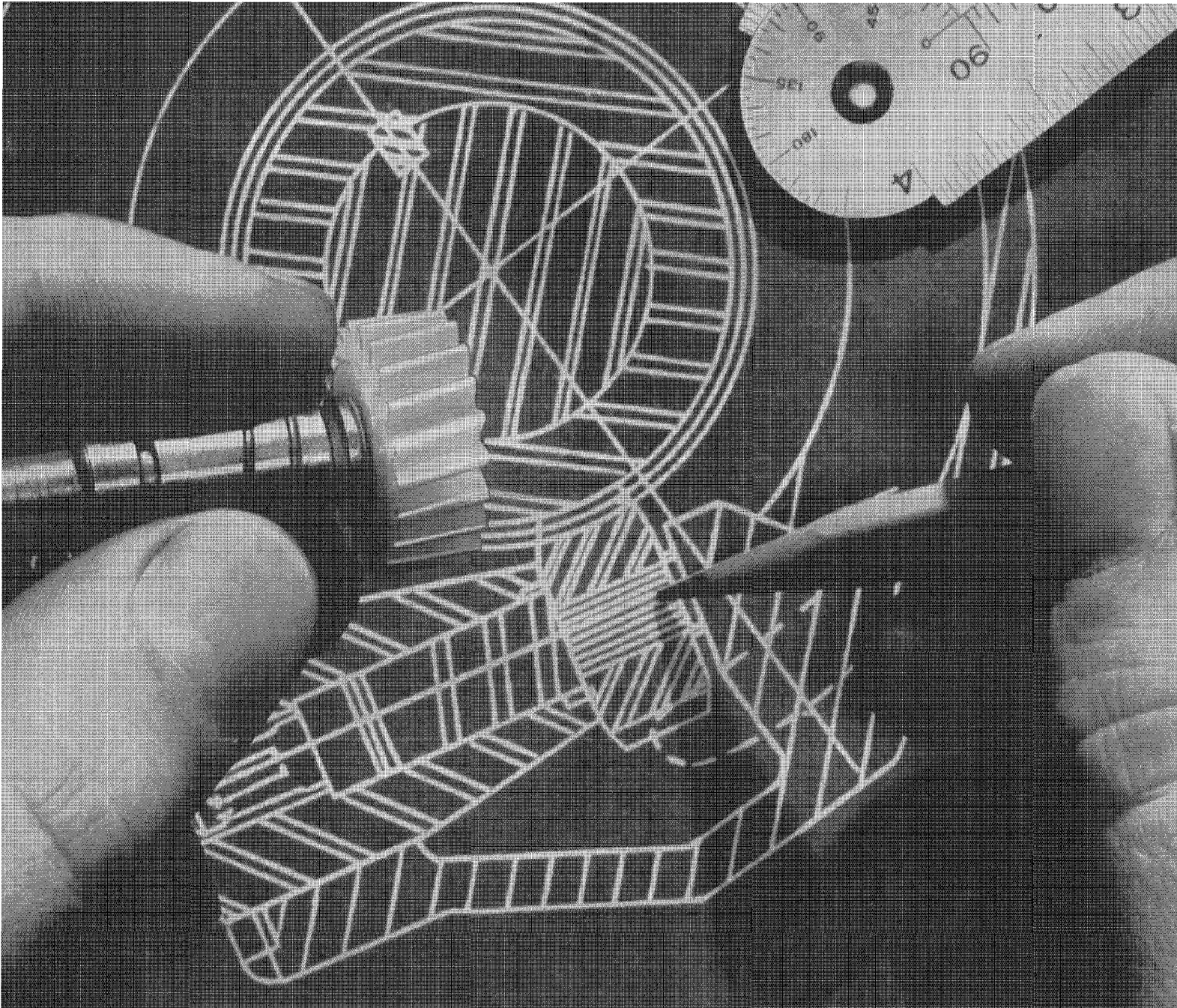
While this house is conservative in style when compared with modern architectural trends, good use of color has made it attractive. Blue shutters add an original note.



Shutters in a traditional green blend beautifully with yellow of house and green of surrounding foliage. Du Pont house paint is made in both traditional and new colors.

For this unusually striking house, the contractor selected Du Pont "40" Outside White; and distinctive Trim and Shutter, bright red.





The gear in 1950 Ford speedometers is made of molded nylon.

The plastic that does it better

Parts of nylon plastic are solving problems and setting performance records for dozens of manufacturers

When a manufacturer finds a material that helps him turn out a better product at less cost, he's really got something.

Let's look at the story of the Sunbeam Corporation's electric razor. Their engineers' problem was with the connecting rod used to transmit power from the

motor to the shaver's cutting blade. It had to move at speeds of from 15,000 to 17,000 half-cycles per minute yet still be light enough to keep vibration at a minimum. The part also had to prevent transmission of shock from the cutter blade to the motor shaft. And long, trouble-free service was a "must."

Nearly every material that could possibly serve these purposes was tried before Du Pont nylon plastic was selected. The nylon part, weighing only a fifth to an eighth as much as one of metal, satisfied every re-

quirement. When cored with a tiny hole packed with grease, tests show that this connecting rod should work for 10 years or more without lubrication. Now three other nylon parts are used in the Sunbeam shaver to make it lighter, improve its appearance and step up production.

Do you have a new car? If you do, the chances are that this plastic is serving you in it. The 1950 Ford has a nylon speedometer gear which operates off the transmission to drive the speedometer cable. It was formerly a laminated gear, tedious to make. By using nylon instead, the cost is cut in half and performance is improved. It has been successfully tested to the equivalent of 100,000 miles at 80 miles an hour.

NYLON PLASTIC IN CARS

There are other automotive parts such as lock nuts, interior lenses, insulator bushings, grommets, sleeves and fuse holders. On one car, a nylon doorlock wedge provides superior resistance to abrasion and repeated impact.

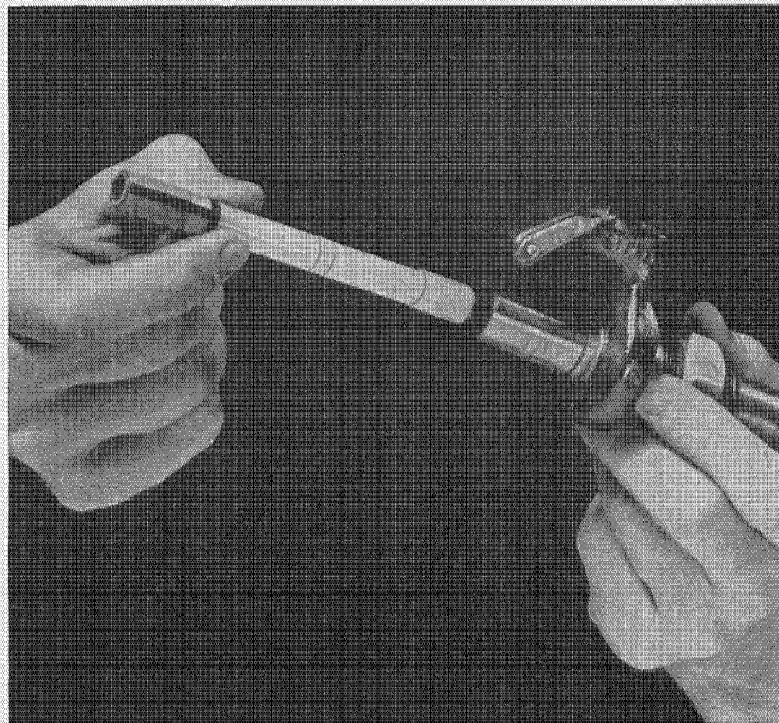
Nylon parts help the housewife, too. Ekco Products Company of Chicago was debating the advantages of replacing zinc gears in egg beaters with nylon gears. So, for comparative test purposes, they equipped egg beaters with both kinds and mounted them over bowls containing heavy motor oil. The nylon gears lasted 20 times longer than the zinc ones, and cost no more.

Another kitchen use for nylon plastic is in the lock mechanisms of refrigerator doors. These parts probably take more punishment than any other locks in your house. For a long time Winters and Crampton Corporation of Grandville, Michigan, who make door locks for most major lines of refrigerators, used stainless steel for the bolt rollers. But it was necessary to keep them well lubricated to avoid excessive wear.

When this manufacturer switched to nylon plastic rollers, savings from 15 to 35% were possible. He found it unnecessary to use any lubricant. One door was opened and closed 500,000 times with practically no wear in the rollers. Needless to say, nylon rollers are now standard parts.

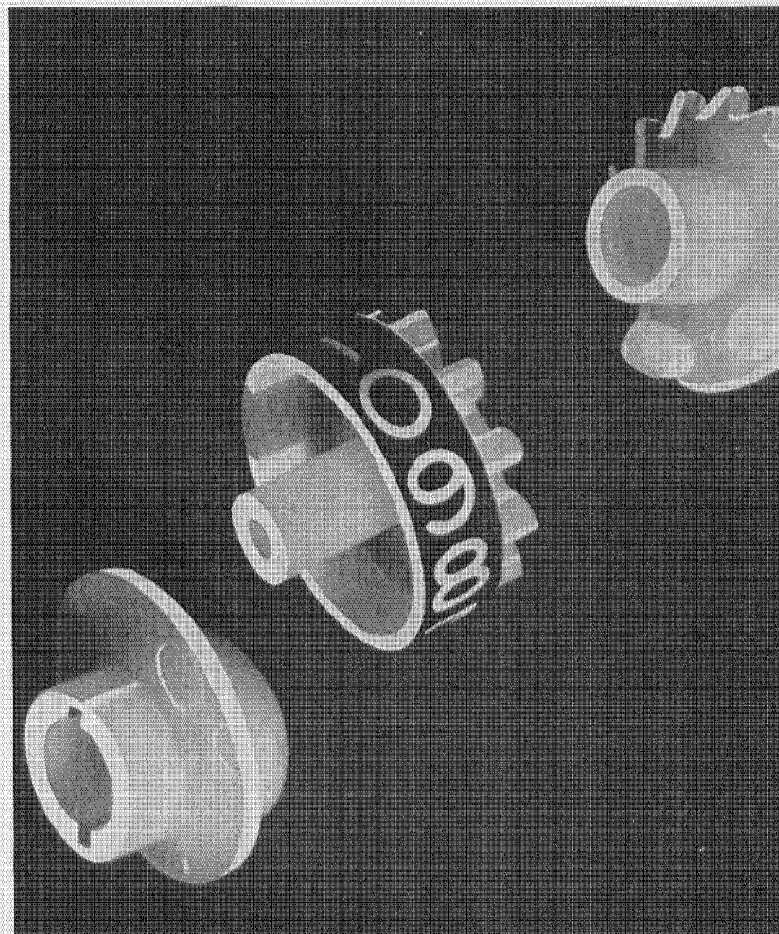
REQUIRES LITTLE LUBRICATION

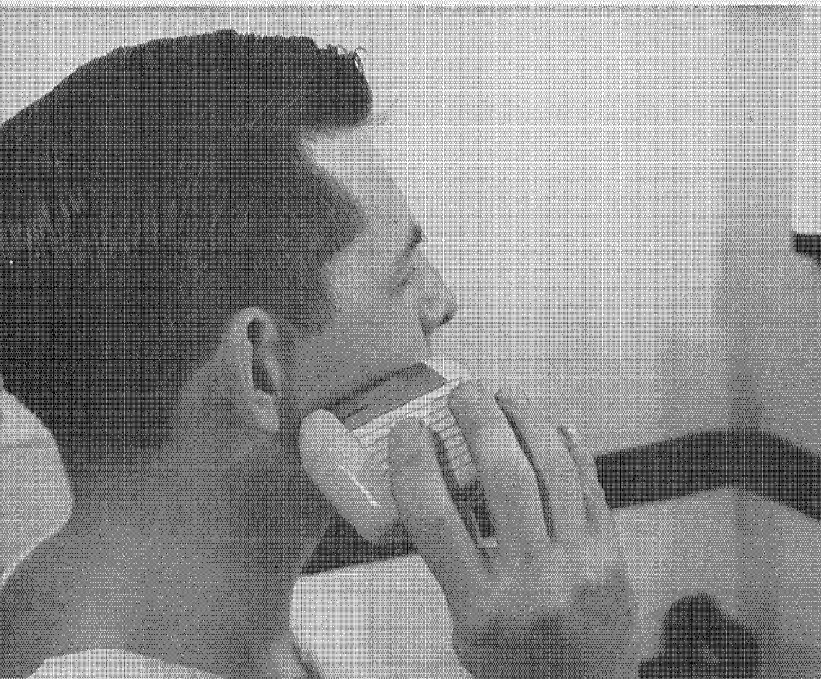
Nylon reacts to lubrication like the proverbial camel to water; a little goes a long way. This is perhaps most evident in textile machinery. In spinning frames, there is a part called a bolster . . . a tubelike piece in which the spindle moves. Normally, bolsters require lubrication after 40 to 120 hours of operation, but those made of nylon run for 1,560 hours without oiling. In one mill, they're four years old and look as good as new. Savings in lubrication costs alone have paid for the installation. Cutting down on oiling is always of major importance in textile mills, not only because of the time involved, but because of damage to yarn or cloth from oil stains. The new bolster accounts for other savings, too, by reducing spindle realignment, loss of power, and cleaning and inspection time. In many other textile-machinery applications, nylon parts need no lubrication at all.



Nylon plastic finds many uses in textile machinery. This part, called a bolster, saves money because it requires few oilings.

Parts molded of this plastic help the Monroe calculator operate smoothly and quietly. Other firms use nylon for similar jobs.





Bell Aircraft reports an outstanding success story in which a nylon part, about an inch in diameter, is the main factor in increasing the life of helicopter transmissions from 25 hours to well over 1,000 hours. Three years ago, when assembly-line production was begun, they ran into trouble. No standard anti-friction bearing small enough for the job would give more than 25 hours of reliable service life. They began looking for a material that would meet their exacting specifications. Some cost too much. Others failed to meet service requirements. Then they tried molded nylon cages and found them to be the answer.

Bell switched to nylon to keep its helicopter transmissions working more than 40 times longer. And no bearing failures have been reported. It's still another in the growing list of tricky industrial problems solved by the use of this remarkable plastic.

Sunbeam shaver engineers required a connecting rod that would move at high speed yet still be light enough to keep vibration to a minimum. Nylon met every requirement.

Helicopters are often used for work out in the field where a breakdown is a serious matter. The trouble-free life of the Bell helicopter transmission has been increased from 25 to over 1,000 hours by switching to a nylon part.



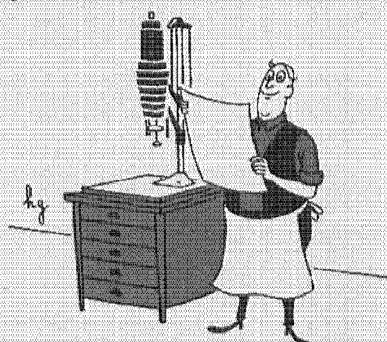
Did you know

... DU PONT WAS THE FIRST company in America to produce commercially a "permissible" high explosive dynamite for use in coal mining? "Permissibles" are so-called because they have been approved by the U. S. Bureau of Mines for blasting in gaseous and dusty mines.



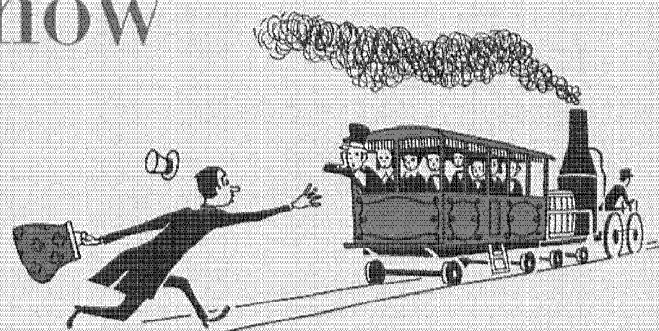
... THE AVERAGE IOWA FARMER lost about \$750 to corn borers in 1949, according to Iowa State College? Du Pont "Deenate" DDT insecticides are effective in controlling these farm pests.

... "IT IS CURRENTLY STATED and erroneously believed by many that big corporations have gobbled up practically all the little companies. The fact is that between 1940 and 1947 all domestic corporations with assets of \$100,000,000 added only 2.1 per cent by the acquisition of other businesses."—Secy. of Commerce Charles Sawyer.



... WARMTONE PHOTOGRAPHIC projection paper is the most recent addition to the products of the Photo Products Department? It has an emulsion ideal for producing rich and radiant enlargements. Warmtone has speed, latitude, stability and an excellent surface texture for toning.

... DU PONT "TI-PURE" TITANIUM DIOXIDE is added to wood pulp to make a paper that is whiter and more opaque? It permits publishers, for example, to use lighter, thinner stocks and thus save postage.

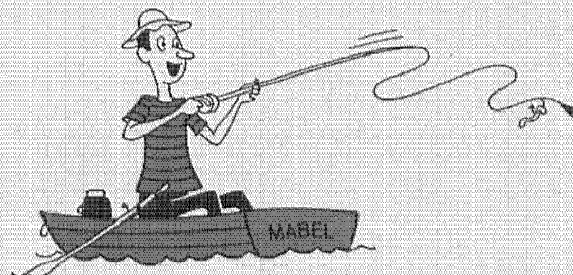


... IN 1833 AMERICA'S longest railroad was 135 miles? It was operated between Charleston and Hamburg, South Carolina, and a branch line passed through Camden, where a new Du Pont plant for the manufacture of "Orlon" acrylic fiber has been built.



... PRINTING PAPER STRETCHES if humidity in a printing plant goes above 60 per cent? If it drops too low, the paper shrinks. Today, many air conditioning units using "Freon" refrigerants are installed to control temperatures and humidities. Result: the paper feeds easily into the press and production increases.

... TEST DATA announced by the Remington Arms Company indicates that titanium metal is practically unaffected by exposure to sea water or marine atmosphere? Test samples exposed on a sea-spray rack were found to be in good condition after over 500 days.

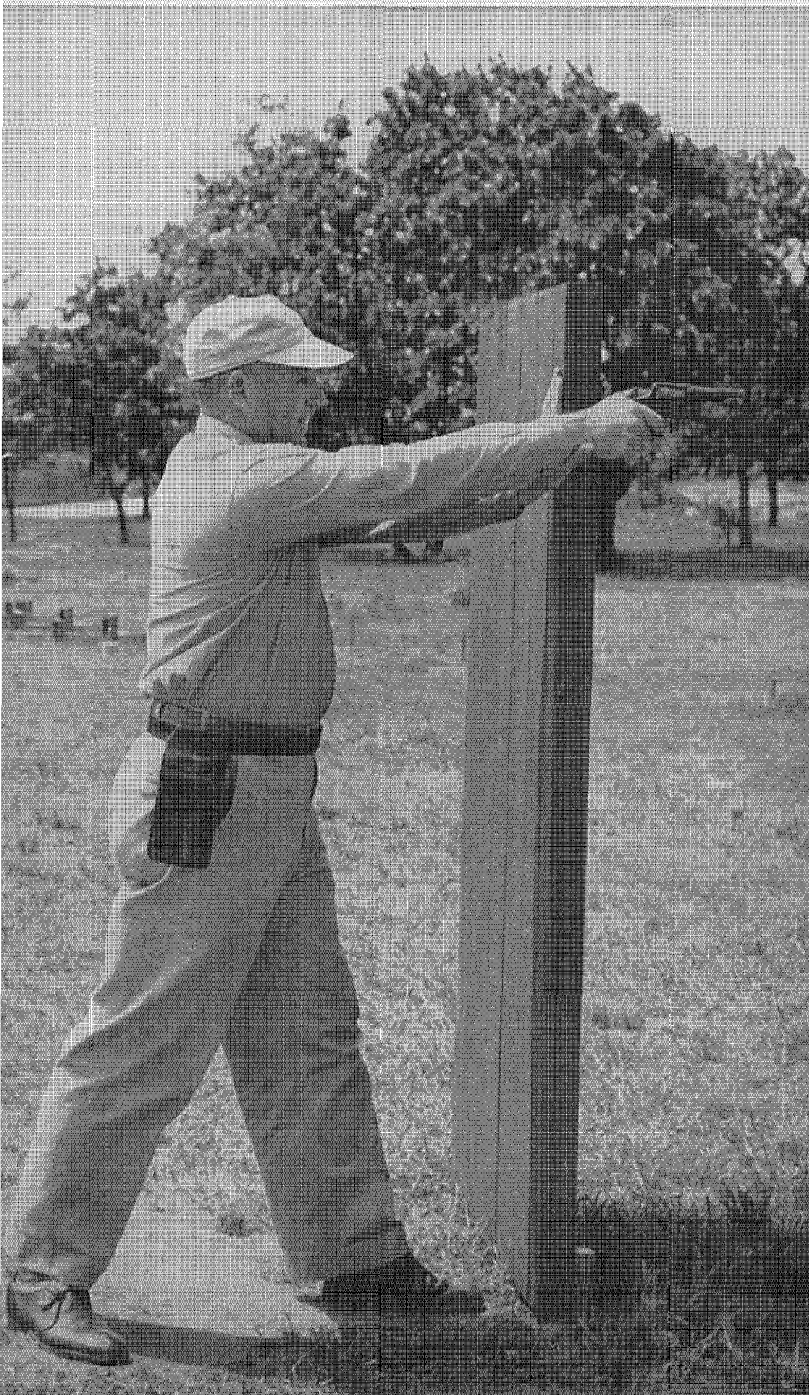


... A NEW TYPE FISHING LINE for trolling called "Monolon," combines braided "Monel" metal wire with a nylon monofilament core? It is extremely flexible, virtually non-kinking, and will not corrode in either fresh or salt water.

Policemen can shoot

*Modern training programs develop
expert marksmanship to protect
our lives and property*

The badge of office and authority of a law enforcement officer is his shield. His ultimate chief defense, and the defense of the public he is sworn to protect, lies in the hand-gun worn on his belt. Law enforcement officers, therefore, should be competent shots.



Heads of law enforcement departments are certainly cognizant of this fact, and while not all police officers can qualify as experts, constant efforts are being made throughout the country to improve the marksmanship of America's guardians of the peace.

An outstanding example of a constructive shooting training program in a law enforcement department is that of the Police Department of the County of Nassau, Mineola, N. Y., under the direction of Commissioner John M. Beckmann.

When Commissioner Beckmann assumed office, he compared a police officer's side arm to the parachute of a pursuit pilot, emphasizing to his men the fact that "if you haven't got one when you need it and know how to use it, you may never need it again." This has been the motivating thought behind the training system at Mineola which has developed well over 1,000 law enforcement officers into competent handlers of all firearms they may need to use, including sub-machine guns, riot guns, gas guns and gas grenades.

The Department's training program, now known as the Practical Revolver Course, was instituted in 1946 with a class of 171 rookie officers. The following year 740 policemen participated in the program. This number included not only all members of the Police Department of the County of Nassau, but members of other local police departments within the county who were invited to participate. Of this larger group 25% failed to qualify on their first trial. Practically all qualified after further training.

MANY NEW INSTRUCTORS

Several members of the Department, who are graduates of the FBI National Academy, act as instructors. Since that time, shooting competency and leadership have been developed within the Department to such an extent that many are now qualified instructors.

In an effort to extend the great interest shown by members, the Department sponsored its first annual police revolver tournament in 1948. More than 30 departments from the states of New York, Connecticut, New Jersey, Pennsylvania and Delaware participated. Last year the tournament was even larger, and increased interest points to a still more successful event this year.

It is Commissioner Beckmann's conviction that training in the proper, safe and efficient use of firearms is essential to the effectiveness of any law enforcement agency. Police department heads throughout the country would do well to take a page from Commissioner Beckmann's book.

Nassau County Department teaches policemen to shoot from cover. The Peters Cartridge Division of Remington Arms makes accurate, dependable ammunition for police personnel.

A new fiber under the sun

Awnings and curtains made of "Orlon" are the first commercial products of this new

Du Pont yarn

For the past year or so people have been asking us a lot of questions about "Orlon" acrylic fiber. Many want to know, "When are we going to see some of this wonderful material?"

In many towns and cities you can see it now in awnings and marquisette curtains. These are among the first uses of the new fiber. At the present time, only "Orlon" filament is being produced at the Camden, South Carolina, plant. A new plant to produce "Orlon" staple has been authorized, but products made from it probably will not be on the market before January, 1952. So you'll have to wait a bit longer for such things as sweaters and men's suits made from this fiber.

In limited but steadily increasing quantities, filament "Orlon" is now appearing in awnings and curtains. Why? Primarily because this fiber is durable. It resists sun, soot and acid fumes much better than other fabrics commonly used for awnings. It is not affected by mildew and has low moisture absorption. Awnings made of "Orlon" dry rapidly, hold their shape well, wet or dry, and have high resistance to stretching.

In appearance too, this chemical fiber offers something new. Fabrics made from it have an attractive translucence. Some awnings, as you know, have painted stripes. When you look at them from the under side, the colors do not show up to advantage. But with awnings made of "Orlon" the stripes show right through.

NOW, CONSIDER CURTAINS

The big advantage of curtains made of "Orlon" is that they are easy to keep clean. You can wash them in your home washing machine or send them to the laundry. Just hang them dripping wet on the line and straighten them out by hand. They'll dry in a surprisingly short time. These curtains require little or no ironing, a relief for the busy housewife. She won't have to worry about shrinking either, and there's no need to use curtain stretchers.

These curtains are strong, wet or dry. Moths don't bother them. Heat from radiators doesn't make them brittle or weaken them. Salt air and acid smoke have no injurious effect on this fiber. The curtains have good draping qualities, and a rich, pleasing luster.

Maybe awnings and curtains of "Orlon" aren't yet available in the stores in your town. But when they are, we think you'll want these articles made of Du Pont's newest textile fiber.



The curtains made of "Orlon" the lady is hanging can be washed, dried and rehung with little or no ironing in less than 1½ hours.

Perhaps the greatest single feature of this fiber is its outstanding resistance to damage from the ultra-violet rays of the sun.



Flameproof fabrics

Now mill operators can process cotton and rayon goods with "Erifon" flame retardant

Du Pont manufactures dozens of textile processing and finishing chemicals. And to the A-to-Z list, the Pigments Department has now added a new inorganic compound euphoniously trademarked "Erifon".

Here's how you can fix the name in mind: just spell "no fire" backward as one word. That suggests the service this product is designed to render. But don't construe it to mean that any chemical processing with "Erifon" will make fabrics fireproof. That's too much to expect. But it can make them flame resistant by retarding the rate of combustion so that these inherently flammable materials, if ignited, won't continue to burn and spread fire.

Flame retardants—chiefly chemical solutions of inorganic salts—have long been applied to safeguard fabrics. You may recall that in 1941 the Grasselli Chemicals Department announced its ammonium sulfamate, a compound that quickly came into extensive use because of its superior flame-resistant properties, and the ease with which it could be applied to clothing, paper products and household articles. After laundering, the protective treatment had to be renewed. That raised the question, couldn't somebody develop a really durable flame retardant?

Du Pont's research staff previously had a similar problem after it put "Aridex" renewable water repellent on the market. This compound is an excellent finishing agent for many fabrics. But the treatment had to be re-applied after washing or dry cleaning. So

more research work was done, and "Zelan" durable water repellent, a more serviceable one, was developed.

An analogous situation has brought "Erifon" flame retardant into its own specialized field. Not only is this chemical compound more durable in service, but, like "Zelan", it can only be applied to fabrics before they are made into finished articles, and that involves the use of precise processing methods and suitable factory equipment.

The active flame-retarding constituents of "Erifon" are salts of titanium and antimony in a solution containing free hydrochloric acid. We'll not attempt a detailed description of the process; that's covered in a Pigments Department brochure for textile technicians. But you'll be interested to know that the processing does not impair the strength of cotton and rayon fabrics, or change materially their "hand," porosity or texture. The treatment adds little weight to the fabrics and is reasonable in cost.

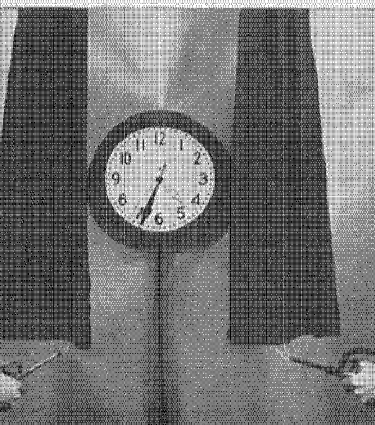
Fabrics properly treated with "Erifon" exceed the requirements of the flameproofing tests established by the Federal Government and private research organizations. Such fabrics, when exposed to weathering, temperature changes, solvent dry cleaning, and controlled laundering operations, maintain their fire resistance. They are non-toxic and non-irritating to the skin.

"Erifon" has been successfully applied to a fairly wide range of light cotton and rayon fabrics. Other types and weights are now undergoing tests. Meanwhile, with fine cooperation from many large and small textile customers, more and more facts about the durability of this new flame retardant are being compiled.

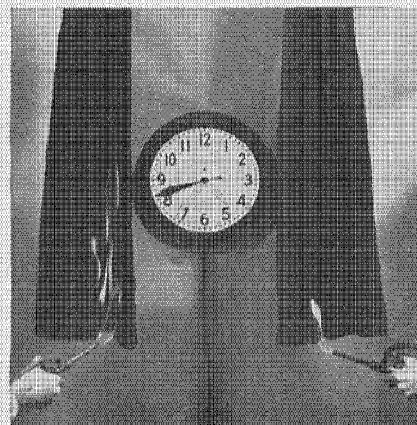
For example, after treating a herringbone cotton twill, the kind used for making work clothing, the material was still flame resistant after being washed 100 times. A similarly treated fabric of the same type has been commercially dry cleaned 25 times—and it's still flame resistant.

That's why mill operators consider that the development of "Erifon" is important to them and to the public which benefits most from their goods and services.

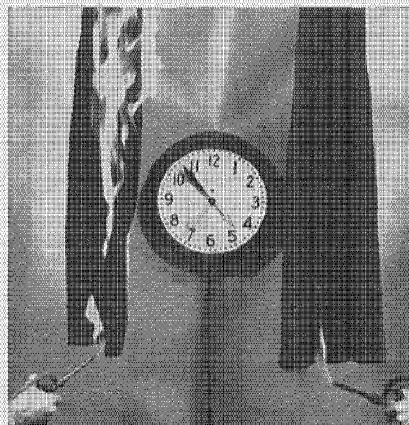
Flame testing twin fabrics; one, right, has been treated.



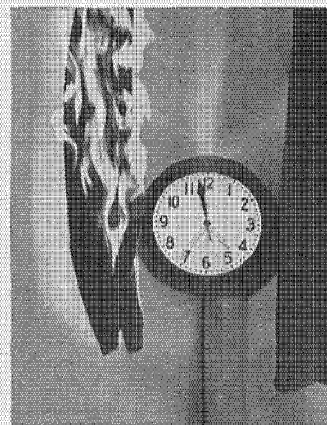
After 10 seconds, untreated sample has caught on fire.



Piece treated with "Erifon" is still flameless and intact.

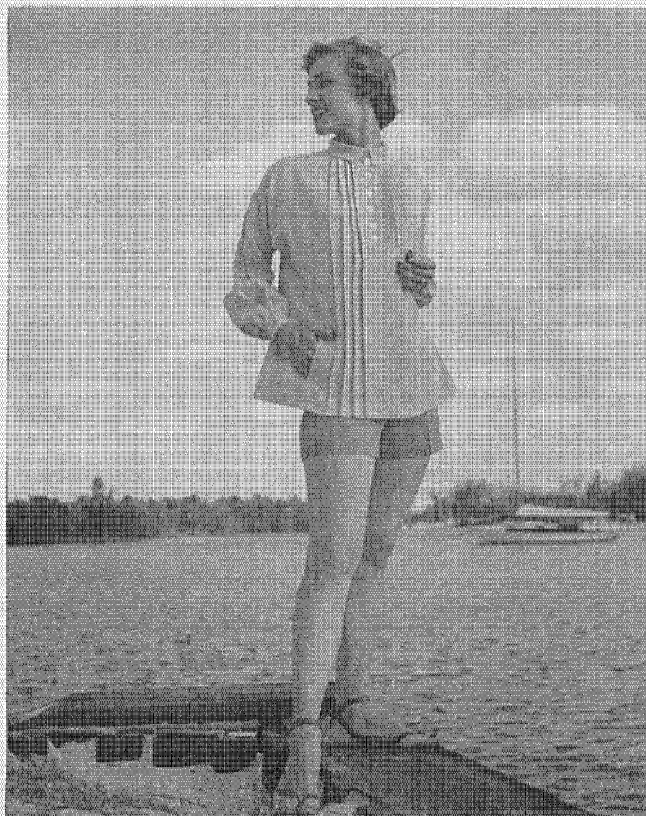


It remains so, but in 25 seconds untreated one is raging fire.



What's new

● **NEOPRENE LATEX TYPE 735.** Adding a small percentage of a suitable compound of this neoprene latex "at the beater" increases the wet strength of paper and gives it several other advantages. It has unusually high breaking elongation, excellent folding endurance, resistance to tearing, and considerable resistance to a variety of chemical reagents. Laboratory and mill tests indicate that neoprene-treated paper may have many packaging applications. For information about this new neoprene latex and the process for treating paper pulp, write to Du Pont, Rubber Chemicals Division, D-2, Wilmington, Delaware.

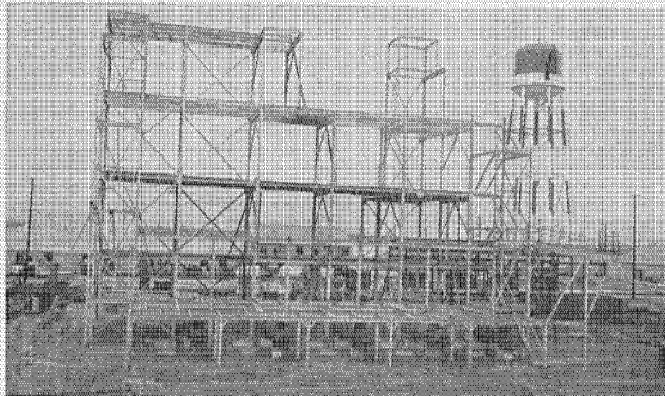


● **NEWEST IN VACATION CLOTHES** is this attractive smock and shorts outfit woven of spun Du Pont rayon and cotton. The crisp, linen-like appearance of the fabric makes the smock suitable for sportswear with shorts. For less strenuous activities the smock can be worn over a dress or skirt. The garments are made by Storrey, Inc., 1384 Broadway, New York.



● **FOR FUN IN THE SUN.** The U. S. Rubber Company makes this "Rigid-Aire" wading pool which these children are enjoying. It's sturdily constructed of fabric coated with neoprene, which adds resistance to sun, air and suntan oil. The walls, which can be inflated with a hand pump, will not collapse when small fry jump or sit on them. A rough finish on the floor helps prevent slipping. They're sold by leading department, toy and sporting goods stores.

● **ADDITIONAL FACTS ABOUT "TEFLON"** tetrafluorethylene resin tape for electrical insulation and on the new "Teflon" polytetrafluorethylene finishes are now available. For a technical bulletin describing the uses and properties of Du Pont "Teflon" tape, write the Polychemicals Department, Room 9529, Nemours Building, Wilmington, Delaware. The bulletin on finishes can be obtained by writing the F. & F. Department, D-3, here in Wilmington.



● **NEW NYLON PLANT.** To increase the supply of nylon salt used in making fiber and plastic, the Polychemicals Department is building a new plant at Victoria, Texas. This picture shows you how construction is progressing.



What do you know about rainwear?

In prehistoric days, about the time man began to use fire, he utilized the skins of animals as a covering for his body. Though they gave him warmth, caves or natural shelters provided him with the only means of keeping dry when it rained.



Thousands of years later in the Orient, straw was woven together in the form of a crude garment. It looked like a thatch roof . . . but was neither a good roof nor a good raincoat.



The forerunner of the modern raincoat appeared in Europe 200-odd years ago. Consisting primarily of layers of cloth, it was heavy, bulky and seldom could be relied upon to keep one dry.



Later, rainwear was made of cloth coated with linseed oil to make it waterproof. These were the familiar oilskins, or slickers, as they are still known and made today. Although they gave protection from the rain, they were often hot and uncomfortable to wear.



Today, rainwear is made from fabrics that are not coated, but are treated with chemicals called water repellents. Such compounds make possible a wide variety of stylish raincoats that are both protective and comfortable to wear. You can also select the degree of protection against rain . . . according to the weave of fabric and construction of the garment.

Water repellents are divided into two classes. One type loses its protection after a single trip to the laundry or dry cleaner. In contrast, there are chemicals like Du Pont "Zelan" durable water repellent which keep their protection even after several washings or cleanings.

Compounds like "Zelan" impregnate only the individual fibers and do not coat the surface of the fabric. Thus, air can circulate through the small spaces between the fibers. Because of protection and comfort, not only raincoats, but jackets and many other types of garments are made from cloth treated with water repellents.

right—rain or shine. And "Zelan" keeps its protection even after several washings or cleanings.

LOOK FOR THIS TAG WHEN YOU WEAR

FABRIC TREATED WITH
Du Pont
ZELAN
DURABLE
WATER REPELLENT
Approved for repellency by
BETTER FABRICS TESTING BUREAU, Inc.

DU PONT

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY
E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware

CAN "LUCITE" GIVE YOUR SALES A LIFT?



When you're thinking of ways to spark your sign sales, keep Lucite® acrylic resin in mind. Sign makers across the country today are using this Du Pont plastic to create many new and unusual products, such as the formed "Lucite" sign letters shown above. "Lucite" is beautiful, tough, weather-resistant, conducts light,

is easy to fabricate, requires only soap and water to maintain. It's available in crystal-clear, and a range of sun-fast colors, transparent, translucent and opaque. Write for data—keep it handy in your files. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Plastics Sales Offices: 350 Fifth Ave., New York 1, N. Y.; 7 S. Dearborn St., Chicago 3, Illinois; 845 E. 60th St., Los Angeles 1, Calif. *REG. U. S. PAT. OFF.

Letters as above vacuum-drawn from .060 to .250 "Lucite" sheet, in sizes from 2" to 24" high. Made and stocked by Polyplastic Co., Brooklyn, N. Y.

