

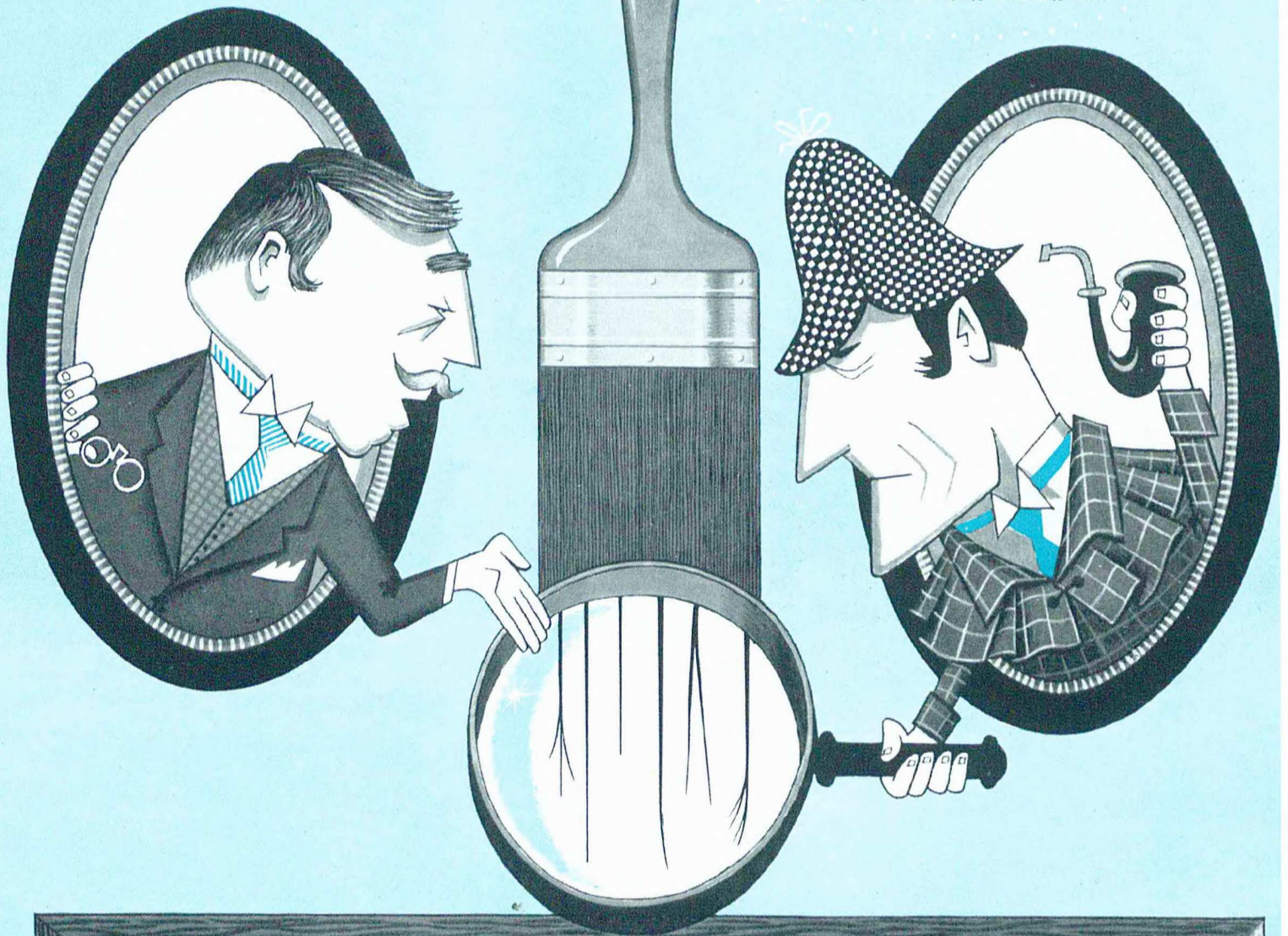
DUPONT m a g a z i n e



Better Things for Better Living
... through Chemistry

BUT WHAT MAKES THIS
BRUSH SO DIFFERENT?

ELEMENTARY, DOCTOR—
THESE ARE "TYNEX"
NYLON BRISTLES...



...AND HERE IS WHY THEY MAKE A BETTER PAINTBRUSH

"As you know, Doctor, I esteem the scientific method, whether applied to the capture of evildoers or the design of a painting implement. Thus I invite your attention to the part brushmaking science has played in designing 'Tynex' nylon bristles to pick up paint, hold it and release it smoothly.

"Surely you see that these bristles have finely tapered tips. This accounts for the ease with which paint is released. And these split ends help to increase paint-holding capacity.

Both are significant clues to brush quality.

"As for wear, I shan't bore you with a dissertation on nylon's durability. Suffice it to say that 'Tynex' bristles wear three to five times longer than the ordinary kind. They are also easier to clean.

"To sum up, Doctor, a uniform, man-made bristle, plus the skill of brushmaking artisans are what make this brush so superior. It's really that simple."



TYNEX[®] NYLON BRISTLES

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

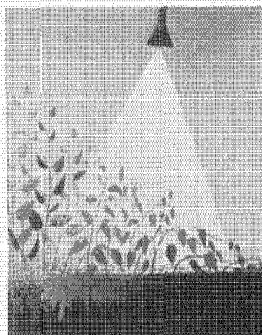
Hoffman

OUR COVER

Some of our readers just didn't like the bold treatment of dynamite on our last cover. In fact, one friend told us, as only a friend can, that we had missed the boat—he felt a little subtlety would have added “quality” to the cover.

Subtlety, we thought, goes with dynamite about like lace on a boxer. But we said, “Stick around, the next cover may be just your meat.” Then we pointed to a pile of letters from readers who said, “We like your new cover.” Made us feel better.

This second in *Du Pont Magazine's* new cover series catches a urea herbicide in the act of killing weeds. Beginning on page two you'll find a personality profile on this new family of Du Pont chemical weed killers and some recent findings on their use.



When we asked artist Houck to portray the herbicide at work, we thought this job would be a cinch. But problems began with his original rough sketch. The first nozzle for spraying the weed-killing solution, said our agricultural experts scornfully, looked more like a bathroom shower head. And where, they asked, had the artist found this plant? Just dreamed it up, said Houck with artistic detachment.

“Phylum nonesuch,” we call the vegetation. And we defy anyone to say nay—and prove it, of course.

FORECAST: THE HAND-WOVEN LOOK

Dorothy Liebes, the American designer whose hand-loomed fabrics have had great

influence on the appearance of decorative fabrics here and abroad, has recently been retained by Du Pont as a consultant to Textile Fibers' new home furnishings merchandising section.

One look at Mrs. Liebes' unorthodox designs and use of materials—ranging from nylon to bamboo—will help explain why she is a leader in the art of creating contemporary fabrics. She is one handweaver who knows mill processes and limitations, and then proceeds to create as if she had no limitations in design, color and texture.

Mrs. Liebes will serve Du Pont as design and style expert on rugs, draperies, upholstery and other furnishings for the home, office, hotel, school, and automobile.

RETURN OF AN EXILE

“What do you do with your old toothbrushes?” we asked a thousand readers recently. The replies we're getting will help us write a scheduled article on the subject. The way the mail looks so far, the useful life of a toothbrush has barely begun by the time it's exiled from the bathroom. Many people had no trouble listing five or even ten odd jobs for old brushes around the house and office.

Cleaning shoes and silverware is high on the list, as you might suspect. One couple finds an old toothbrush just the thing for cleaning the tops of 300 antique salt shakers. A lady in Camden, N. J., brushes dye on last year's straw hat to renovate it; another uses an old toothbrush to keep her eye brows neat. A Long Island baby gurgles over a plastic chain his father made by softening old plastic toothbrush handles in boiling water and bending them into links.

In short, don't throw that old toothbrush away until you've had a chance to read the story we have coming up.

PHOTO CREDITS

Page 7, bottom right: Courtesy Convair Div., General Dynamics Corp.; Page 18: Courtesy Edwin F. Guth Co.; Page 25: Courtesy A. & M. Karagheusian, Inc.; Page 26, right: Courtesy Anesito Co.

CHANGE OF ADDRESS

Please send your new address as promptly as possible so that you will not miss your copy.

Mail to: Editor, Du Pont Magazine
Wilmington 98, Del.

Send old address with the new, enclosing if possible your address label. Post offices will not forward unless you provide extra postage.

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New weapons in the war on weeds

Weeds are a number one picker of the farmer's pocketbook. They rob industry on a massive scale, too, creating an eyesore, and constituting a fire hazard around oil tanks, lumber yards and other storage areas. Moving to the attack this spring on both farm and industrial fronts are substituted urea herbicides, the latest chemical weed killers to come from Du Pont laboratories

By GORDON H. KESTER

Some authorities have defined weeds as plants growing where they are not wanted. Others, more charitably, have called them plants whose virtues are still undiscovered. Whatever words are used, the fact remains that weeds are the thistles in nature's flower bed, the "bad guys" of the plant world.

For one thing, these botanical bandits hold up American agriculture for an estimated three to five billion dollars every year. They rob crops of food and water; ragweed, for example, requires three times as much water as corn. The billion and a half dollars farmers spend on fighting weeds amounts to more than seven per cent of the value of their crops.

Weeds also nick commerce and industry for a sizable sum. Figures are scarce on non-farm weed control costs, but a large railroad, for example, may spend a half-million dollars or more a year keeping its right-of-way clear of vegetation.

The traditional method of controlling weeds has been by direct physical assault, usually hoeing or mowing. But labor costs are high, and the weeds begin growing again as soon as the hoer or mower is out of sight.

More and more, the men concerned with destroying weeds are turning to chemicals, just as farmers have enlisted chemicals to protect crops against insects and

disease. Chemical weed control is usually cheaper in the long run, and its effects are generally longer-lasting.

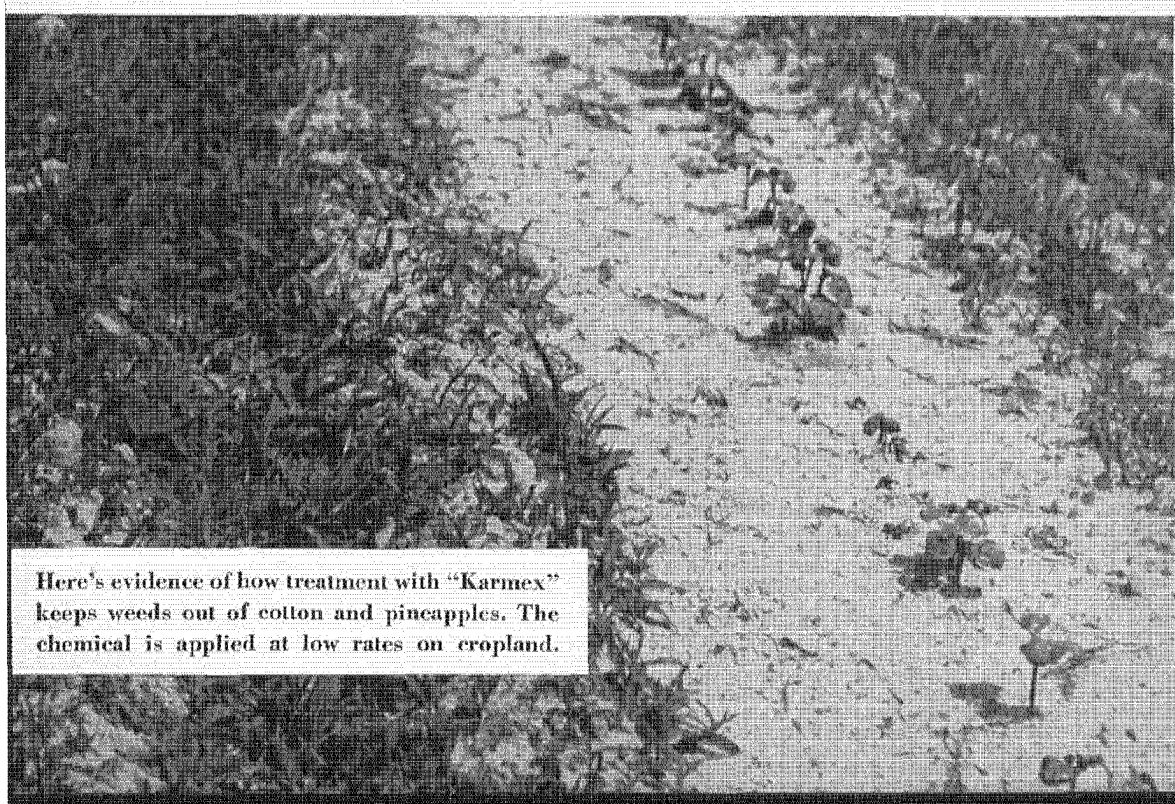
Chemical weed killers have their shortcomings, too, of course. Some are flammable, some toxic to men and animals, and some so volatile it is difficult to confine their effects to the area of treatment. Some, because they have to be reapplied fairly frequently, cost more than they should.

A promising new family of weed killers with an unusual balance of favorable properties are Du Pont's substituted urea compounds. Chemically, they are made by substituting other groups of atoms for urea's hydrogen atoms. Scores of these compounds have been screened for their weed-killing potency, and two are currently on the market.

To eradicate all vegetation—around oil tanks, for example, or along railroad tracks—heavy concentrations of 20 to 40 pounds an acre of the chemical are applied. It acts through the roots of the weeds. Carried into the soil by rain, it remains there and retains its killing effect for an entire season or longer.

Applied to the soil in lesser concentrations, urea herbicides are killing weeds in cotton, sugar cane, asparagus and pineapples without harming the crops.

The Du Pont formulations for industrial users are



Here's evidence of how treatment with "Karmex" keeps weeds out of cotton and pineapples. The chemical is applied at low rates on cropland.

sold as "Telvar" weed killers, while those for agricultural uses are "Karmex" herbicides. The products are low in toxicity to livestock and humans, non-corrosive, nonflammable, nonvolatile, and economical because a little goes a long way.

"Telvar", for example, has made it easier for the Aluminum Co. of America to control weeds along the two-mile aluminum fence at its Davenport, Iowa, works. Even with special mowers to cut weeds close to the fence, expensive hand clipping had been necessary around each fence post—and there are 1,200 posts in all. One application of "Telvar", Alcoa found, gave complete weed control all summer without damaging the fence.

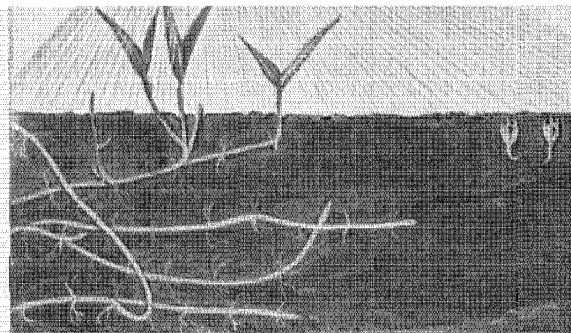
A steel company was out to destroy vegetation around its railroad system. Weeds growing next to wooden ties, the company points out, hold moisture and promote rotting; they also are a tripping hazard for brakemen getting on and off cars. After testing a number of weed-killing chemicals, the company settled on "Telvar", which did the job effectively in one application with a saving in labor.

Reporting on weed-control activities last year, a maintenance spokesman for the New Jersey Turnpike Authority had this to say: "Our success in 1954 has led us to plan considerable expansion in our use of 'Telvar' next season. We expect to use the material along (turnpike) guard rails, around culverts, bridge abutments, signposts, safety reflectors and on hard-surfaced embankments . . . Chemical weed killers are becoming an important tool in highway maintenance. In the hands of qualified crews, they do a thorough job with minimum labor cost."

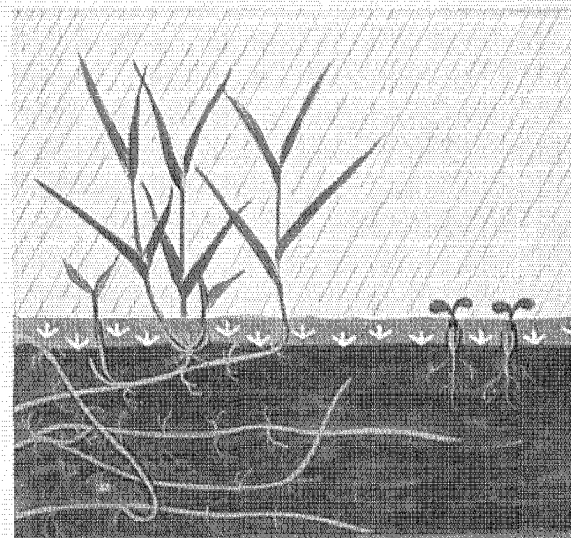
A list of other industrial locations where "Telvar" is battling weeds includes oil and gas tank farms, refineries, pump stations, lumber and pole yards, sawmills, power plants and substations, loading platforms, parking areas, storage yards, docks and warehouses.

Meanwhile, "Karmex" herbicides are lightening

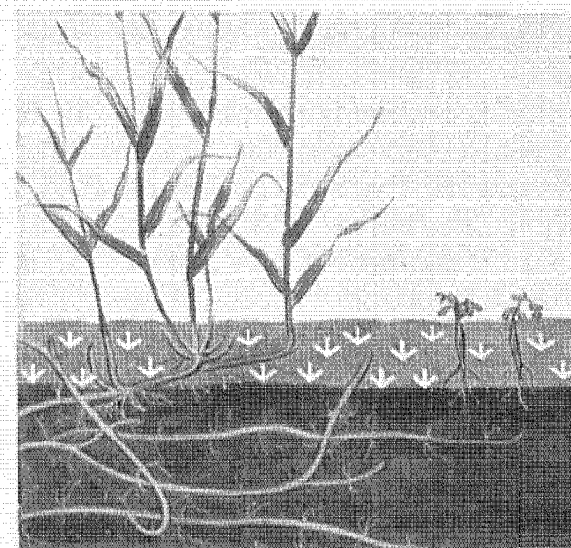
As chemical is applied, quack grass has emerged, ragweed seeds are germinating. Weed killer goes on early in growing season.



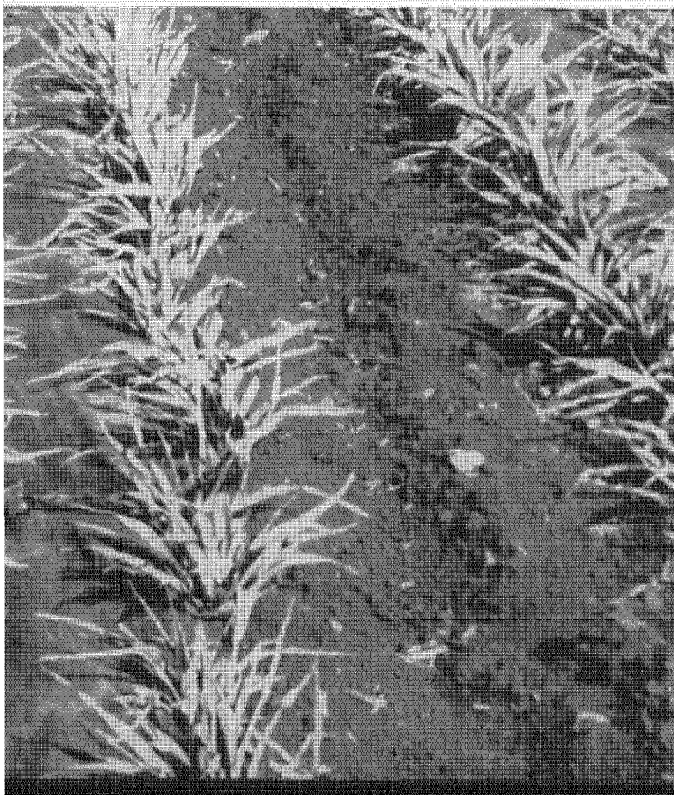
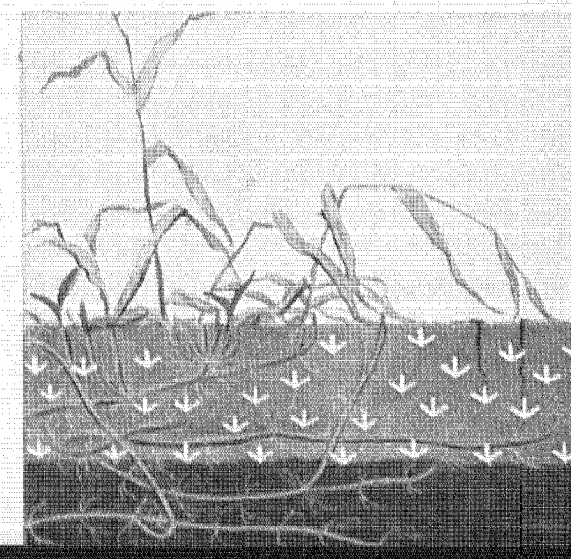
Rains wash the herbicide below soil surface. Ragweed and quack grass are healthy at this stage because roots are not being affected yet.

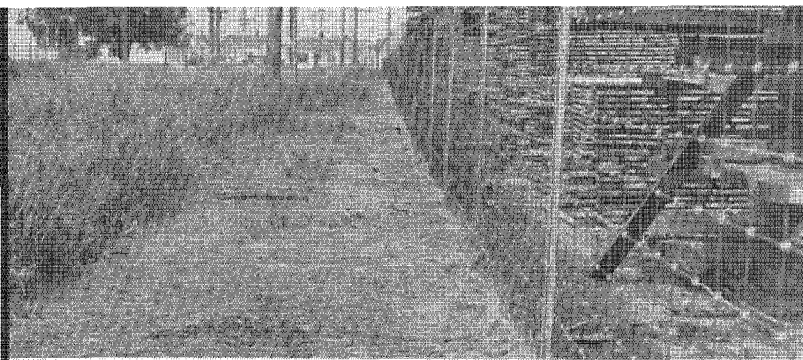


As chemical goes deeper, young ragweed dies and deep-rooted quack grass begins to yellow. Small amount of urea herbicide does the job.

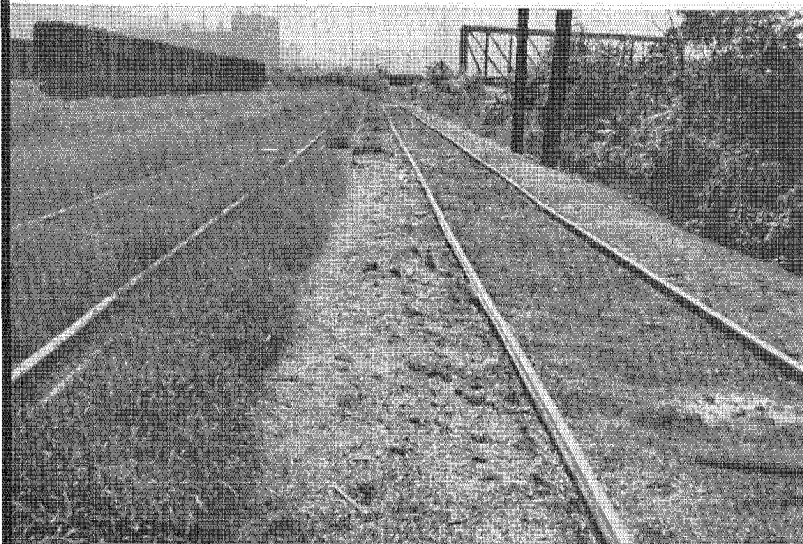


Chemical, acting in root zone, has grass in bad shape. Low dosage kills weeds for few weeks; a higher rate controls them for many months.

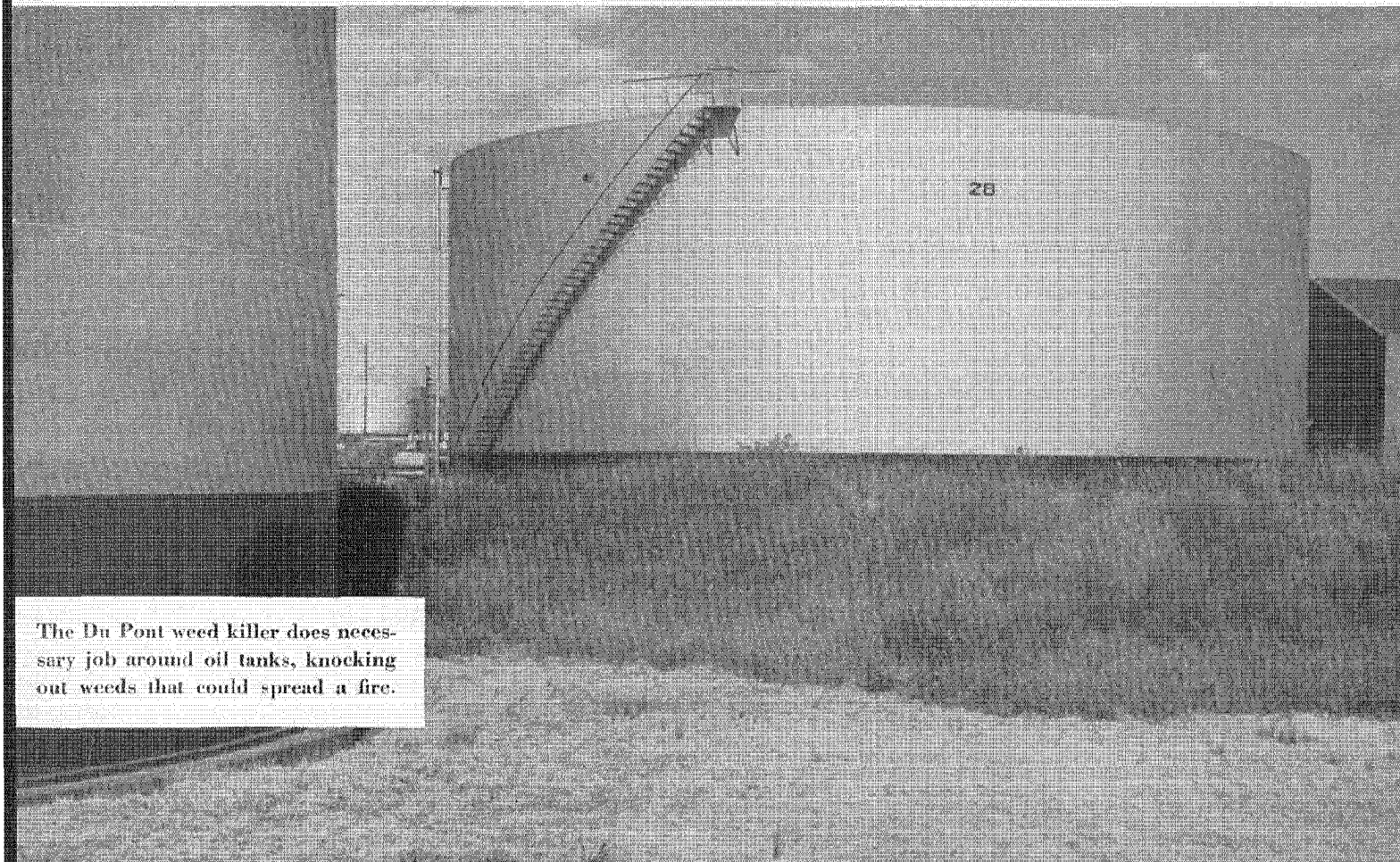




Weeds are kept out of this Winnipeg lumber yard by treating soil with "Telvar". One application of chemical equals many mowings.



Vegetation holds moisture, can hasten rotting of railroad ties. Treatment with "Telvar", as here, is cheap, effective solution.



The Du Pont weed killer does necessary job around oil tanks, knocking out weeds that could spread a fire.

the weed-killing Du Pont chemical. More than 5,000 acres of cotton land in the Mid-South and the southeastern Piedmont were treated successfully with the Du Pont chemical last year, and many more thousands of acres will be treated this spring. "Karmex" is applied in a 12- to 14-inch band on the row right behind the cotton planter. Weeds germinate, but the chemical kills them quickly, giving satisfactory control for three to eight weeks and getting the cotton off to a good start.

Plantation operators say hoeing costs ordinarily range from \$5 to \$40 an acre for a season. With "Karmex" at least one and sometimes as many as four hoeings are eliminated. The cost of the "Karmex" amounts to about \$2.50 per acre of cotton.

As for weed control in asparagus, here's a report from the Fuller Canning Co. of Princeton, Ill.: "We sprayed 400 acres of asparagus with 'Karmex' in April last year. Nine weeks later our fields were practically as free of weeds as they were before the application."

The use of "Karmex" for pre-emergence weed control on additional crops is being studied, and formulations of other substituted ureas are being screened for their weed-killing effectiveness. Another aspect of research, naturally, has been concerned with how long "Karmex" persists in the soil. Where crops are replanted on the same land year after year, will the material build up to an objectionable level? At the low rates (one to two pounds an acre) recommended for agriculture, studies have shown that soil microorganisms decompose the herbicide within four to eight months. No significant accumulation is left after that.

Safe to use, economical, effective in killing unwanted growth—these are among the principal reasons why Du Pont's substituted ureas are being most heartily welcomed, both on and off the farm, as valuable and powerful new weapons in the never-ending war on weeds.

FEATURES AND HIGHLIGHTS OF SPECIAL INTEREST TO DU PONT'S
CUSTOMERS AND FRIENDS FROM PRESIDENT GREENEWALT'S . . .



ANNUAL REPORT FOR 1954

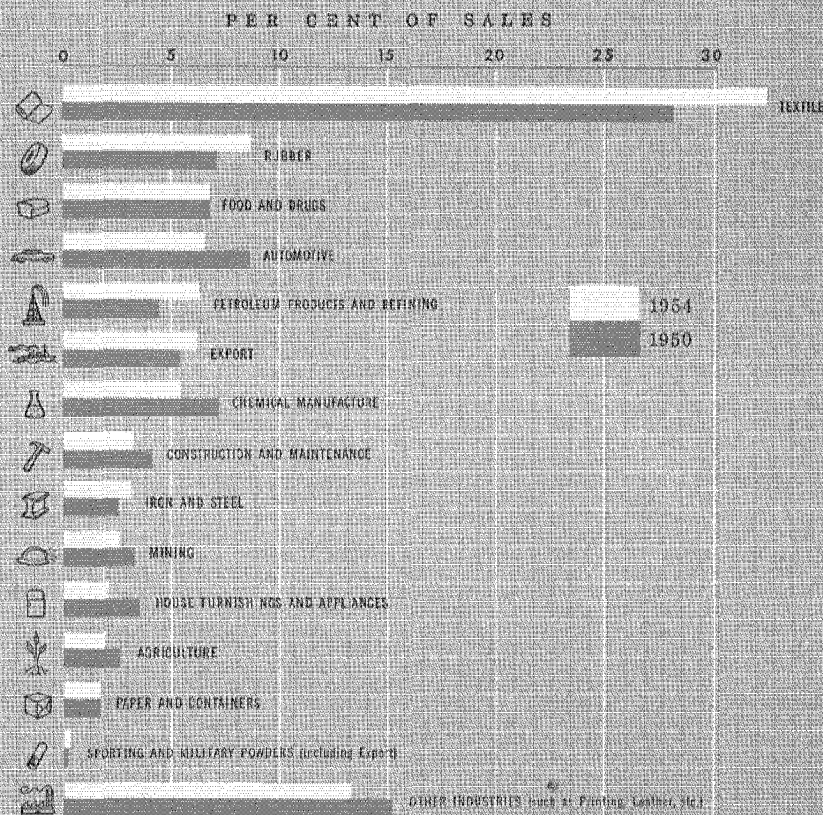
President Greenewalt and Board Chairman
Carpenter discuss the 1954 annual report.



Although sales in 1954 were 3.5 per cent lower than in 1953, last year was one of high industrial activity for Du Pont. Average gross operating investment was \$1,996 million, an increase of \$130 million or seven per cent over 1953. Earnings from Du Pont sources after taxes were at an all-time high of \$5.30 per share, compared with \$3.31 for 1953, due principally to the expiration of the excess profits tax. The year-end dividend was the 201st consecutive quarterly dividend paid on the common stock.

SALES DIVERSIFIED

Sales for 1954 were \$1,688 million, including \$103 million to customers outside the United States. The following chart indicates the percentages of Du Pont sales to customers in various industrial classifications in 1954 as compared with 1950:



Approximately 95 per cent of Du Pont products, in sales value, are sold to manufacturers for further processing. For this reason, an essential element in the Company's selling effort is technical assistance to customers in their use of our products.

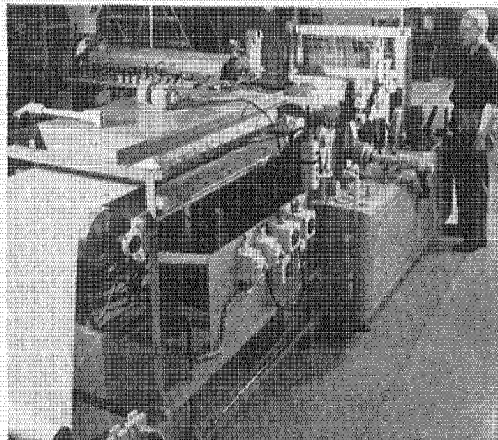
This concept is not new. The hazards involved in the use of explosives made assistance to customers necessary from the early days of the Company. Today, with Du Pont's diversified business, sales service has become increasingly technical. In fact, frequently sales service to customers is closely akin to research.

The extent of technology in sales is illustrated by a

"An essential element in the Company's selling effort is technical assistance to customers in their use of Du Pont products."

Textile Research Laboratory recently constructed near Wilmington. Here approximately 60 scientists and a non-technical staff of about 250 persons are developing textile technology that can help customers make more profitable use of Du Pont fibers.

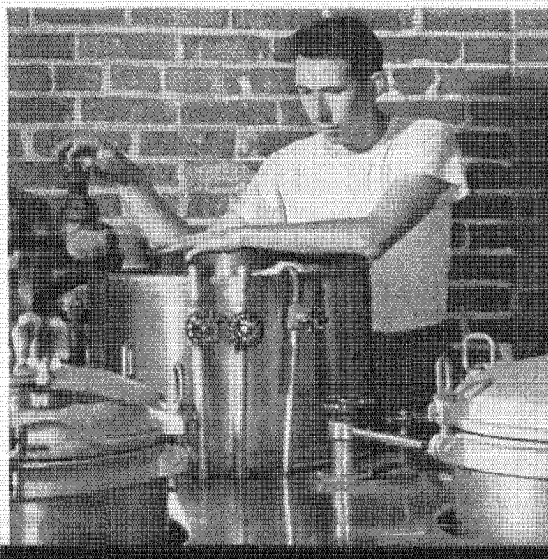
Under a single roof has been assembled equipment to convert staple fibers to spun yarns by most of the usual



New textile lab helps our customer make more profitable use of Du Pont fibers.



Polychemicals Dept. has also opened technical sales service lab at Chestnut Run.



commercial systems. Other equipment weaves or knits spun or continuous filament yarns into all of the principal types of apparel and industrial fabrics. Still other equipment dyes and finishes fabrics.

Most of this work seeks to develop better textile products from Du Pont fibers or to extend markets by developing new end uses. The wide background of textile knowledge acquired in this work should prove a valuable guide in continuing to improve Du Pont textile fibers.

Laboratories for three other departments are being constructed at the same site to provide service to customers. The Company maintains more than 50 technical service laboratories at various locations.

Technical assistance sometimes develops distinctly new production methods for other industries. Du Pont engineers, for instance, devised equipment for continuous bleaching of textiles to replace the traditional batch process. The new method reduced costs for customers. It also broadened the market for the Company's hydrogen peroxide.

ADVERTISING VALUABLE SALES TOOL

The Company's advertising is important in this sales effort. It comprises in part a variety of current literature on technical developments and on end uses of Du Pont products. All media, including newspapers, general magazines, Company publications such as this *Magazine*, exhibits, motion pictures, radio and television, are employed to reach present and prospective customers. Technical or specialized information is set forth in advertisements in trade and scientific publications.

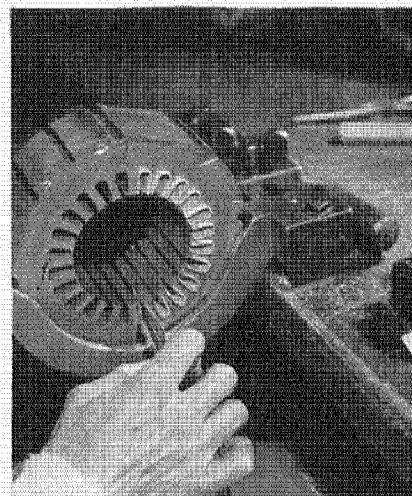
The television program, "Cavalcade of America," has proved effective in broadening general knowledge of Company policies, activities and products. This type of institutional advertising also promotes sales.

MANUFACTURING FACILITIES INCREASED

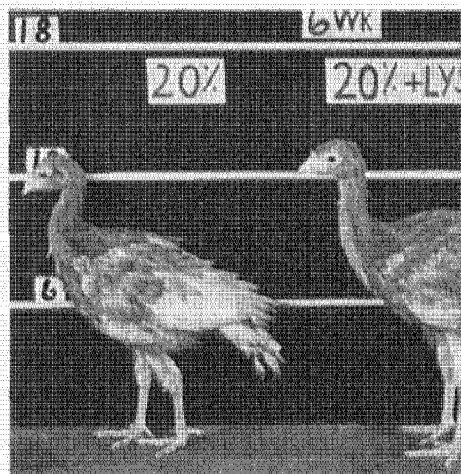
Six of the products represented in expansion program



Among products in 1954 expansion program was nylon, shown here in luxurious carpet.



"Mylar" film has excellent industrial future, as for electrical insulation.



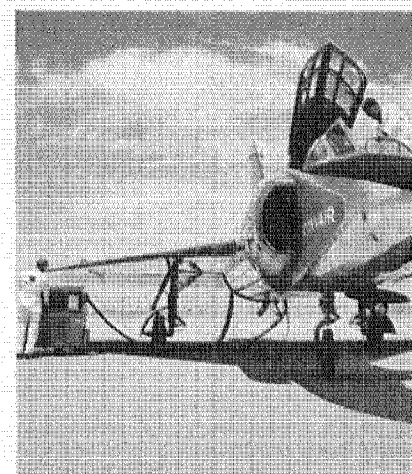
Methionine, poultry food supplement made in new Texas plant, speeds growth of fowls.



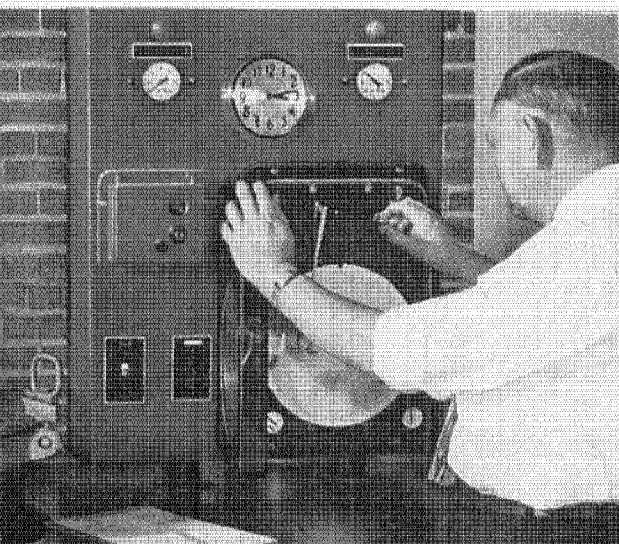
Du Pont increased polyethylene plastic facilities to keep up with new markets.



Plant capacity for making neoprene rubber also was increased during the past year.



More titanium metal is being made for aircraft, such as for parts in F-102.





TWO NEW PLANTS GO TO WORK

During 1954 the Company spent \$120 million to improve and expand plants and laboratories and to build new ones. \$135 million was spent in 1953.

Among the products represented in the expansion program were: Nylon • "Dacron" polyester fiber • "Mylar" polyester film • Titanium metal • Neoprene • Cellophane • Polyethylene plastic • Methionine • "Cronar" polyester photographic film base.

Two new plants were completed. Production of "Mylar" began at the Circleville, Ohio, plant in July. Late in 1954 the Beaumont, Texas, plant started manufacturing methionine, a poultry feed supplement.

Plans are under way for two additional plants: one at Montague, Mich., for the manufacture of neoprene synthetic rubber, another at Antioch, Calif., to make tetraethyl lead and "Freon" refrigerants.

ATOMIC ENERGY AND OTHER DEFENSE ACTIVITIES

The Company's undertaking to build and operate the Savannah River Plant for the Atomic Energy Commission is proceeding satisfactorily. Additional units were placed in production during the year, as well as research and development laboratories for the support of operations.

The major portion of the construction project, estimated to cost well over a billion dollars and reputed to be the largest ever undertaken, has been completed. However, it is likely that some construction forces will be at work on the site for an indefinite period.

The Company continued to operate the Indiana Ordnance Works at Charlestown, Ind., to meet Army production schedules. This plant was built and operated by the Company for the Government in World War II. Its principal product is military smokeless powder.

Capacity production from expanded facilities to produce titanium metal is expected early in 1955. This expansion was started in 1952 at the request of the Government.

SCIENTIFIC EDUCATION AIDED

The Company over the years has sponsored various programs to support scientific education in colleges and universities. Appropriations for this purpose have been increased from time to time and total \$805,000 for the academic year 1955-56.

Recognizing the growing need to encourage science and engineering in colleges and universities, the Company has expanded its financial support for such work. It has also extended it to help support improvement of teaching, now the largest single phase of the program.

Studies indicated a need to help advance the teaching of science and mathematics in high schools. Since it is in secondary schools that students begin to decide on their careers, inspiring teachers at this level can encourage students who have a talent for science and engineering.

The program, authorized in 1954, provides for grants totaling \$75,000. It will go to 11 colleges and universities for training high school teachers in these fields for the 1955-56 academic year.

Because progress in college and university science teaching also needs encouragement, two plans have been developed. Under one, grants for 24 postgraduate teaching assistantships were made to as many university chemistry departments. In the other plan, grants were made to 50 privately supported liberal arts colleges and smaller technical schools to advance the teaching of chemistry.

Industrial support of postgraduate science studies through fellowships was pioneered by Du Pont in 1918. Since then, more and more such fellowships have been granted by industry and others. Consequently Du Pont now is placing relatively greater emphasis on support of teaching. For the 1955-56 academic year the Company is providing 57 postgraduate fellowships for 38 institutions.

In 1949 the program was broadened when a total of \$100,000 in grants was made for unrestricted fundamental research in chemistry in ten universities. The amount has now been increased to \$279,000 for 34 institutions.

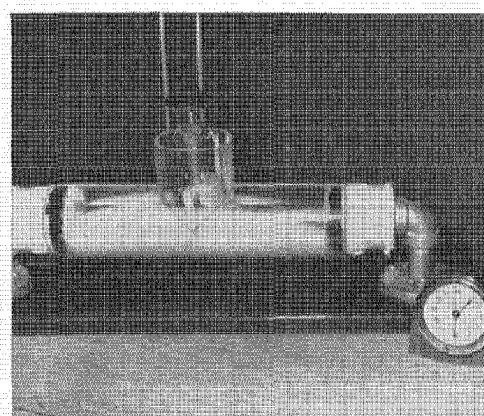
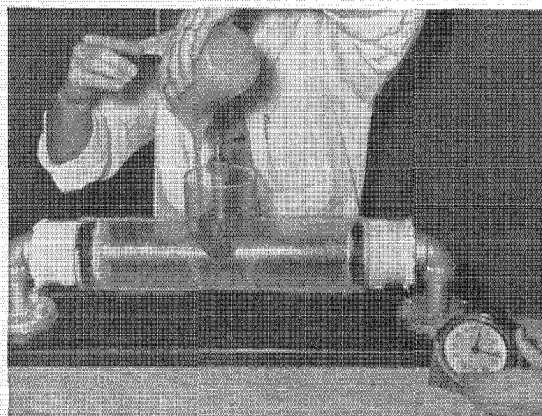
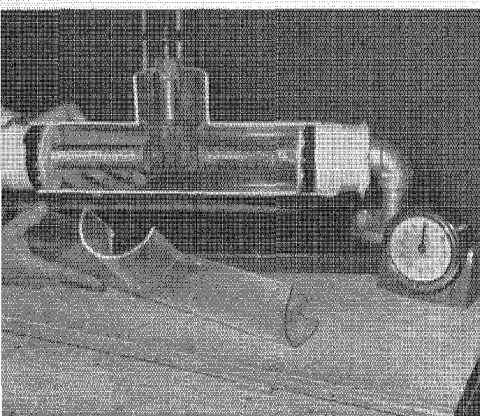
In no part of its program for support of scientific education does the Company stipulate specific research work to be undertaken, nor does it require any commitment as to future employment. The benefit to Du Pont lies in general progress in those branches of learning on which the Company's operations are based. Advancement in teaching and fundamental research in the sciences creates a reservoir of ability and new knowledge essential to industrial research. In the broader view it is also essential to national prosperity and security.

RESEARCH FACILITIES EXPANDED

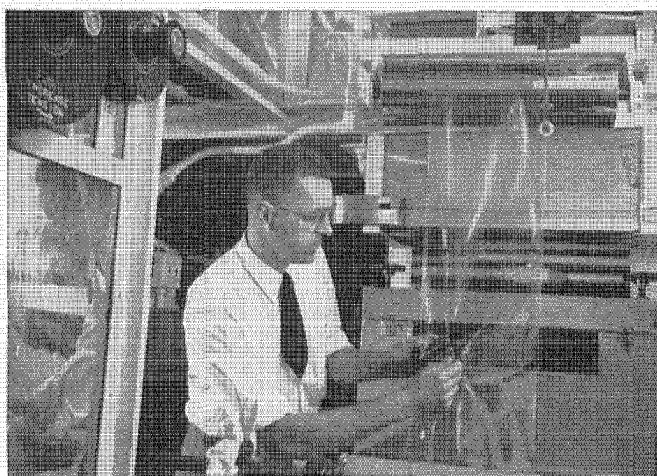
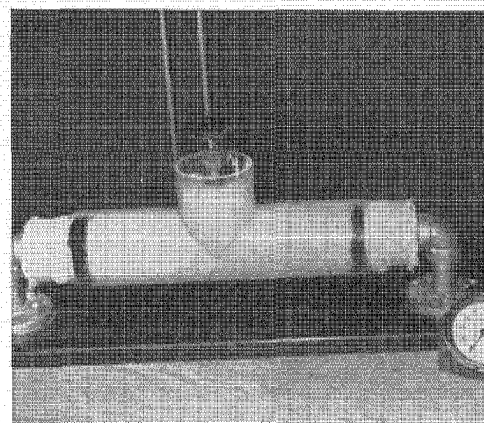
Last year construction began on three additional laboratory buildings at the Experimental Station, near Wilmington. When they are completed early in 1956, all ten manufacturing departments and the Chemical and Engineering departments will have facilities for long-range research at the Experimental Station.

In all, more than 1,000 technical people then will be engaged in research at the station. A like number of research personnel will continue to be located in laboratories at plant sites.

Since its establishment more than 50 years ago, the Experimental Station has been concerned primarily with long-range research aimed at diversifying the Company's business. A formal program of fundamental research was started there in 1927 and has become an important activity of each research division. A fruitful source of scientific knowledge, it has provided the basis for the discovery of new products and processes. The discovery of a new class of synthetic, crystalline polymers, for example, provided the foundation for development of nylon fibers and molding plastics as well as the more recently developed "Dacron", "Mylar" and "Cronar". Other products stemming from fundamental research include neoprene synthetic rubber, super tenacity rayon tire cord and synthetic plant hor-



"Products stemming from fundamental research include versatile class of chemical compounds, the diisocyanates, which have recently provided the bases for new elastomers, adhesives, sponge rubber and foam insulation" (as pictured in this sequence of pictures taken in the Rubber Chemicals Laboratory).



Discovery of synthetic, crystalline polymers laid foundation for development of "Cronar".

rectifiers. Process improvements made possible reductions in the price of "Teflon" tetrafluoroethylene resin, and ductile titanium metal sponge.

Research expenditures during 1954 were \$61 million, exclusive of laboratory construction costs.

ANTITRUST LITIGATION

No new antitrust cases were brought against the Company during 1954. The following developments occurred in cases previously brought by the Government.

General Motors et al Case—In December the Federal District Court in Chicago dismissed the case brought by the Government against the Du Pont Co., General Motors Corp., U. S. Rubber Co., Christiana Securities Co., Delaware Realty and Investment Co., Wilmington Trust Co. and certain individuals. Among other things, the Government sought to compel Du Pont to dispose of its investment in the common stock of General Motors. In its decision the Court found:

"... When read as a whole the record supports a finding, and the Court so finds, that there has not been, nor is there at present, a conspiracy to restrain or to monopolize trade and no limitation or restraint upon General Motors' freedom to deal freely and fully with competitors of Du Pont and United States Rubber, no limitation or

mones and herbicides. One of the latest additions to this list is a versatile class of chemical compounds, the diisocyanates. They provide the bases for new elastomers, adhesives, foam insulation, and sponge rubber.

Laboratories at plant locations contribute not only to the development of new products and processes but also to the continual improvement of existing products and processes to meet the keen price and quality competition in the chemical industry. For example, the Company recently announced an improved nylon molding powder that can withstand prolonged outdoor exposure, an extremely fast photographic film for press use, and silicon of exceptionally high purity for use in electronic transistors and

restraint upon the freedom of General Motors to deal with its chemical discoveries, no restraint or monopolization of the General Motors market, and no restraint or monopolization of the trade and commerce between Du Pont and United States Rubber . . .

"The Government has failed to prove conspiracy, monopolization, a restraint of trade, or any reasonable probability of a restraint, and for those reasons the amended complaint should be dismissed."

The Government has appealed this decision to the Supreme Court.

Cellophane Case—In December 1953 the Federal District Court for Delaware dismissed this action in which the Government charged Du Pont with monopolizing the manufacture and sale of cellophane and cellulose caps and bands.

In April 1954 the Government appealed to the Supreme Court from the decision with respect to cellophane. The Supreme Court is expected to hear arguments on the appeal this year.

I.C.I. Case—Final judgment in this case, which involved relationships with Imperial Chemical Industries Ltd. (I.C.I.), of England, required the Company to end its joint ownership with I.C.I. of three companies in Canada, Argentina and Brazil.

As to the companies in Argentina and Brazil, this was reported to you last year. Joint ownership of Canadian Industries Ltd. (C-I-L) was terminated in July. Under the plan approved by its stockholders, C-I-L's business and assets were divided between two new Canadian companies. C-I-L became a holding company, known as Du Pont of Canada Securities Ltd., holding all of the stock of one of

the new companies, Du Pont Company of Canada Ltd., to which was transferred C-I-L's nylon and cellophane business and assets and certain of its non-manufacturing assets. Du Pont owns approximately 82 per cent of the common stock of Du Pont of Canada Securities Ltd. The remainder of C-I-L's business and assets was transferred to the other new company, in which I.C.I. owns, through a Canadian subsidiary, about 82 per cent of the common stock.

MORE STOCKHOLDERS

At the end of 1954 there were 149,414 different owners of Du Pont stock. The number of common stockholders increased during the year from 129,994 to 133,997; preferred stockholders decreased slightly, numbering 21,984 at the year-end.

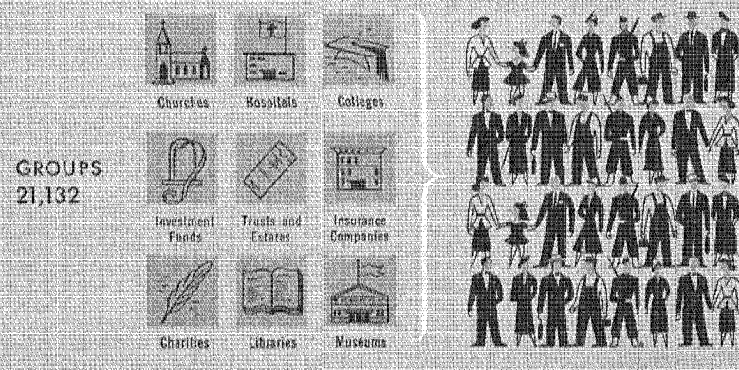
Of the total, 128,282, or 86 per cent, were individuals, the majority of them women. There were 65,127 women, 50,311 men, and 12,844 joint accounts. The individuals included farmers, craftsmen and industrial workers, bankers and other businessmen, doctors, nurses and other professional people, students, housewives and widows.

The remaining 21,132, or 14 per cent, were institutions and groups. For example, the Company's stockholders included 545 colleges, 216 hospitals, 516 insurance companies, 412 churches and 675 charitable institutions.

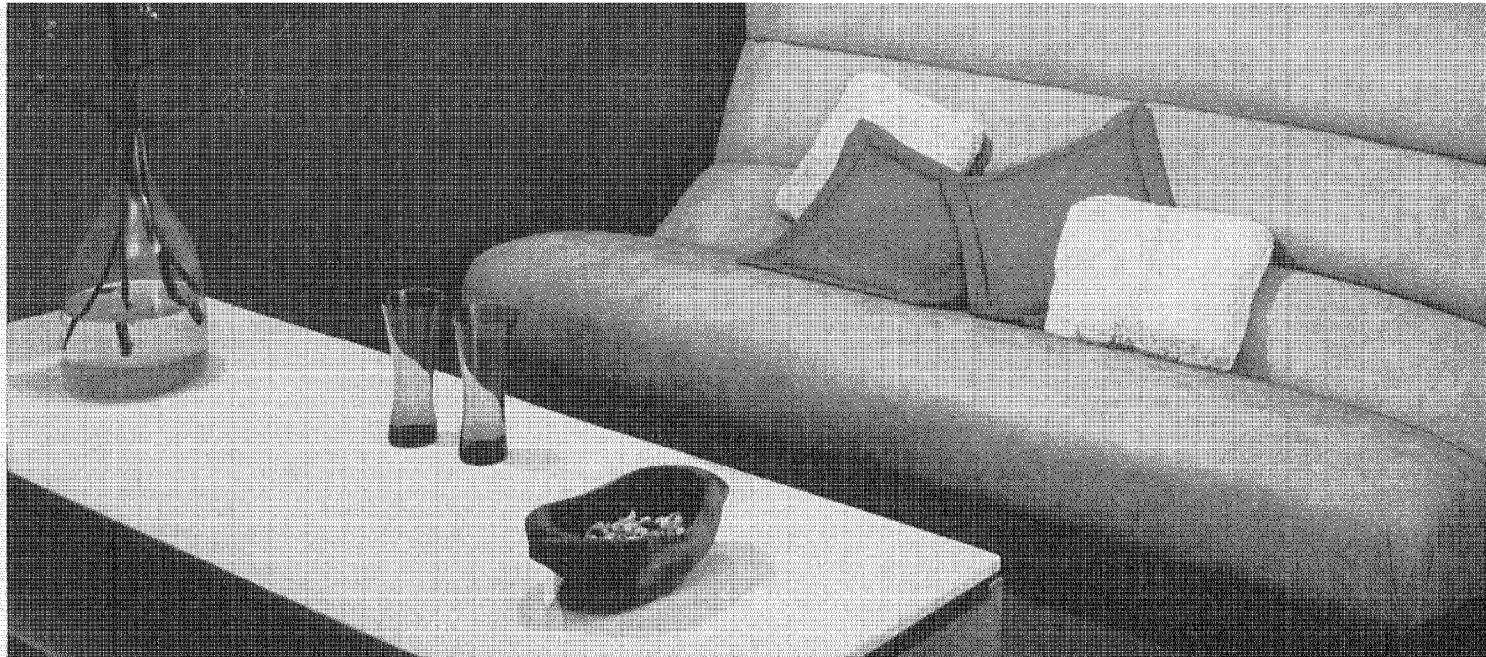
Through such organizations thousands of individuals, including insurance policyholders, students in colleges and patients in hospitals, benefit indirectly from the successful operation of the Company.

OWNERS OF THE COMPANY

December 31, 1954



Dividend checks being prepared for mailing to the 149,414 different owners of Du Pont Company stock.



This "Fabrilitite" breathes

*New Du Pont plastic upholstery contains tiny pores that
let air through to make sitting more comfortable*

If someone says the new Castleton pattern of "Fabrilitite" vinyl plastic upholstery is "breath-taking," this is not just a phrase of the advertising copywriter. The upholstery *can* take a breath of air through invisible pores built into the deeply grained pattern. And this new development is important not only to furniture manufacturers and upholsterers but to all who sit.

Before Russel Wright designed the Castleton grain and Du Pont made sure it could breathe, upholsterers had to see that air somehow escaped from plastic-covered areas. They used a cloth backing on a cushion, for example, or made use of vents or grommets. Naturally, a cloth-backed cushion isn't reversible.

With "Fabrilitite" that breathes, no air is trapped inside the cushion. When you sit down, the air in the cushion is pushed out through the tiny pores. Air continues to pass through the upholstery so that it remains cool and dry. The person who relaxes on a Castleton-covered seat of foam rubber enjoys the full comfort of the resilient, porous filling. There is no trapped air to build up pressure and create a hard seat. The cushion, entirely covered with Castleton, can be turned or reversed anytime.

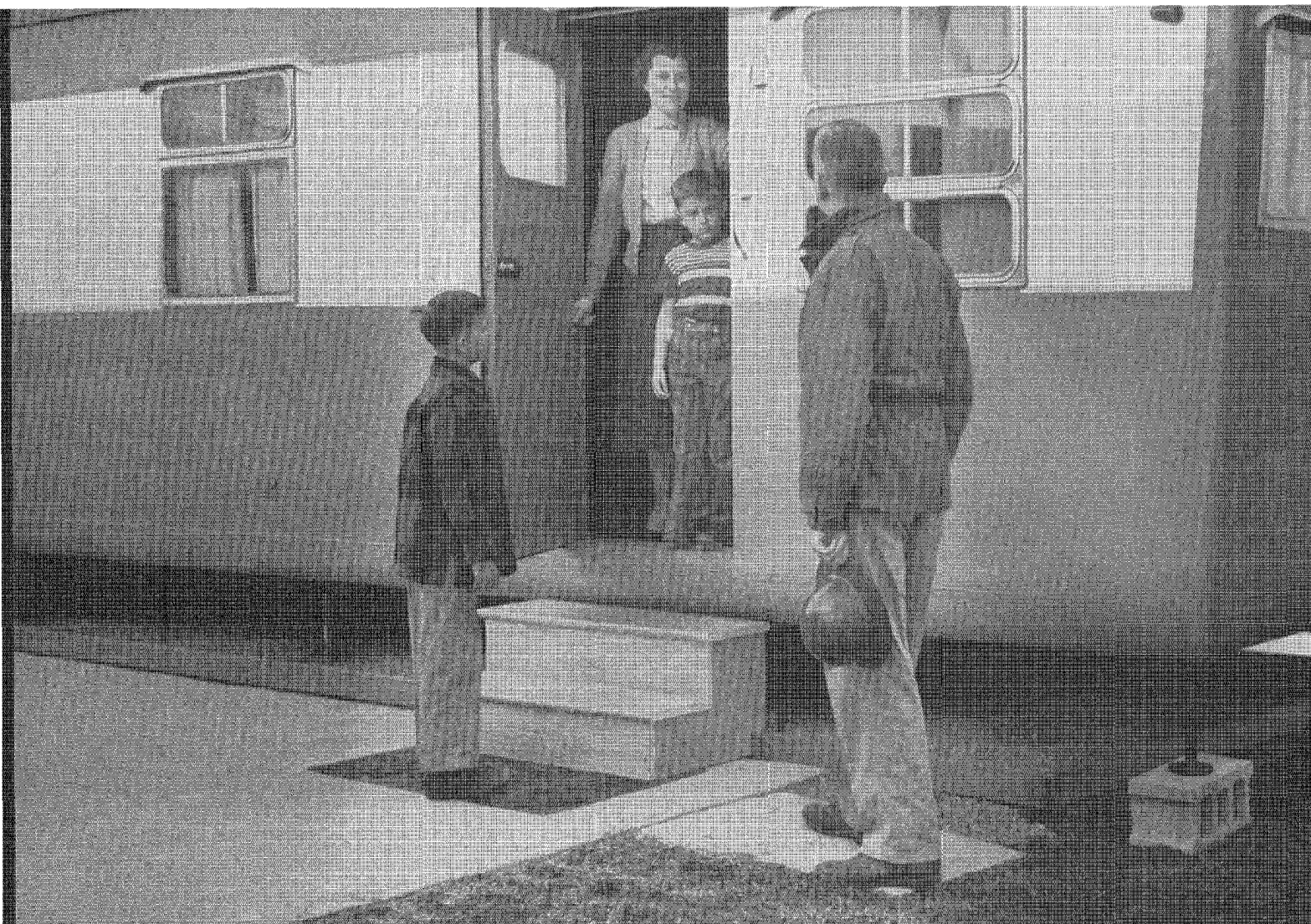
Besides adding comfort for the occupants and making possible reversible cushions of vinyl plastic, the new Castleton retains all the easy care qualities of traditional "Fabrilitite". The upholstery wipes clean with a damp sponge. Less soil accumulates in the first place because

the material's dry, high-slip finish encourages the dirt to keep moving. Taking advantage of a knitted backing, Castleton is engineered chemically to stay pliable even under heavy service conditions.

The new upholstery is available to furniture manufacturers and upholsterers in 15 colors, selected by Russel Wright. Furniture upholstered in Castleton may soon be purchased at most furniture dealers.

Proof of the tiny invisible pores in the "breathable" "Fabrilitite" is the smoke test shown here.





They take their homes with them

Two million people who move with their jobs or the seasons find trailers solve their housing needs. "Dulux" enamel adds color and durability to these homes on wheels

By MARY ELLEN EVANS

Since the days of the Conestoga wagon, that home on wheels that inched across the prairies to new lands and new jobs, Americans have been on the move. Last year, about 31 million of us changed our place of residence. Of this number, nearly ten million moved because their jobs took them to new places.

We may have to read history to be reminded of the covered wagon, but we have only to look about us to see today's mobile home, a streamlined house trailer that comes equipped with just about everything except a basement rumpus room.

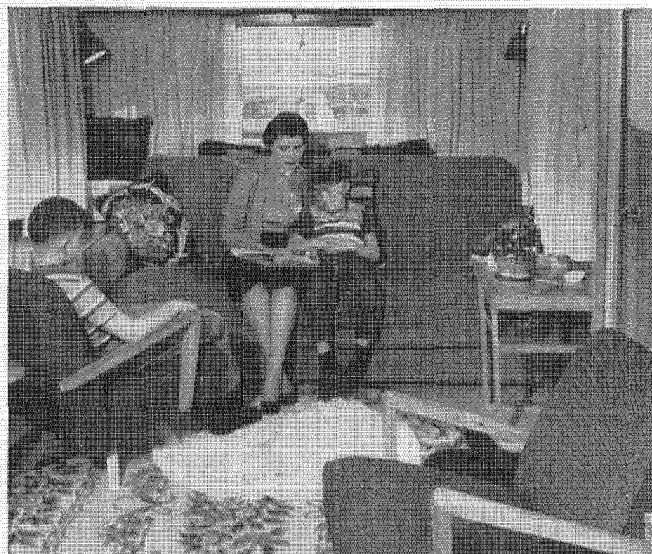
More than two million Americans—construction

workers, members of the armed forces, retired couples, students and others—have found the answer to housing in mobile homes. The industry that builds them is a billion-dollar business made up of nearly 200 manufacturers, 3,500 dealers and 12,000 trailer parks. Sales have shot up to 300 times what they were two decades ago. This home on wheels has literally rolled into our way of life, apparently to stay.

What are the new mobile homes like? Their convenience and beauty are striking if you recall their recent ancestors, known simply as trailers. The 1955 models are larger, 41 to 51 feet long and approaching the maximum

exteriors following the trend for automobiles in two-tone color styling. They are increasingly more streamlined. And like houses, they are featuring television, garbage disposal units, washing machines, air conditioning, radiant heating, and even upstairs bedrooms.

Most models contain a full bathroom with tub, some made of reinforced plastic. While most mobile homes feature aluminum and steel construction, one manufacturer has introduced a trailer with plastic sides. Many have picture windows. Kitchen appliances conserve more space than ever. Another manufacturer this year ventured into a design that resembles a cottage complete with upstairs, a porch and chimney.



Keeping the family together by living in a mobile home is a happy solution for construction workers.

The modern mobile home must not only be convenient and attractive, but it must be prepared to lead a dual life of highway vehicle and stationary house. The exterior finish must withstand the wear and tear of road traffic and the effects of southern sun, northern blizzards, or coastal salt air. For this reason, many manufacturers have taken a cue from the automotive industry and finish their mobile homes in durable Du Pont "Dulux" enamel.

The Vagabond Coach Manufacturing Co. of New Hudson, Mich., one of the oldest in the business, has used Du Pont finishes from the time it started in the early '30s. Vagabond's 1955 models gleam in exterior combinations of sparkling "Dulux" colors—Bittersweet and Majestic White, Glacier Blue and white, and Spring Green and white. The birch interiors of Vagabond homes are finished with "Dulux" clear finish.

"We are now painting all trailers," says George F. Miles, treasurer, "because color is important to most people these days—in their houses, their automobiles and their clothing. Mobile home customers are now more conscious of color on the outside than on the inside."

Dealers agree with manufacturers on the selling power of color. This is especially true, they say, of the young

The convenient, space-saving trailer kitchen often has more storage area than an average home kitchen.

couples buying their first trailer. And surveys show young couples do most of the buying now.

Wartime housing shortages and postwar industrial expansion boosted the mobile home into its present popularity. Before the war, trailers took the family on vacation or allowed retired couples to follow the sun from Maine to Florida. In general, they were small, colorless and bereft of conveniences. Wartime concentrations of skilled workers and armed forces made even inadequate housing difficult to find. Thousands turned to trailers to keep families together and to move them easily to the next job or military post.

The war proved that the trailer could be lived in year-round and that it meant a more independent, happier family life than was possible in most emergency housing.

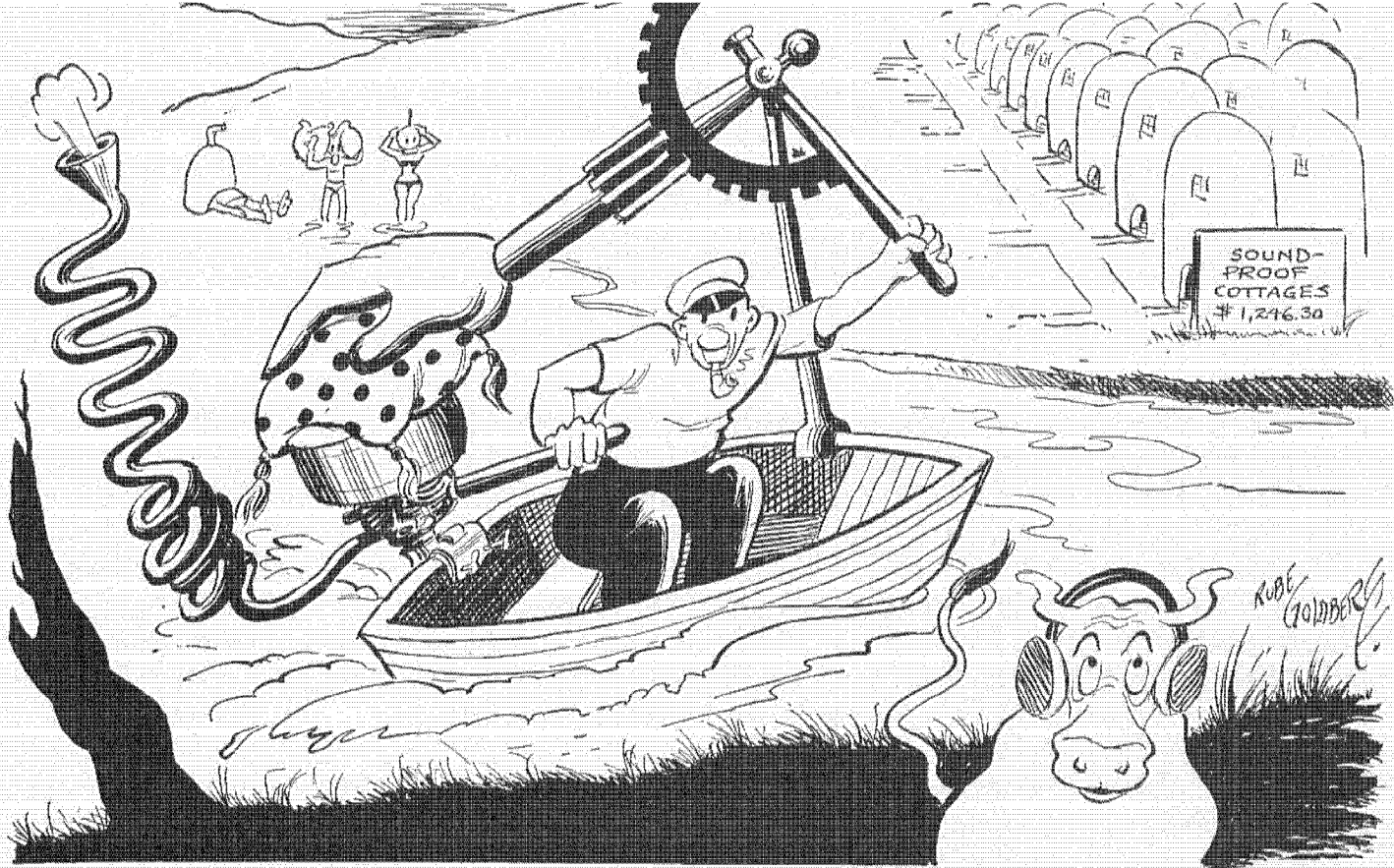
ANSWER TO INDUSTRY AND TOWNSPEOPLE

After the war, large construction projects began to call for the work of specialists for three months to three years. Even now, most towns do not have surplus housing and do not wish to build low-cost homes that will be left to rot away when the construction project is completed. The mobile home has been the answer both to industry and to the town.

Take, for example, the housing situation at the atomic energy plant near Portsmouth, Ohio, a city of less than 40,000 population. During the peak of construction activity there, nearly 25,000 persons swarmed to work on the plant buildings. It was like putting one small city down upon another. Where should this extra city live? For some 16,000 of the workers the solution was mobile homes. The result looked good to the city fathers. Old-time residents of Portsmouth say there was little housing dislocation, and about the only evidence of the huge construction project was heavier street traffic and better business. When construction ended, most of the workers simply wheeled their homes away to new construction sites.

"We like the fact that we can go anywhere at the drop of a hitch," said one mobile homeowner. The increasing popularity of the new homes on wheels seems to prove that many others agree with him.





Outboard without roar

By EDMOND C. FETTER

Two years ago the nation's largest producer of outboards, Johnson Motors, rocked the boating world by producing a truly quiet 5½ h.p. Sea-Horse. For that they won a citation of merit from the National Noise Abatement Council. Just a few months ago they did it again. The 1955 models of their big 10 and 25 h.p. motors are now so quiet, even at full throttle, boat occupants can converse in normal tones. The slap of waves is louder than the engine.

How was the outboard's roar reduced to a purr?

It wasn't easy and it didn't come quickly. The first step was taken on the first outboard made; a muffler was put on the exhaust. Then came the underwater exhaust and still later came the allover engine hood. Mufflers and resonating silencers were added to the carburetor air intake. Gear whine was reduced by machining gears to very close tolerances.

All these things helped, but by 1952 engineers had gone about as far as they could with hoods, mufflers and gears. Outboards still roared.

Johnson designers knew what they had to do. They must keep the engine from vibrating the boat, for it was the boat, not the engine, that radiated the din. It amplified engine vibration just as the box of a violin amplifies the sound of the vibrating strings.

The obvious answer was to mount the engine on vibration isolators, but designing a practical suspension was a

stopper. Annoyances popped up at every turn. Some sounds responded to treatment by changing pitch or character, but they didn't abate. Sometimes the elimination of one sound caused another to be amplified, or revealed a sound that had formerly been drowned out, or transformed an inaudible vibration into a definite noise. Time and again research engineers came up with an effective mounting only to have it rejected because it was too bulky, too heavy, too expensive, or too hard to manufacture.

To show how devilish the noise problem can be, W. C. Conover, chief engineer of Outboard, Marine & Manufacturing Co. (Johnson's parent corporation) likes to recall the story of Gas Tank Tinkle. It happened in 1949 when his company brought out their first separate gas tank. A young engineer borrowed a pilot model for a fishing trip. When he came back he said the separate tank was wonderful, but when he got to his favorite fishing spot and killed the engine, he kept hearing a little tinkle inside the gas tank. It was a most aggravating tinkle, the engineer said.

"I've got to admit," Conover says now, "he got the bum's rush. There I was, with a big roaring engine to quiet, and this fellow complains about a little tinkle in the gas tank."

"Do you know, though, when the separate tank got on the market, that damnable little tinkle became the number one complaint. We had to change to a different

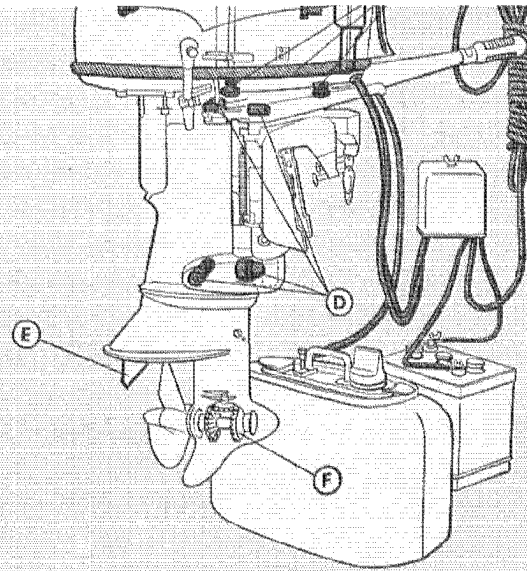
That's the kind of thing that happened all through the engine-quieting program. A noise doesn't have to be loud to be annoying, and John Public's ears were better than instruments when it came to detecting the aggravating little whines and whistles.

TAMING OF THE SEA-HORSE

The drawing of the cutaway engine shows how the big Sea-Horse 25 was finally tamed. The engine is supported on lightweight neoprene mounts that isolate engine vibration from the boat. As in a muted violin, vibration cannot pass freely from exciter to sounding board, and the result is the same: *pianissimo*.

Why did Johnson choose neoprene for their engine mounts? Because it meets all three requirements of rubber in an outboard. It withstands oil and gasoline without softening or swelling. It's strong and resilient. It stands up to long hours in sun and weather without oxidizing and cracking. Other kinds of natural and synthetic rubber are fine in one or two of the requirements, but neoprene alone meets all three. That's why it is used all over the Sea-Horse, not just for engine mounts. Hood mounts and seal strips are neoprene. All holes in the hood, through which fuel, ignition and control lines go into the engine, are sound sealed with neoprene grommets. Fuel line from the gas tank is neoprene tubing. All ignition wire is covered with this Du Pont rubber.

The Sea-Horse is a quieter beast now, but in neoprene gear and trappings it's as rugged and dependable as ever.



Quieting the outboard's roar meant changes in design and materials
A—Hood was mounted on neoprene • **B**—Mufflers were added to carburetor air intake • **C**—Powerhead was neoprene sealed • **D**—Engine was mounted on neoprene springs • **E**—Exhaust was put under water • **F**—Gears were machined to close tolerances to cut whine

Paper from man-made fibers

Du Pont's experimental product is three to ten times stronger than paper made from conventional pulp or rags

Paper has been successfully produced for the first time from man-made fibers by the Pioneering Research Division of Du Pont's Textile Fibers Dept.

New papers were made on a laboratory basis from nylon fiber, "Dacron" polyester fiber and "Orlon" acrylic fiber. While tests indicate the synthetic fiber papers can be made commercially, Du Pont will not manufacture them. Instead, the Company is making the details of the work available to the paper industry.

Its developers say the advantages of the new type of paper lie in the unusual properties of the man-made fibers that carry over into the papers made from them. They are "highly resistant to chemical attack, absorb very little moisture, and resist the action of molds, bacteria and light," Dr. Robert A. A. Hentschel, of the Pioneering Research Division, reported at the annual meeting of the Technical Association of the Pulp and Paper Industry.

The high strength of the fiber papers—three to ten times stronger than ordinary pulp or rag paper—suggests use in heavy duty bags. Their resistance to chemical attack

would be useful in filtration of corrosive liquids and packaging chemicals. The fact that the papers absorb little moisture may make them suitable for map and tracing papers and for important documents.

Dr. Hentschel further discloses that the resistance of the synthetic fiber papers to folding is up to 200 times that of paper made from wood pulp or rags. The cost of the new product is higher than wood pulp paper, he said, but is expected to decrease as use increases.

The man-made fiber papers may diversify further the range of paper properties, Dr. Hentschel says. Cooperation between the papermakers and fiber producers is expected to solve problems still blocking commercial production.

Photomicrograph shows bonding of "Orlon" acrylic fibers, 250 times size, in experimental paper.





Ever hear of fiberfill?

You'll probably be going to bed with it, if you haven't already. It's a newly coined descriptive word for the "Dacron" used to stuff pillows, comforters and sleeping bags

By GERALD KING

Some of the same qualities that make "Dacron" polyester fiber good for street clothes—its warmth, light weight and resilience—are winning it a growing popularity in bedding.

Pillows filled with "Dacron" first appeared on department store counters less than two years ago. Today one of the biggest manufacturers in the field is stuffing 25 per cent of his pillows with the Du Pont fiber. Comforters and sleeping bags filled with the synthetic are more recent developments, but both appear to be catching on rapidly.

More recent work has turned up promising applications in furniture and auto upholstery, in life jackets and other floating devices.

Along with the broadening uses has come a change in name. "Dacron" was once sold to the filling field as pillow-stock. Recently Du Pont switched to the more inclusive name, "Dacron" polyester fiberfill.

Consumer reaction to the pillows, the first product in which "Dacron" was used as a filling, has been enthusiastic. Among 1,800 purchasers surveyed, 70 per cent thought pillows filled with "Dacron" were more comfortable than others they had used, while 20 per cent said they were just as good. Another significant finding: of 575 persons reporting an allergy to dust, feathers or foam rubber, 85 per cent claimed less sneezing and coughing with a pillow of "Dacron".

One pillow manufacturer says the non-allergenic property of the fiber proved to be a potent selling point.

"We knew we had a fluffy, resilient pillow that held its shape, and we knew that 'Dacron' resisted matting. We even knew a woman could wash the pillow easily at home because the fiber dries quickly. But we never appreciated how many people were allergic to various pillow fillings. The fact that 'Dacron' is non-allergenic has been an important advantage."

This spring the Julee Comforter Mfg. Corp. is introducing a new electric quilt called the "Electropuff" automatic comforter, which will be filled with "Dacron".

"'Dacron' tops any other material I know of for comforters," says Julius Kaplan, president of Julee. "It's about one-fourth to one-sixth the price of good quality down, yet it's better in many ways. It's less apt to shift around inside a comforter, leaving lumps in one spot and voids in another."

"I can make a lighter weight product, too, because I don't need a heavy cover to keep feathers from poking through. And the comforter filled with 'Dacron' is washable."

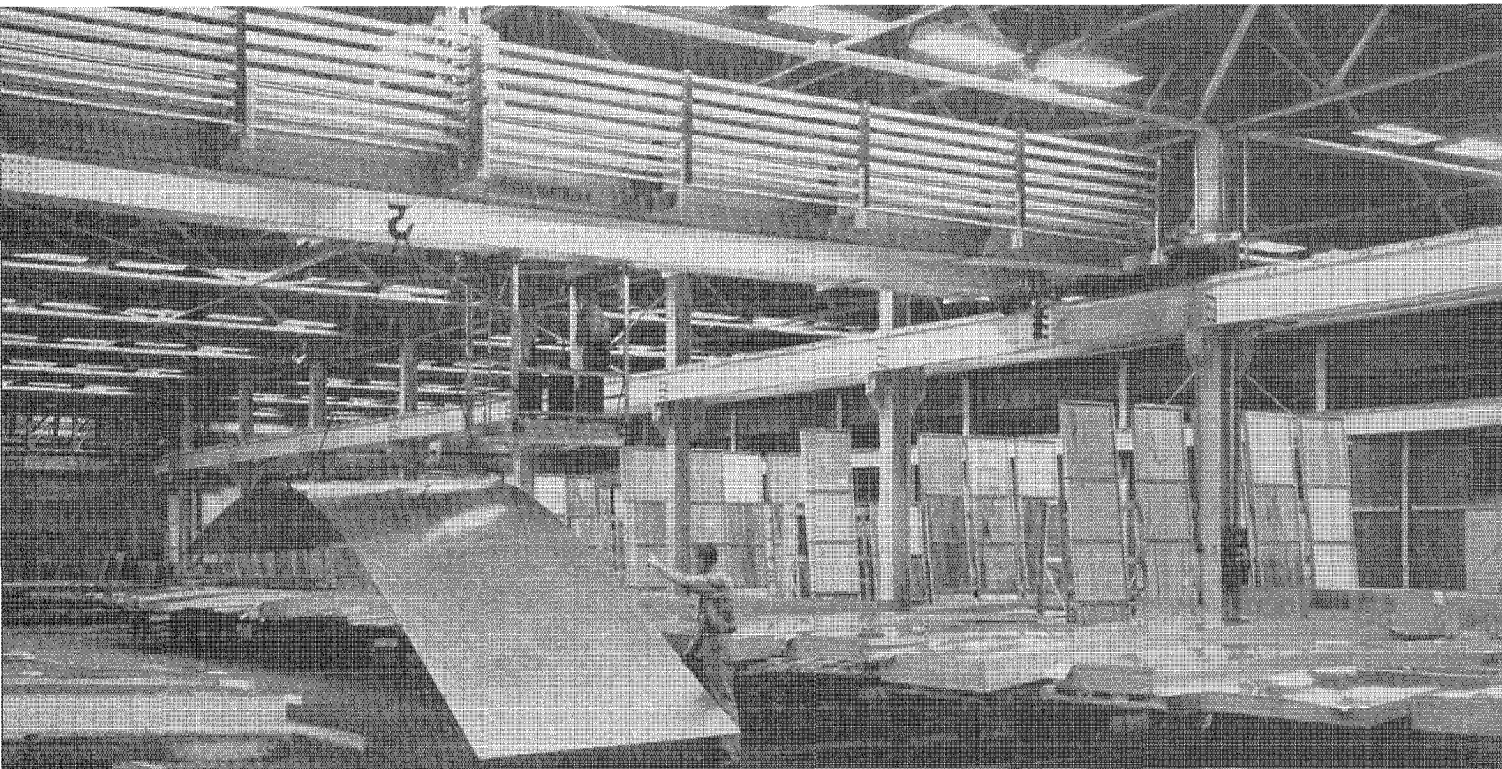
In sleeping bags, Kaplan adds, "Dacron" has moved to the fore with rare speed, capturing more than half the market in a year's time. The fact that it dries quickly is a strong point—as anyone who has ever spent days drying out on the trail will testify. "Dacron" also resists rot and mildew. The light weight of the filling is important, too; an extra ounce can feel like an extra pound by the end of a day's hike.

"Campers call us up to ask for sleeping bags with 'Dacron'," Kaplan says. "The word-of-mouth advertising must be terrific. Some aren't even sure how you pronounce it, but they know they want it."

Sleeping bags padded with "Dacron" fiberfill are warm, light in weight, and quick drying. They're making big hit with campers.



Pillows and comforters filled with "Dacron" hold their shape and don't tickle noses of the allergic.



Today, industry wants its warehouses, as well as offices, correctly lighted.

The right light for the job

This has been the aim of the Guth Company for 50 years.

Du Pont "Dulux" enamels help them reach their goal

"Inadequate, unbalanced lighting can make an employee tired and slow on the job," says Edwin F. Guth, Jr., president of the St. Louis light fixture company that bears his father's name. "Eventually, poor illumination can affect a person's eyesight and even his posture and health."

The Edwin F. Guth Company has done much to help correct this condition by developing fixtures that assure proper light for industrial and commercial buildings.

In 1902, Edwin F. Guth, Sr., now 79, formed the St. Louis Brass Company to make gas and electric fixtures. Most of the first electric fixtures could also be operated on gas, a precaution made necessary by the customer's hesitant faith in electricity. By the end of the first year of business, the little group faced bankruptcy. Orders for fixtures for the Louisiana Purchase Exposition, opening in St. Louis in 1904, helped save the business. In five years the company was on a sound financial footing.

In 1912, Guth introduced one of the very first packaged lighting fixtures, the "Brascolite". Up to this time, merchants had assembled chains, wiring, globes and bulbs for their customers.

"The 'Brascolite' put a white shirt on my back," says Guth. "Millions of 'Brascolites' were sold."

After the "Brascolite" brought the company into national prominence, the building boom of the 1920s filled their order books. Guth furnished custom lighting fixtures

for state capitols, courthouses, factories, convention halls and schools across the country. Always inventive, Guth, Sr., experimented with materials, designs and fittings to make lighting not only functional but correct in design for the building. In all, he was granted more than 150 patents for lighting devices.

Fluorescent lighting, introduced in 1938, brought new designs and materials—and new problems. Fluorescent lights produced about three times as much light for comparable wattage as incandescent lights, but they were cooler. Metal fixtures could now be finished with enamel, if the enamel met the requirements of good adhesion, durability in spite of bending and bumping of the metal, color retention, high reflectivity and moderate cost.

"From the beginning of our interest in baked enamels, Du Pont has worked closely with us," Fred Guth, company executive, says. "The local Du Pont salesman worked practically around the clock with us on our painting system. We have used 'Dulux' enamels from the first. We found high reflectivity in the whites. Their heat resistance made it possible for us to use them with incandescent light. We have learned to prepare steel properly before applying the hot enamel, and we are now using shorter baking schedules. We can vary the gloss for light diffusion from a high gloss to a dead matte. In addition, 'Dulux' can be pigmented with color. Yet with all this, cost is reasonable."

The engine* purrs with power

NEW TOP OCTANE

This is the engine that blazed the way into the Power Era! This is the proved high-compression engine with billions of miles of driving behind it!

High-Compression Engines...

HIGHEST OCTANE

gives any gasoline more power
...controls knock in high
compression engines

NEW higher power, new higher compression ratios, for faster acceleration with regular gas. Five ultra-modern, short-stroke engines, four V-8's and a Six!

Get Peak Performance from

Modern high-compression

The '55 gasoline for all high-compression engines

This Year

Made especially for newer
high compression, high-powered
engines. Makes most cars run better!

powerful new V-8 and 6

a new high in V8 power

HIGH COMPRESSION—New Super Blend is made especially for newer high compression, high-powered engines. Overcomes engine ping and knock. Insures freedom from sticking valve lifters. Reduces camshaft wear. Gives peak power and performance!

SO POWERFUL... '55

Up to 5 extra octanes

NEW KIND
OF OIL

...WORLD'S MOST
POWERFUL ENGINES...

V-8 with higher compression

Why high compression car engines?

*What's Detroit up to, boosting engine
compression ratios to almost double the 1930
level? What does the trend mean for car owners?*

*Here to answer our questions is Paul Richard,
an automotive engineer who is the eyes and
ears of Du Pont's Petroleum Chemicals Division
in the Motor City*

Q. What does a higher compression engine mean to the motorist?

A. It means better car performance. It actually gives greater horsepower and better fuel economy. If you were to increase the engine's compression ratio in your present car, it would automatically produce more horsepower. If you were a conservative driver and never used this maximum horsepower, the higher compression engine would give you more miles to the gallon than you're getting now.

Q. Yet today's cars seem to give no better mileage than the older ones. Why?

A. They're heavier. The same amount of gasoline is hauling more weight around at higher speeds.

Q. Which of the 1955 model U. S. cars has the highest compression ratio?

A. This year both Buick and Cadillac have a compression ratio of 9 to 1. Five other cars have compression ratios of 8.5 to 1. The lowest this year is approximately 7.3 to 1. This compares with a weighted average of compression ratios of 5 to 1 in 1930, so you can see how engine compression has climbed.

Q. I've heard that a high compression engine operates at a higher temperature. Is this good or bad?

A. A high compression engine does operate at a higher temperature during the combustion part of the cycle. During other parts of the cycle, however, it actually runs cooler. This is demonstrated by the fact that a smaller

a low compression engine of the same horsepower. The point is that you get more actual work out of the fuel in a high compression engine. Less gasoline is wasted in heat to the cooling system.

Is it good or bad? It's good. Any heat engine—steam, gasoline, diesel or what have you—is more efficient when it operates at a higher combustion temperature.

Q. How high are compression ratios likely to go? Is there any practical limit on how high they can go, or will they just go on increasing indefinitely?

A. In the industry, compression ratios as high as 12 to 1 are foreseen by 1960. It's a little hard to say what the limit may be. One limiting factor is fuel. The higher the compression of an engine, in general, the higher the octane number of the fuel required for knock-free operation. At present there is a practical ceiling on the octane numbers of fuel that can be produced economically in the vast quantities needed for automotive consumption. We can make 100 octane fuel, of course, but it's difficult to make it in the quantities required at a price the motorist would be willing to pay. A 10 to 1 engine, for example, would require a fuel of about 100 to 105 octane. I'm taking a little poetic license here, because our octane scale ends at 100. But engine requirements are going beyond that old 100 mark.

Q. How is the petroleum industry facing up to this situation?

A. By 1960 refining processes now being developed are likely to be in operation. Improved antiknock additives also are being worked on. Another facet is that auto manufacturers may design their engines so that higher compression ratios can be used without increasing octane requirements very much. The design of the combustion chamber, carburetor and spark advance can govern to some degree the octane requirements. In effect, you design the engine to burn its fuel-air mixture more rapidly.

OCTANE RATINGS CLIMB FAST

Q. How high is the octane number of gasolines now on the market?

A. Gasoline rated at 95 octane is now generally available at premium pumps. In many locations it's possible to buy even higher octane fuel in the premium grade. These fuels meet the requirements of present engines, and they are evidence of cooperation between the automotive and petroleum industries for the motorist's benefit. The two exchange information through the American Petroleum Institute and the Society of Automotive Engineers, for example. In addition, representatives of the oil companies and their additive suppliers are stationed in Detroit to stay abreast of developments. My job is to help keep Du Pont and our petroleum customers up to date on the fuel and lubrication requirements of new vehicles. This lets us know the direction our research at Du Pont should be taking. We're following Detroit's work on automotive gas turbines, for example, with great interest, although no turbine-driven car may be on the road for ten years. We also keep the automotive people informed on new developments in chemical additives. This exchange of information is invaluable to all concerned.

Q. What is the petroleum industry promising for the next few years as far as higher octane fuel is concerned?

octane gasoline. It was originally estimated that we wouldn't have this until 1960, but the climb in octane numbers is being accelerated. The addition of more tetraethyl lead will be partly responsible, but most of the increase in the years ahead will come through improved refining.

Q. Besides a higher antiknock requirement, what problems are high compression engines presenting for the petroleum industry?

A. Engine deposits left in the combustion chamber by fuel and oil are a serious problem. They can raise the octane requirement of an engine approximately eight points, and cause knocking. Cleaner burning gasolines and lube oils that leave less residue in the combustion chamber are an approach to the problem. Du Pont's petroleum laboratory and others found that a more volatile lube oil would cut down engine deposits, for example. This more volatile lubricant, designated as a multi-grade oil is being marketed now by many refiners as their top grade oil. It can reduce deposits, thus lowering the engine's octane requirement a good three or four numbers.

BIGGEST BUG: PREIGNITION

Engine deposits are also responsible for the toughest problem presented by high compression engines—preignition. As compression ratios climb, the deposits glow under certain operating conditions, igniting the fuel-air mixture prematurely. This raises the octane requirement, may cause power loss, and in severe cases can break pistons and warp exhaust valves.

Q. What can you do to lick this?

A. There are two possible attacks. One is to reduce deposits. The other is to modify the deposits in some way so that they will be less harmful. Du Pont, along with the rest of those concerned, is putting a lot of research effort on the problem. I predict it will be licked.

Q. How can I tell whether my car needs regular or premium gas?

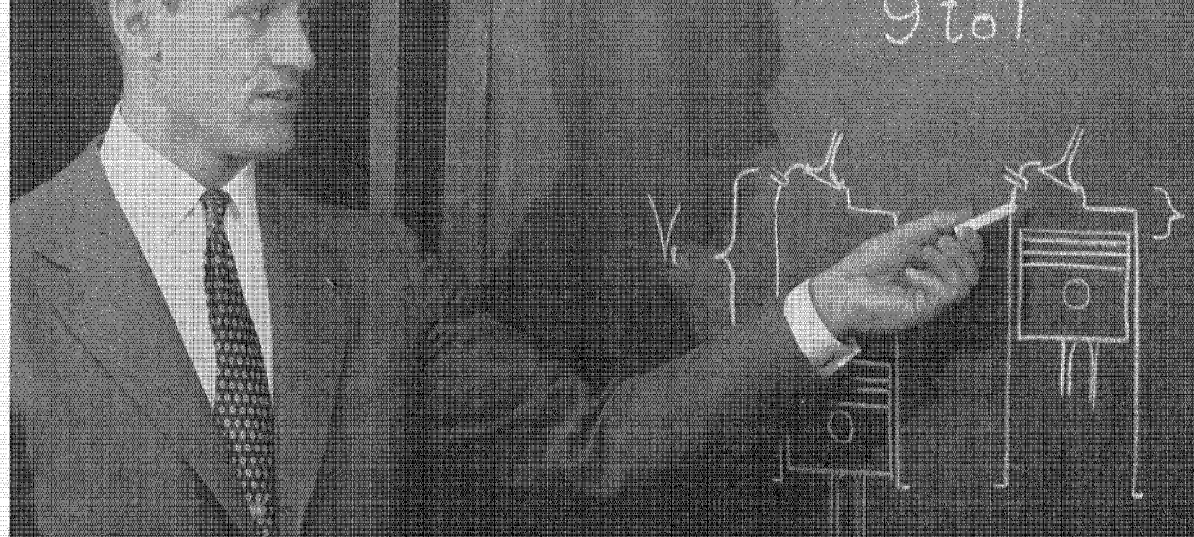
A. Check the owner's manual, which usually specifies the grade required. If it isn't specified, then try regular. If the car usually knocks on regular, you need premium. Premium gasoline also warms up the engine faster, reducing the danger of crankcase dilution and letting the engine make better use of the fuel it receives.

Q. Will you summarize what the motorist can expect in the way of over-all performance in his future cars?

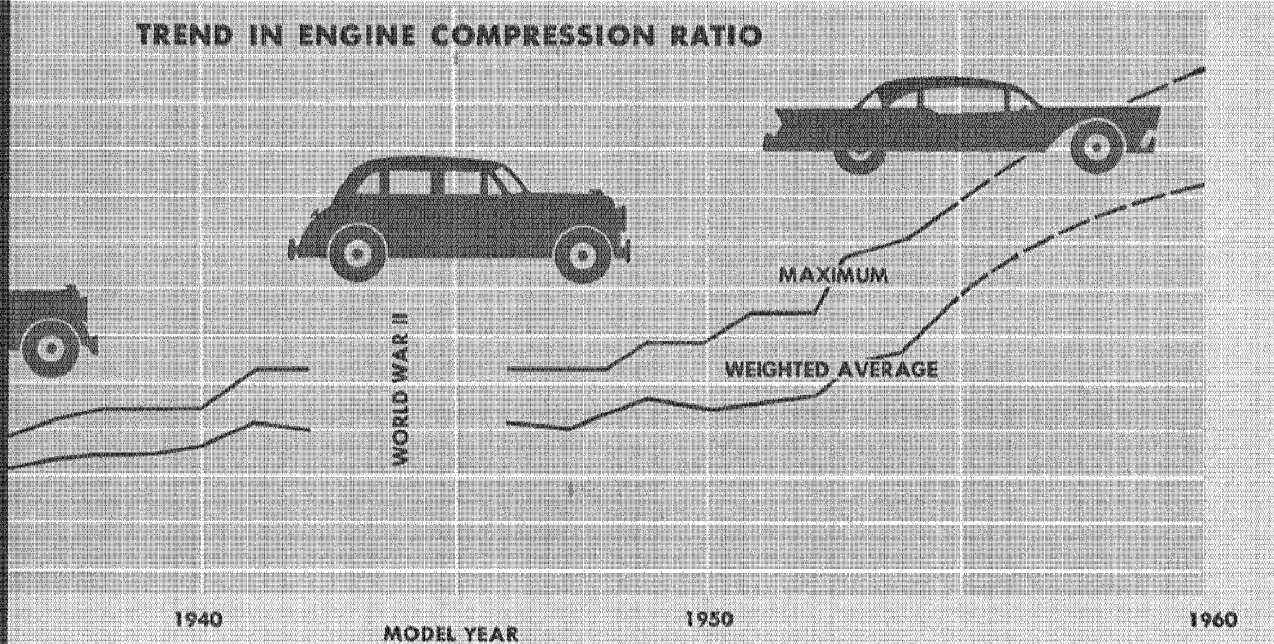
A. Future cars will have more power, giving still better performance than is available today. By performance I mean acceleration throughout the entire speed range. Because high compression engines are more efficient, this improved performance will not be achieved at the expense of fuel economy. Auto manufacturers and refiners are working together to make this possible.



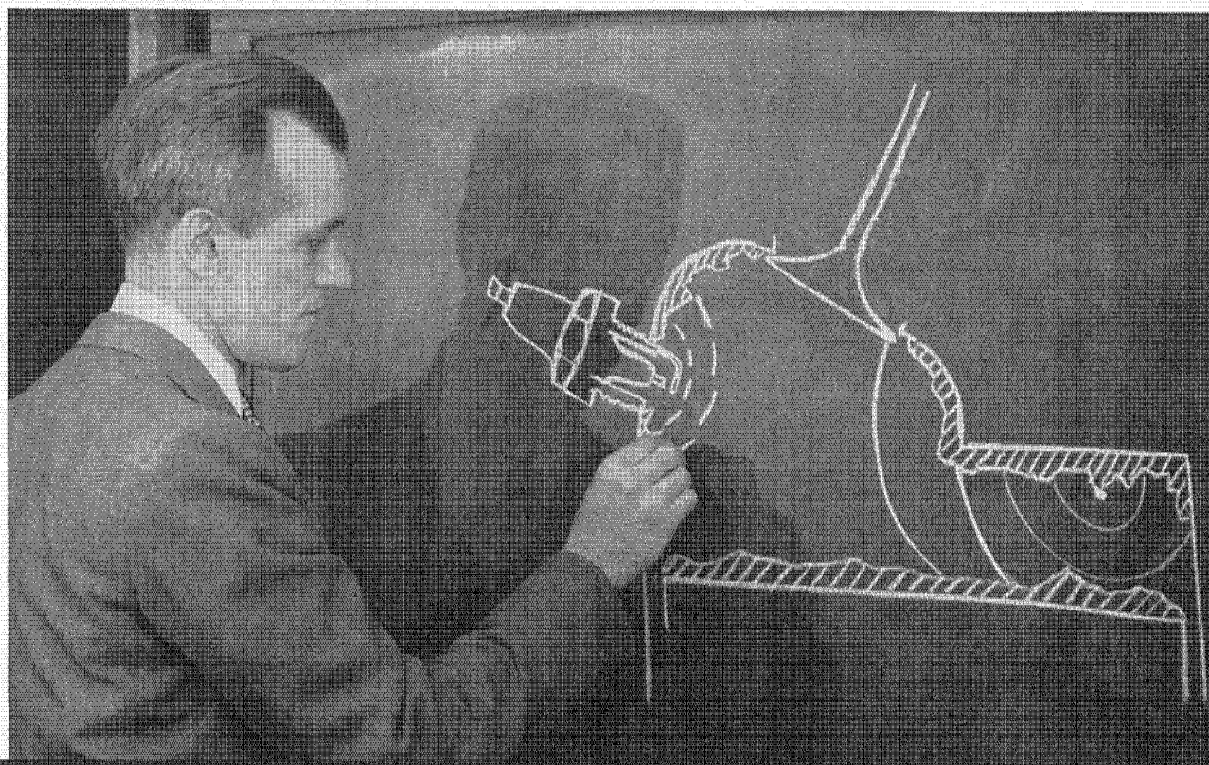
In high compression engine, Richard explains, piston stroke exerts a greater squeeze than in older engines. This increases combustion temperature, and raises the engine's efficiency to a new level, he points out.

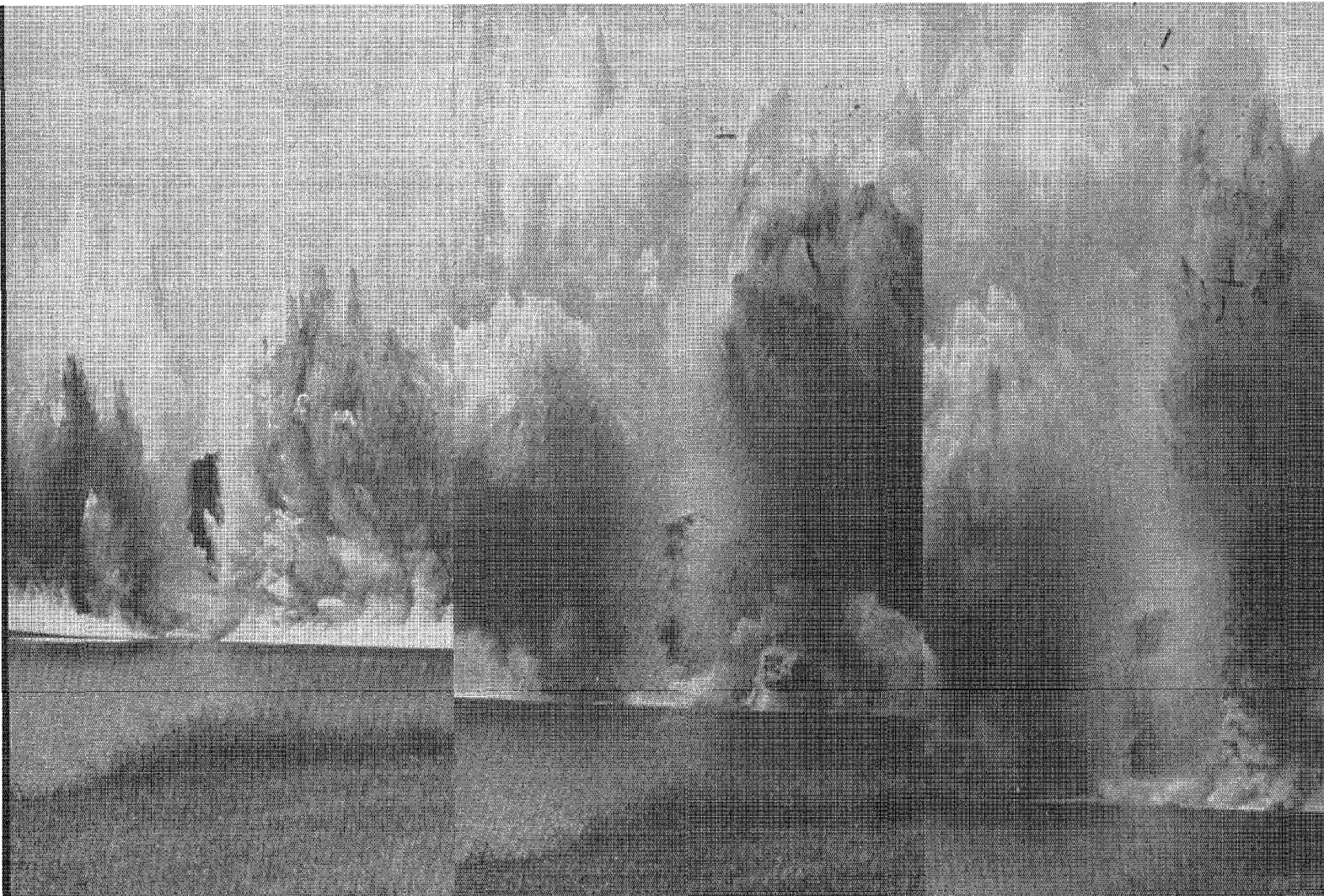


TREND IN ENGINE COMPRESSION RATIO



Preignition caused by deposits (cross-hatched) is big problem in high compression engines. Glowing deposit (rt.) ignites the fuel-air mixture before spark plug fires, causing engine knock. Solution is a major target of research.





At 10:55 a.m. the sightseers held their bre

The day they blew up the dam

*Du Pont explosives clear the Cumberland River
of outdated dams as new
navigation and power project opens*

By NEIL O. JOHNSON with MARY ELLEN EVANS

On a Saturday morning late last July, sightseers gathered along the Cumberland River banks overlooking Lock and Dam A. They were waiting for the death of the aging dam, and except for the nostalgic tales of a few old river men, most of them were glad to see it go.

Not that they didn't give the lock and dam its due. It had served the Middle Tennessee basin well since the first boat went through the locks in November 1904. It had seen the passenger-and-cargo-carrying packet steamboat give way to the modern towboat whose barges carry more tonnage than the largest Victory ship of World War II.

Although the lock had been a boon to navigation 50 years ago, nowadays the large tows couldn't pass through the lock in one operation. The tows had to be broken and locked through a few barges at a time, with the towboat going back and forth like a switch engine in a railroad yard. When two tows met at the lock, there was nothing the exasperated pilot of the upbound tow could do but stand by for hours waiting his turn.

The Army Engineers, as well as shippers and river pilots, had long known something must be done. The



while a mighty wall of water, concrete and steel shot skyward. The entire 536-foot-long dam seemed to disintegrate before their eyes.

answer came in a navigation and hydroelectric power project for the Corps of Engineers, Nashville District. Plans called for the building of Cheatham Dam, below old Lock and Dam A, and the construction of another dam near Old Hickory, northeast of Nashville. These projects, plus others on the Lower Cumberland, would make the river an inland waterway that could accommodate the largest of river craft from the Ohio to Carthage, Tenn., some 300 miles eastward.

OLD MAKES WAY FOR NEW

By this July morning, Cheatham Lock and Dam was near completion. If old "A" were not demolished before the water started rising in the reservoir, it would be one devil of an underwater hazard for shipping.

At 10:55 a.m. the sightseers got the show they had waited for. One mighty blast of water, concrete and steel shot skyward. The entire 536-foot-long dam seemed to disintegrate before their eyes. In seconds, the wall of spray and debris reached its peak, then dropped down, a few final bits of steel splashing into the river before it became calm again.

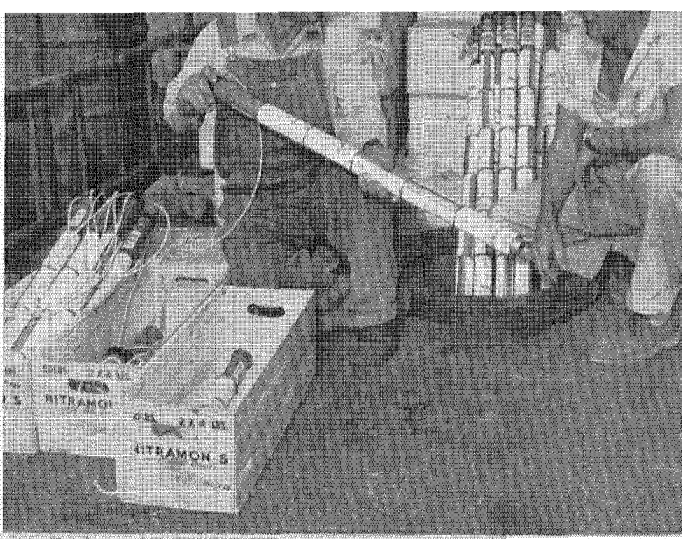
To the camera-clicking crowd, the blast had been worth the standing around. It isn't every day that one can safely photograph a dam on the fly. But to the Army Engineers and the men of the New London Materials & Construction Co., contractor for the demolition, the photogenic blast was simply another well calculated step in clearing the Cumberland for modern navigation.

The steps had begun when Jim Richards of the contracting firm had examined the old dam. He found it was constructed of a four- to eight-foot-thick concrete pad over heavy rock-filled cribbing. Steel piling reinforced the upstream side. On the downstream side was a 33-foot-wide concrete apron. The central part of the dam consisted of eight-foot steel wickets placed side by side and mounted on a heavily reinforced concrete base.

The dam might be obsolete but it was sitting solidly in the river. Richards and his superintendent, Cliff Grindy, decided that blasting was the only economical way to crush the dam so that it could be rooted out by dredging machines. C. H. Gause & Sons, divers, handled the underwater work.

An intricate distribution of more than 10,000 pounds

Experienced in demolition work, these men prepare Du Pont "Nitramon" S charges for underwater blast.



of Du Pont explosives was plotted carefully. Eight hundred holes were drilled in the concrete under the wickets and loaded with 60 per cent Special Gelatin, a water-resistant dynamite. Four rows of holes were also drilled in the upper apron. The underwater part of the apron was prepared with 50-pound doby charges at 10-foot intervals. At the base of the wickets, they placed 1,000 pounds of 60 per cent "Hi-Velocity" dynamite bombs to shear the steel. More than 3,000 pounds of "Nitramon" primers were floated under the apron. All charges were hooked into trunklines along the top of the dam. Water levels on the upper and lower side of the dam were equalized Saturday morning and the charges touched off.

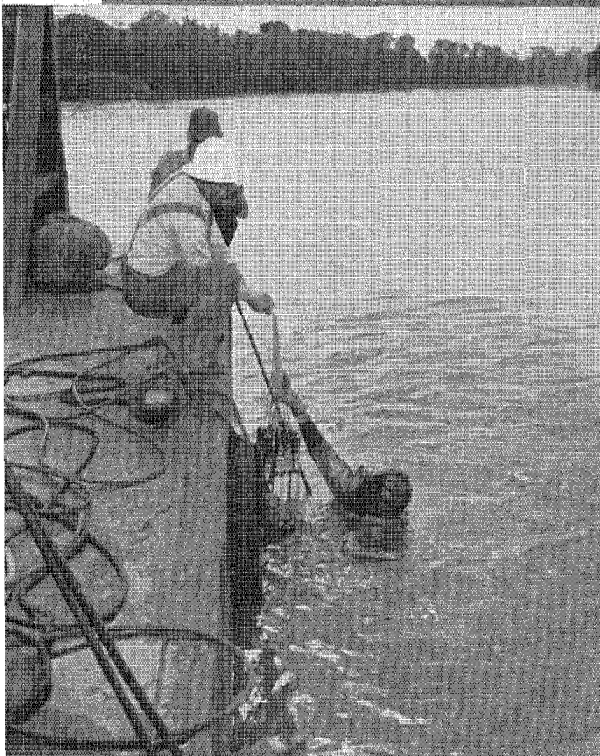
What appeared to be one mighty blast to the sight-seers was a series of explosions that leapt from the lock wall on one side across the dam to the lock wall on the other. They were timed so that the intervals between were so close they seemed to be nonexistent.

After this shot, the demolition men started on the wagon drilling and blasting of the large, solid hand-hewn stone lock.

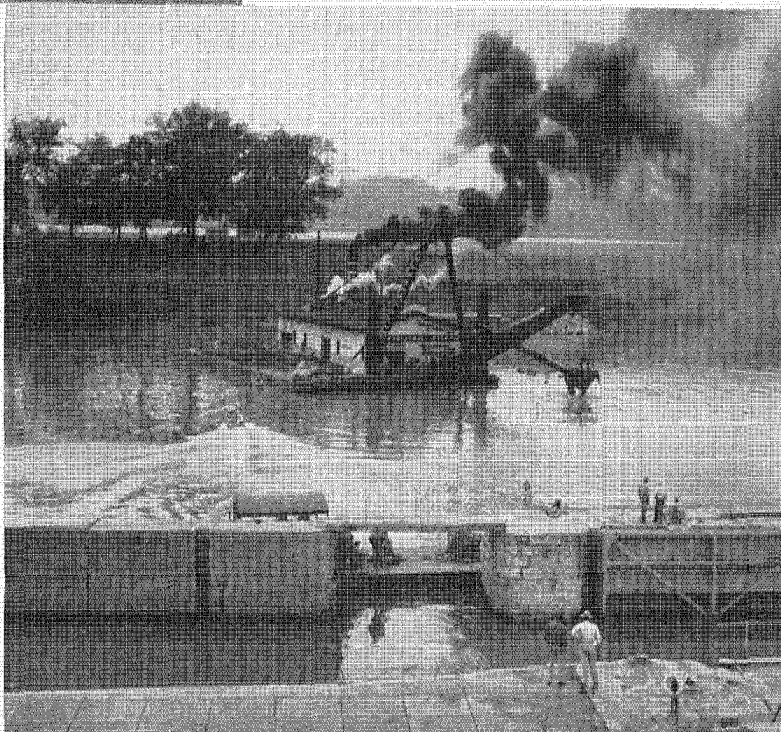
SECOND DAM SHOT

By October they had reached Lock and Dam 1, near Nashville, the second old dam to be retired by the new Cheatham Reservoir. Here, because of nearness to buildings, the blasting was completed in separate shots using "Nitramon" S charges in holes drilled by divers under six to eight feet of water. For each blast, holes were hooked together by "Primacord" detonating fuse. Also tied in with "Primacord" to the drill holes were doby charges in the lower lip of the dam. By demolishing this lock and dam in separate, smaller blasts, not much more than a quiver reached the nearby buildings.

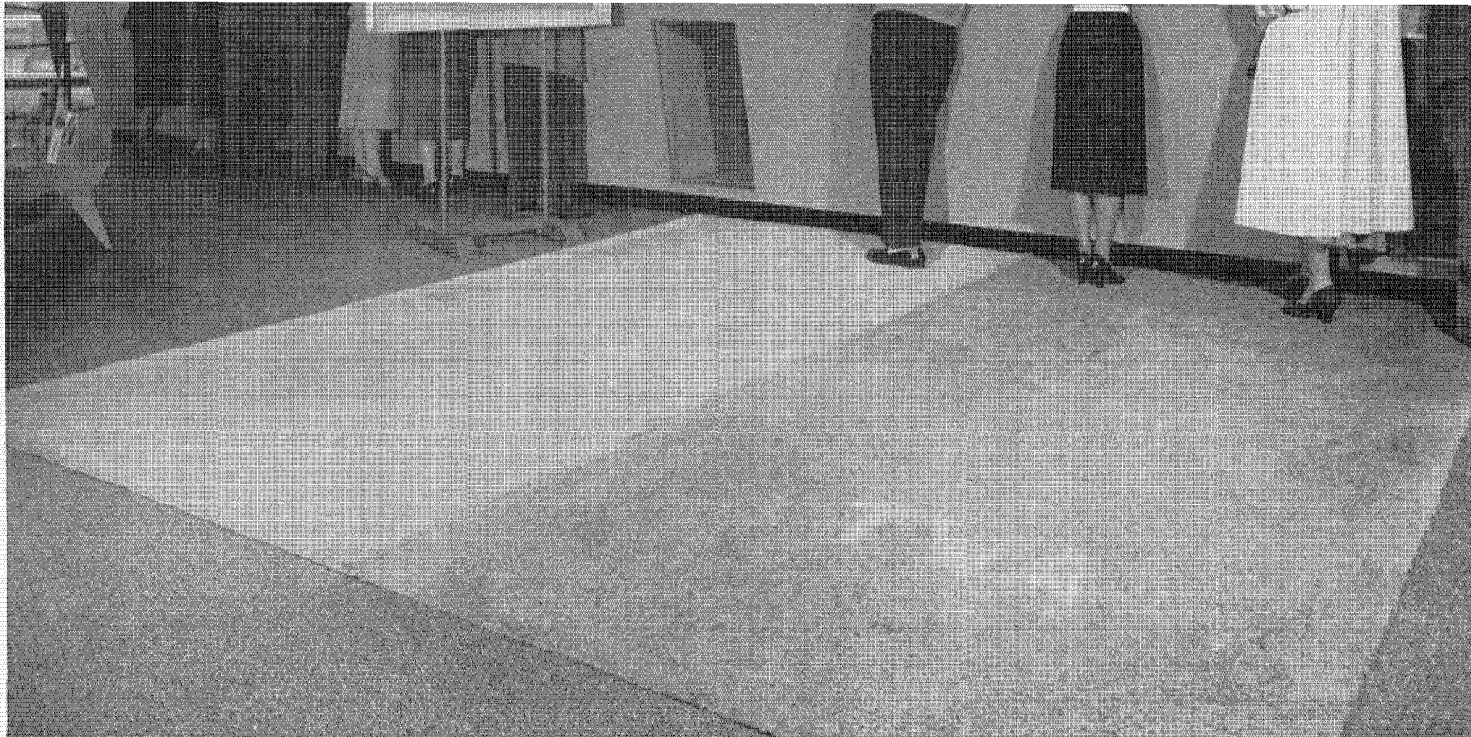
With the building of new dams and the demolition of the obsolete ones, the winding Cumberland is again on its way toward becoming one of the most modern inland waterways in the whole country.



▲ A diver surfaces to take charges under water to holes drilled in dam, now submerged. Holes were then all linked together by the "Primacord" fuses.



◀ After the blasting of the dam, its shattered remains are removed by floating dredges. Blasting was most economical way to clear river of old dams.



Carpet at left and letters "TWA" in untreated carpet at right are protected against soiling by "Ludox".

"Ludox" colloidal silica, the antislip ingredient in safety floor waxes, adds a new string to its bow. Applied to fabric, paper or a painted surface, the product builds . . .

An invisible barrier against dirt

Rugs that stay clean up to five times longer than usual. Upholstery fabrics that resist soiling. Wallboard, wallpaper and painted surfaces that shed dirt and are easier to clean.

These are a few of the boons promised by the newest application of "Ludox", a Du Pont-developed product that won notice first as an ingredient in antislip floor waxes and more recently as a bonding agent in latex adhesives and a strengthener of textile yarns.

As a soil inhibiting agent, "Ludox" fills the tiny fissures in textile fibers, paint films and other surfaces with transparent particles. Dirt and dust, finding no place to lodge, are forced to move on.

The pioneer commercial application of "Ludox" as a soil retardant has been on carpets. Several leading manufacturers are using it to treat new rugs in the plant. One, who used to be plagued with customer complaints, has sold several million yards of carpet treated with "Ludox" without one complaint of premature soiling. Rugs treated with "Ludox" are easier to clean, too. Because dirt is not ground into the fibers, it is more readily removed by vacuuming or shampooing.

Recently the Artloom Carpet Co. of Philadelphia introduced a formulation of "Ludox" for home and commercial use. Called "delay", the Artloom product is sold by department stores (in pint and quart bottles with spray

tops) to housewives who want to treat new or freshly cleaned carpets in the home. The product also is being marketed through janitor supply houses in gallon containers.

The York Research Corporation, which tested "delay" for the American Hotel Association, found that soiling was effectively retarded on all types of carpet fibers—wool, cotton, man-made fibers and blends.

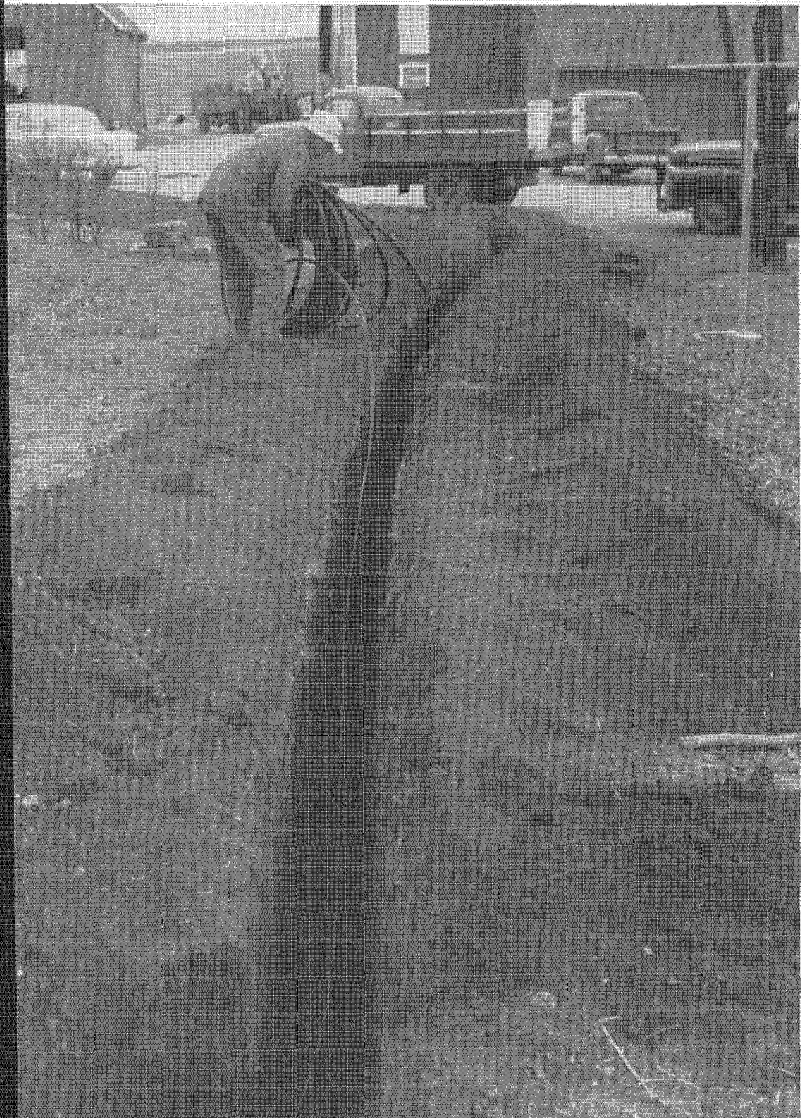
A letter to Artloom from the manager of the Sam Houston Hotel, Houston, Texas, says: "I have two corridors laid with the same carpet. Both received approximately the same traffic, and I'm pleased to say that the carpet treated with 'delay' has maintained a much better appearance . . . I am sure from all indications that this treatment is going to prove most beneficial to hotel operators everywhere."

Detroit is taking a close look at "Ludox", too. With the public taste running to light colored interiors, the auto industry is concerned about upholstery soiling. Manufacturers are now testing fabrics treated with the Du Pont soil retardant.

Meanwhile, other applications for "Ludox" are being sought in areas where dirt should be kept on the move. In the months to come you can expect to see developed a number of new products for home and industry, products aimed at keeping things cleaner longer.

Plastic: no pipe dream any more

A hundredfold increase in sales in six years . . . that's the success story of light, flexible polyethylene piping. New formulations of Du Pont "Alathon" polyethylene resin, made especially for pipe, offer significant improvements in strength and durability



Simplicity of installation is major virtue of lightweight pipe of "Alathon". Since it's flexible, it can easily be snaked around obstacles and laid at uniform depth regardless of land contours.

Enough polyethylene piping was extruded in this country last year to girdle the earth at the equator. What's more, a fancy bow knot could have been tied with the 8,000-mile section left over.

Manufacturers processed an estimated 35 million pounds of polyethylene resin to make the pipe, up from 300,000 pounds in 1948. Early in the 1960s they are expected to be using more than 100 million pounds a year.

Polyethylene today has about 75 per cent of the plastic pipe market. In its phenomenal climb, the polymer has acted as a spur for the whole industry. Its success has boosted the use of other plastic materials, some of which had been around for years without exciting much interest among pipe users.

Production figures are no lasting key to success, however. To maintain its popularity over the long pull, polyethylene piping has to deliver on its promises. If it is exposed to the weather—strung across the ground to a poultry house, say—it must resist sunlight, freezing, thawing and general abuse. If it is called on to carry fluid under pressure, it must withstand top-rated pressures for long

Installing jet in well is one-man job with polyethylene pipe. No complicated rig needed, and no fear of the pipe corroding. Jet is lowered merely by uncoiling the light, flexible pipe.



Pipe is no better than the resin from which it is made. Reprocessed material or inferior grades of resin can fail, threatening the good name of all polyethylene piping.

It was this concern with quality that led Du Pont to introduce "Alathon" 25 polyethylene resin a few months ago. A material made especially for pipe, "Alathon" 25 has up to 20 per cent higher bursting strength than previous grades and maintains superior strength over a wider range of temperatures. It also contains well-dispersed channel black for resistance to sunlight.

IT'S GOING DOWN ON THE FARM

Roughly 70 per cent of the polyethylene piping made is used down on the farm for jet well installations, irrigation and livestock watering. Another 20 per cent carries water and gas to municipal and industrial users. The remainder goes for a miscellany of tasks, including uses in the food and chemical processing industries and the discharge of acidic mine wastes.

One of the big selling points of pipe made of "Alathon" is ease of installation. It's so light that one man can shoulder a 400-foot coil. Many major jobs thus become do-it-yourself projects. Take a jet well, for instance, which consists of a pump at the surface, the jet mechanism down in the well, and a double pipe connecting the two. Connecting the jet to metal pipe and getting it into the well casing is a complicated job, requiring a special rig to hold the jet and pipe while new lengths are connected at the surface. With polyethylene, no rig is needed and the jet is lowered merely by uncoiling the light, flexible pipe.

The flexibility of "Alathon" allows the pipe to be snaked around obstructions to carry water to house or barn. Thus fewer couplings and elbow joints are needed. Where joining is required, a knife or saw can be used to cut the pipe. You can join the pipe end-to-end with a coupling, or join polyethylene to metal pipe with an adapter. No threading or wrenches are necessary. Ordinary hose clamps suffice.

Polyethylene pipe can stand freezing without burst-

when the ice melts. Connecting clamps and adapters, however, may be damaged and should be protected from freezing. Where frosts are infrequent, the pipe can be laid safely in shallow ditches or furrows. It doesn't rust, corrode or collect scale, either, and resists most chemicals. The smooth inner surface of the pipe offers minimum resistance to water. This means higher pumping efficiency and lower costs.

Quality pipe of "Alathon" is made with inside diameters ranging from one-half to three inches or more, and is usually sold in coiled lengths of 100 to 400 feet. Rated maximum continuous working pressures at 73.4°F. range from 104 pounds per square inch for the half-inch pipe to 51 pounds per square inch for the three-inch.



Farmers use 70 per cent of all polyethylene pipe made. Ease of stringing it across ground makes it popular for watering stock.

PORTABLE ICE SKATING RINK? IT'S A PLASTIC PIPE CINCH!

Pipe of "Alathon"—eight and a half miles of it—makes this Wilmington, Del., rink easy to assemble. Pipe carries 15°F. brine.

Sawdust goes between pipes, then water is sprayed on to build up 2-3 inches of ice. Brine doesn't corrode pipe of "Alathon".

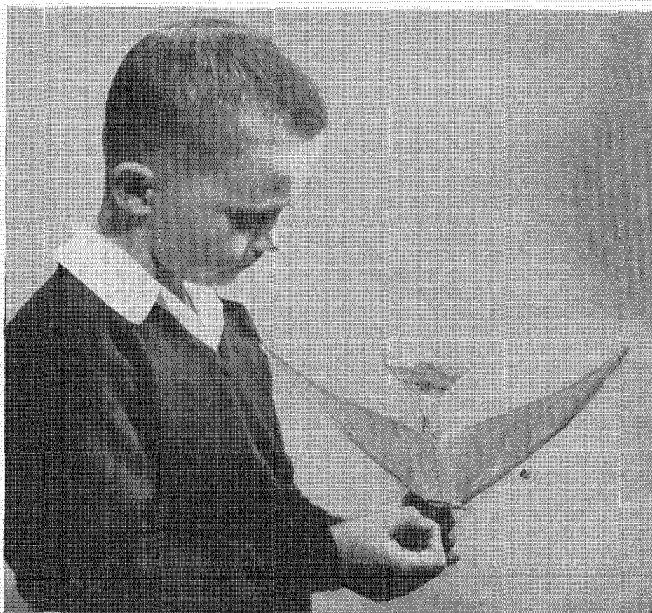
Rink, which uses "Freon" fluorinated hydrocarbon refrigerant, is disassembled in the spring to make way for a baseball diamond



What's New

• **AUXILIARY VENTILATION** of mines, subways and tunnels may be improved by the use of Du Pont's newly developed neoprene-coated nylon "Ventube" flexible ventilating duct. The new product combines strength, mildew resistance and excellent aging qualities with extremely light weight.

• **A NEW WASHING AID** for service station and car wash operators is a self-sudsing Speedy Car Wash Pouch that eliminates water buckets and toweling. Covered on both sides with long-lasting blue fleece of "Dacron" polyester fiber, the zippered pouch holds Du Pont Car Wash. Available to dealers through automotive wholesalers. Write Du Pont, Specialties Sales, Room 2395, Du Pont Building, Wilmington 98, Delaware.



• **MECHANICAL BIRD**, being cranked up by this young aeronaut, will flap its wings, fly, swoop and soar. It is said to be the first successful mechanical bird to fly with flapping wings; tail and wings are made of "Mylar" polyester film. Manufactured by Orthopter Co., 1820 Lawrence St., Denver 2, Colo., it will be marketed where toys are sold.

• **FOR BIG GAME HUNTERS**, Remington Arms Co., Inc., has announced the new Woodsmaster Model 740 autoloading rifle, chambered for the popular 30-06 cartridge. Its developers say it has the softest recoil ever achieved in a lightweight, high-power sporting rifle. The Woodsmaster comes in standard and deluxe models. Remington has also announced the new Fieldmaster Model 572, a 22 caliber slide-action rifle designed for every age group.



• **OPTICAL FRAME** manufacturers can now discuss color, design and fashion trends with Du Pont representatives at the new Color and Design Center in the Arlington, N. J., plant. Here the visitor can get individual help from specialists in planning eyeglass frames of Du Pont "Pyralin" cellulose nitrate sheeting.



• **FUNNY FACE** with a Du Pont toothbrush bristled with "Tynex" nylon may be just the incentive to encourage the younger set to keep their teeth sparkling. Funny Face sticks to the wall by suction cup. The novelty holder and toothbrush are available at variety stores, drug stores and the like.

"With so many products to choose from, how do I know which is best for me?" asks this reader. "What I want to know is . . .

"Which auto polish should I buy?"



"I polish my own car," writes Frank A. Morris, an insurance agent of Concord, N. H. "What is the difference between your different cleaners? I use 'Seven-ite' cleaner because I want one without wax, so I can keep on scrubbing until the car is clean. But then you come out with another one whose name I've forgotten. So which is best, and why?"

"If you clean your own car, and remember how your arm aches, you know this is a very vital question."

Agreeing that Mr. Morris' question was vital to a good many car owners, we asked the people who make Du Pont No. "7" products to answer it for all the Mr. Morrises among our readers.

Essentially, we were told, the answer hinges on what you want to accomplish.

There are three things you can do to the finish on your car. You can clean it—remove accumulated dirt film and oxidized paint. You can polish it—bring up a high luster much as a jeweler polishes gems. And you can add a protective coating to impart gloss and to help ward off dirt. So you take your choice of products designed to do any one or a combination of these things.

The most conventional approach would be to use Du Pont Speedy Cleaner, a liquid that cleans the finish, and then apply Du Pont Auto Wax for gloss and protection.

A more recently developed pair of products, "Seven-ite" cleaner and "Seven-ite" protective coating, perform similar functions. "Seven-ite" cleaner, also a liquid, is formulated specifically for use before a liquid wax. The companion product, "Seven-ite", a liquid wax containing silicones, is applied, allowed to dry, and wiped to a high shine with a minimum of rubbing.

IT PAYS TO KEEP CAR CLEAN

Incidentally, if you keep your car reasonably clean, both Auto Wax and "Seven-ite" can be reapplied without using a cleaner again. Just wash it well first.

By far the most popular product, because we all like the easy way, is No. "7" Auto Polish and Cleaner, familiarly and widely known as No. "7" Polish. It's easy and fast because it's one product in one can and it both cleans and polishes. No protective coating is applied to the finish, but the high, hard luster imparted by No. "7" Polish helps keep the car from getting dirty.

There are other No. "7" products for special applications—Du Pont Car Wash for washings between polishings, Rubbing Compound, a scratch and blemish remover, and Chrome Polish for the bright-work. But Mr. Morris can buy and use with assurance either Speedy Cleaner and Auto Wax, or "Seven-ite" cleaner and "Seven-ite" for a two-operation job that gives his car the most complete protection. Or, he can take the fast, easy way, with No. "7" Polish, to make his car look its best.

Man behind the man behind the camera

HOLLYWOOD, CALIF.

That's Du Pont's Holly Moyse, who has been known to stay up all night helping with film processing problems. His latest campaign is paying off in filmed TV shows that look a lot better on your TV set

Du Pont's Holly Moyse (rt.) inspects film rushes of Groucho Marx TV show with members of the program's production staff.



Has your enjoyment of movies on TV ever been lessened by chalky faces, or by dark clothes turning into shapeless black blobs? Have you been bothered by gray flare in dark picture areas?

These are conditions that usually can be corrected. And the man who is probably doing more than anyone else to correct them is Hollis W. "Holly" Moyse, one of Du Pont's technical representatives to the motion picture and television industries.

Moyse, who has been pulling this type of chestnut out of the fire for more than 26 years, is careful to point out that the principles for improvement in TV filming techniques did not originate with him. They began with the publication of a technical paper in 1950 by C. L. Townsend, director of technical film operations for the National Broadcasting Company. The Townsend paper expounded a principle that boils down to this:

Two key characteristics of the television tube must always be taken into consideration when preparing film for this medium.

First, the TV tube's tone range is only a fraction of what you can realize with film projection. Dark areas on film will tend to lose detail and become cloudy on the TV screen. When these dark areas overlap the edges of the screen, you are quite likely to get a gray, cloudy effect on the fringes.

Second, the TV tube reproduces the lightest part of a

"... a personal liaison man between the laboratory and myself." That, says Cameraman Ken Peach, is how he thinks of Holly Moyse.



out faces.

Townsend's recommendations:

Prepare TV film prints that compress the blacks and whites in the original negative into a range that the TV tube can show. Deep blacks beyond the scope of the electronic tube should be eliminated. The result is a film that looks a little bleak when run through a regular motion picture projector, but which captures far more detail on the TV screen.

In photographing every scene, provide some object substantially whiter than the faces of the cast. This serves as a "white reference" for the tube, preserving the natural appearance of the faces.

When technical information like this comes up, it becomes Holly Moyses's job to start thinking of practical ways to make the improvements. In this case, he found the answer in an item already part of Du Pont's extensive motion picture film line.

OLD-TIMER FILLS A NEED

For some years, Du Pont had made a low contrast emulsion. It was developed back in the '30s, and until publication of the Townsend report was used largely for special sound film applications.

Largely at Holly's request, a slight modification of this special emulsion was made. Now Du Pont's Type 824 Fine Grain Low Contrast Positive Film is rapidly becoming the standard on the nation's better filmed TV shows.

However, even with an ideal film and the strong support of the Townsend paper, putting over the "low contrast" idea was not easy. The big drawback was the common practice of judging TV programs by normal theatrical projection viewings. In this atmosphere, a regular release print is far more pleasing. When the release prints

with the blacks blocking up and the whites bleaching out.

A typical example of the work required in preaching the new low contrast technique can be seen in the experience of one major network TV show.

Holly caught the show at home a couple of times and could see that the program was in trouble because of excessive print contrast. He then contacted the head cameraman, who told him that theatrical prints were specified for the benefit of the small projection room audience. At Holly's suggestion, a test was arranged by the technical director of the television station involved. Instead of running the film through a movie projector as in the past, a theatrical and a low contrast print were run simultaneously on synchronized projectors feeding to one TV set. By switching from one print to the other, the difference was so pronounced that the show has been printed on Type 824 ever since.

This show, and most of the others which are switching to low contrast film for TV, uses a simple operating formula that seems to satisfy all parties. The dailies, daily uncut prints from current shooting, are made up at theatrical contrast. These are shown for the director and his staff, who decide which scenes will make up the final film. Once the film is edited, low contrast prints are specified. Since the negative is normal in all respects, theatrical prints can be taken from it if desired.

As Holly sees his role in TV production, it is largely one of consultant to the cameraman. Most people who have never been on a Hollywood set find it hard to visualize the tremendous tensions and responsibilities that go with the job of head cameraman. He must be both artist and executive.

The head cameraman bears almost full responsibility for the pace of film production. A movie set costs anywhere

Actor-director Donald O'Connor directs filming of his TV program while Moyses watches from behind Peach, the head cameraman.



O'Connor's show, like many top programs, is printed on Du Pont low contrast film, Type 824, which helps make film telecasts look "live."





"... The Lone Ranger rides again!" This show is telecast regularly on Du Pont low contrast film.

from \$3,000 to \$10,000 for every hour it is in use. At these rates, even a big-budget production can't afford to waste time. It is up to the head cameraman to see that it doesn't.

The kind of service Moyse brings Hollywood's technical people can be seen in the experience of Dr. Ferenz Fodor, technical director for the Groucho Marx show, "You Bet Your Life."

"I have been able to count on Holly for nine-tenths of my important laboratory follow-up work," Fodor says. "During the early days of our conversion to low contrast

or even in the morning and stay all night making sure the film was handled properly."

Kenneth D. Peach, A.S.C., head cameraman for the Donald O'Connor show, has a similar story to tell:

"Filming a weekly TV show, a cameraman is kept so busy he never has time to check up on the processing of his own film. In this situation, I have come to think of Holly as a personal liaison man between the laboratory and myself. He has kept up with our requirements infallibly."

Developing Holly Moyse's caliber of technical skill has not been a short-term proposition. He and sound film came to the movie industry at about the same time, back in 1928. A graduate chemical engineer, Holly spent his first year with Du Pont in the research laboratory working on early improvements in movie film. In 1929 he suggested it would be a good idea to assign a man to help movie studios with some of their problems.

His original assignment was to spend one day a week at this work and the rest of the time in the lab. He recalls now that he went out to make his first call on a Monday and found enough work to keep him busy full-time. That demand for his services has held up for the past 26 years.

In addition to Holly, two other Du Pont technical representatives, Jack DuVall and Al Cushman, assist Hollywood customers with film problems. Elsewhere, such technical representatives as Jack Phy in Chicago, Fred Gerretson in Washington, D.C., Norm Oakley, Joe Dougherty and Vic Salter in New York, and others throughout the country stand ready to help motion picture and TV film producers use Du Pont motion picture film to the best advantage.

Push-button warfare on insects and weeds moves ahead with these . . .

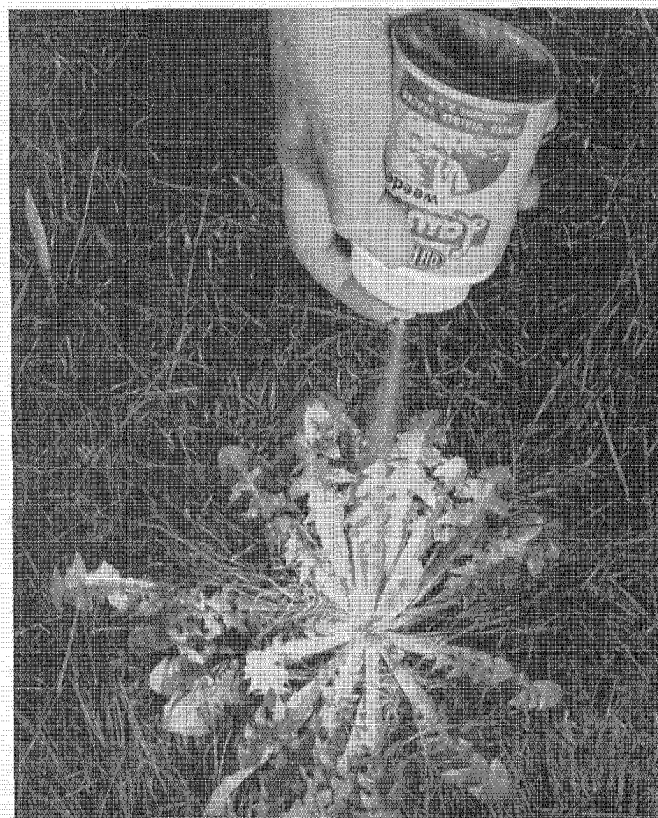
New aerosols for the gardener

Du Pont's first aerosol-packaged garden chemicals, a new lawn weed killer with a built-in "tracer" and a multi-purpose insecticide spray, will make their debut on garden supply counters this spring.

Called Lawn Weeder, the weed killer is a formulation of 2,4-D packed in a 12-ounce can with "Freon" fluorinated hydrocarbon propellant and an inert white pigment. The "Freon" ejects the material as a coarse, wet spray, and the pigment marks the dandelions and plantains already squirted. Like other lawn weed killers, Du Pont Lawn Weeder will give best results if applied when weeds are young, and on a warm sunny day when the air is still.

The new insecticide combination, Du Pont Garden Insect Sprayer, contains methoxychlor, lindane and rotenone. Also packaged in an aerosol can, it's effective against such pests as aphids, Japanese beetles, red spider mites, leafhoppers, lacebugs, thrips and other bad actors of the flower garden.

Like all aerosols, the new products boast the advantage of extra convenience for the user. No measuring, mixing or stirring. Just pouf, that's all.



Awkward fastening job

... 60-second solution

... how Du Pont industrial rivets solved a tough wood-to-metal fastening job to help trigger a new trend in classroom seating

Texas, which claims its full share of things to boast about, has added another: one of the biggest makers of tubular classroom chairs. No claim is entered for pioneering in tubular furniture, which has been around for at least 15 years. Only recently, however, has the tubular chair become a top favorite for classroom seating, and American Desk Mfg. Co. of Temple takes a bow for helping make it so.

About five years ago, American Desk's engineering department designed two new chairs, both of simple, graceful tubular steel with shaped wood-veneer backs and seats. Fitting the back to the frame was easy; it slipped into slots in the frame. Attaching the seat was something else. Their assistant general manager, S. E. Carter, describes it this way.

"Some manufacturers fasten wood seats to tubular frames by drilling a hole through the seat and both the top and bottom of the frame. Then they use either a long fastener extending through all three holes, leaving a rough burr on the bottom, or they use a short fastener, leaving open the bottom hole in the tubing to attract and catch children's fingers. Either way, the double holes weaken the chair frame.

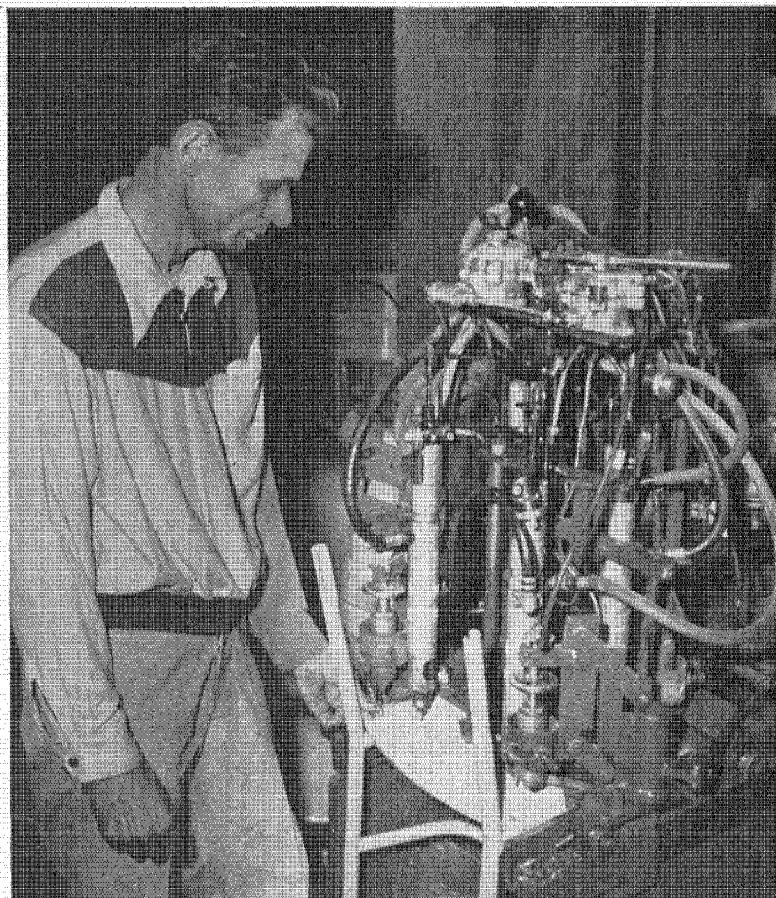
"We began by side-stepping both the rough burrs and finger traps. Our chairs are the only ones of tubular design that attach the seat by drilling through only the top of the tubing. For this single-hole method, Du Pont industrial rivets are the only feasible answer, as they lock in place inside the tube. Our engineers were sure they would help us introduce not just a new product, but a better one as well.

"At the same time our engineers were proving out the worth of industrial rivets for the job, we were dreaming up a special jig to install them. The idea was to drill four holes at one time in the seat and top of the tubing, and then expand four rivets simultaneously.

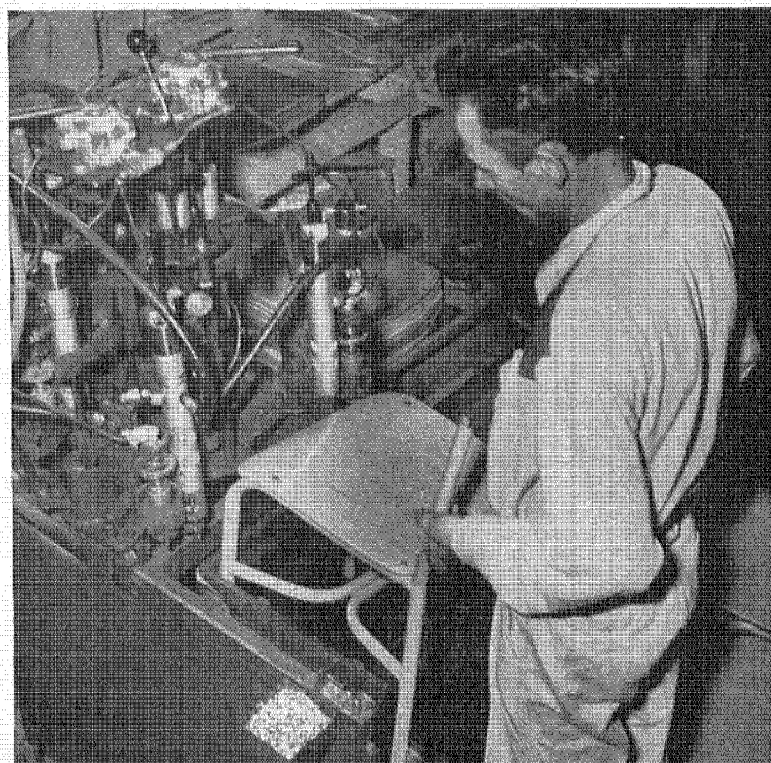
"The process worked right from the beginning. The seat and frame are slipped into the jig and aligned, holes drilled, and rivets inserted. One tug on a lever brings four heated Du Pont irons in contact with the rivets and sets them in about two seconds. Then the chair is removed from the jig. The whole job averages about a minute.

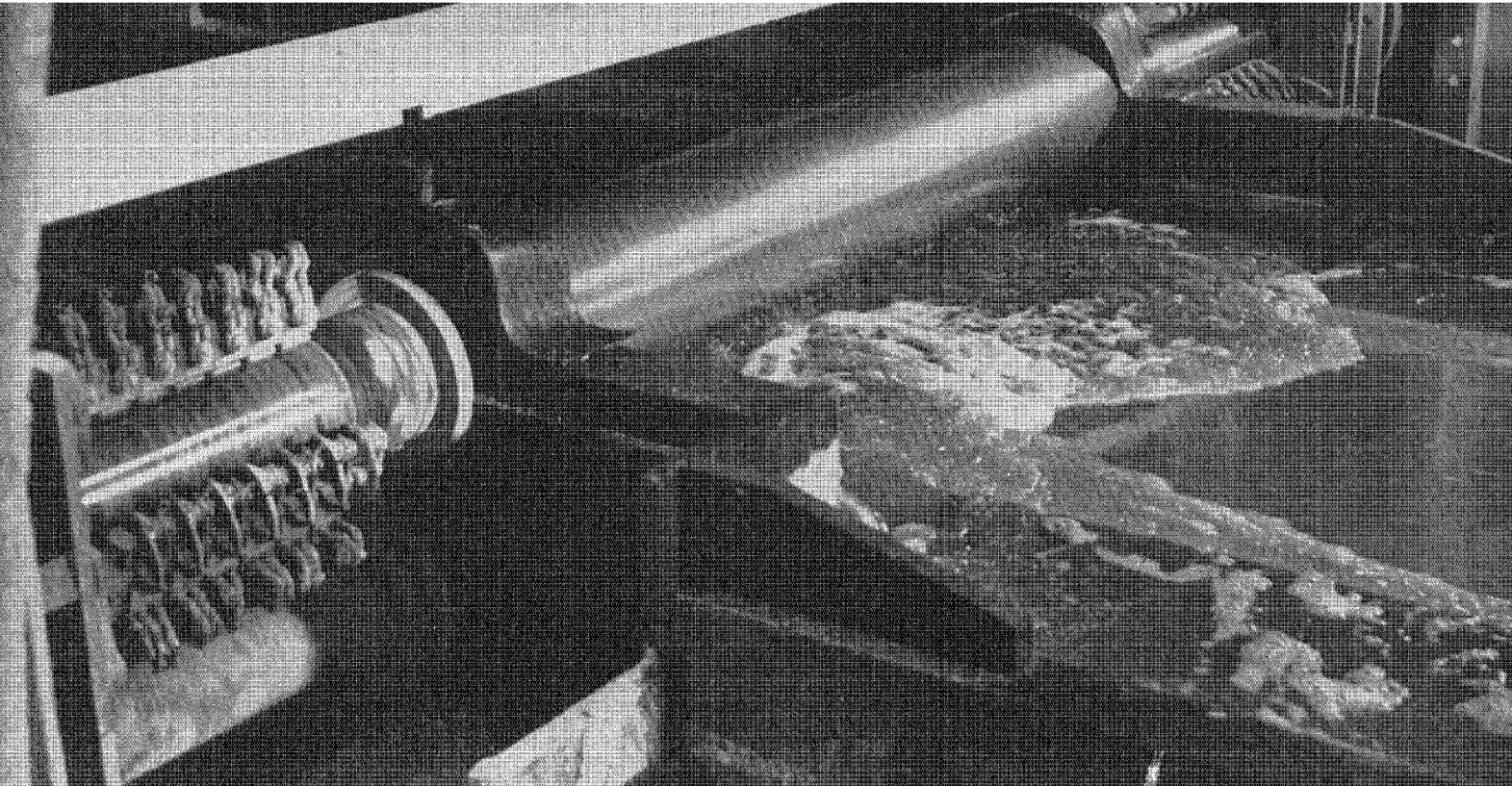
"The high quality of units put together with Du Pont industrial rivets is now so well known, our salesmen report, that buyers are specifying chairs fastened with them. We don't always know which of its advantages—smart looks, durability or easy maintenance—is selling the chair, but are surely glad schools have learned it's the thing to buy."

Special jig for drilling and setting industrial rivets joins seat to chair frame in 1 minute.



▲ Inserting Du Pont industrial rivets in holes drilled through seat and into frame. Rivets do good-looking work that lasts.





"Du Pont, also interested in the electrodeposition of tin, developed two separate processes for tin-plating."

Progressing from gold to tin

*...is, strangely enough, part of the story of
Du Pont's history of service to the electroplating industry*

By RICHARD C. BOTSCH

During its early American years electroplating was an art, and secrets and procedures were passed down within a family of craftsmen. Little, if any, fundamental research had been undertaken in the field. Electroplating consisted almost entirely of plating gold or silver for aesthetic effects.

It was not until the arrival of the automobile that electroplating as we know it gained momentum. Early decorative and even functional parts, such as head lamps and radiator grilles, were often made of brass. A bright, attractive luster on these parts required hours of tedious hand rubbing. When a layer of nickel was deposited on the brass, time and labor were saved, and electroplating was on its way to becoming a major industry.

One of the country's earliest supply firms in the electroplating field was founded in 1885 by two German immigrants named Roessler and Hasslacher. In 1891 the R & H Chemical Co. began producing cyanides widely used to make electroplating solutions of such metals as copper and silver. Continuing to expand, R & H joined Du Pont in 1930. It later became the Electrochemicals Dept. of Du Pont.

Five years later, a development that was highly important to the electroplating industry was announced.

Du Pont had developed a process for depositing bright zinc from cyanide baths. This was immediately accepted because of an acute shortage of cadmium. Actually, the process works on three basic principles. First, the plating bath and anodes must be virtually free from metallic impurities. Second, rigorous control of the solution composition must be enforced, in accordance with definite specifications. And third, brightening agents or a bright dip should be used for added luster. Thus, the process was set up on controlled standards, unlike much of the hit-or-miss conditions of previous methods.

...NOTHING LEFT TO CHANCE

In 1938, Du Pont announced another important development, the high-speed copper process. Previously, copper plating was slow, and limited to thin deposits. With the growing use of zinc base die castings, especially for automobiles, a process for plating a heavier deposit of copper was needed. The new Du Pont process was the answer. Again, specifications were set up, leaving nothing to chance.

One of the important principles in high-speed copper is the use of addition agents for brightening and producing



In all, Du Pont products are used in plating lead, cadmium, copper, silver, gold, brass, tin and zinc.

a smooth finish. The use of addition agents in plating baths was not new; they facilitate faster and better adherence of the plating metal. Many strange, but nonetheless effective, addition agents have been found practical under certain conditions—wool, licorice root, molasses, glue, and sawdust extract among them.

Du Pont, also interested in the electrodeposition of tin, developed two separate processes for tin-plating. The first process, developed in the early '30s, uses an alkaline bath of tin salts. The second, put to use in the early '40s, uses an acidic solution.

For many years, the alkaline tin salt bath was the major process used in tin-plating. Gradually, however, it gave way to the acid-type baths, of which the Du Pont halogen tin process is an outstanding example. This method has helped the U. S. produce over four million tons of tin plate a year. The halogen process can turn out the coated metal strip at the rate of a mile every two minutes, a world record. Tin plate made by the electrolytic process not only uses about one third as much tin as the older "hot dip" method, but can also be more closely controlled.

During World War II, electroplaters aided the Allies immeasurably. Many of the innovations and restrictions demanded by war conditions have become standard prac-

ways been made of solid brass. A critical shortage of brass during the war necessitated using more abundant metals, and electroplating a thin layer of brass over them.

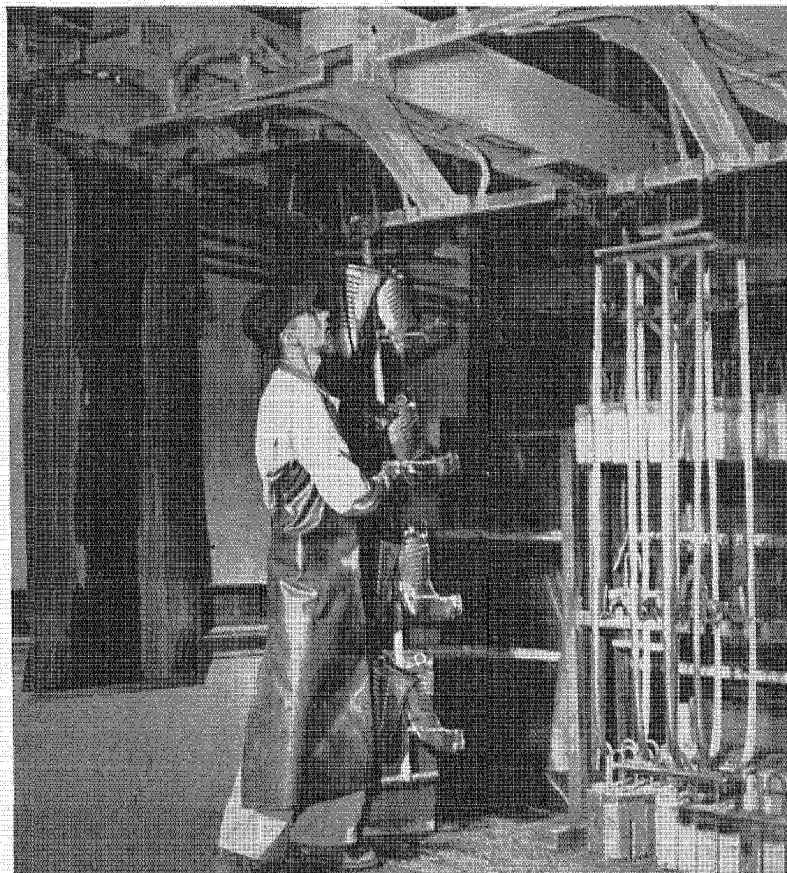
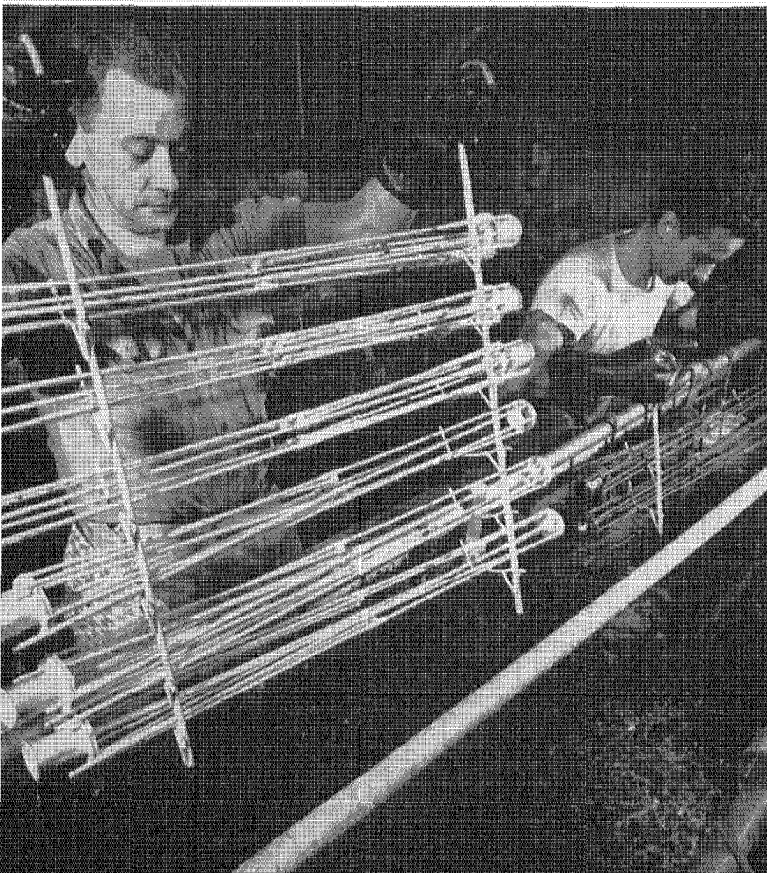
Today, Du Pont is one of the leaders in cyanide electroplating. Although many of these Company developments are guarded by patents, many are licensed without fee. Most of Du Pont's electroplating products fall into three categories: prepared plating salts, addition agents, and general plating chemicals. The plating salts include such products as "Zin-O-Lyte" for zinc plating. Addition agents, such as "Durobrite", are used primarily to produce bright, unpitted surfaces. The third group includes such chemicals as potassium, sodium, copper and zinc cyanides. These can be used with several different plating processes and formulas, depending upon the user's preference. In all, Du Pont products are used in electroplating cadmium, copper, lead, silver, gold, brass, tin and zinc.

To facilitate the proper use of such products, the Electrochemicals Dept. maintains an active technical service section. Qualified men in all district offices are ready to help customers with their problems. At the Niagara Falls plant, a laboratory staff continually searches for new products and processes, and more efficient ways of using present ones.

If all this were to be boiled down into one major Du Pont contribution to the field of electroplating, it might well be the taking of electroplating out of the realm of hit or miss, and putting it on a scientific basis. Countless examples of electroplated articles are familiar to all of us. Techniques even permit metallic plating of such things as plastics, leather, wood, and dried foliage. However, these are remote examples in a vast industry. Plating is a necessity in the constant war against corrosion of materials like iron and steel, a war that exacts a loss estimated at \$10 million a day. Electroplating is another in the long list of major American industries that Du Pont serves.

"Cadalyte" plating salts give good, bright cadmium plate on almost any metal surface, such as on these umbrella frames.

Fully automatic copper plating bath for plating on zinc die castings is one recent development in electroplating's long history.



Save your antifreeze? Well...

This spring you can ignore the experts who advise discarding permanent type antifreeze after a season's use. If, that is, you're prepared to conduct a series of chemical analyses.

The experts don't claim that used anti-

freeze is completely useless. It will certainly keep an engine from freezing up. What they do is raise an important question each car owner must answer: Am I sure my car is OK? Am I sure, for instance, that exhaust gases aren't leaking into the cooling system? If not, then it's good insurance to drain after a season's use.

Experts say minerals in the water, air seeping into the cooling system and corrosive exhaust gases from leaky gaskets can destroy the effectiveness of the rust and corrosion inhibitor in any kind of antifreeze, even a premium product such as "Zerex" antifreeze, after a season of use. And if the inhibitor is destroyed, they say, it's false economy to re-use the antifreeze solution.

TO CHALLENGE THE EXPERTS...

If you'd like to challenge the experts, here's what you can do to find out whether the inhibitor in your "permanent" antifreeze is still capable of doing a job. First, take a sample from the radiator and determine its antifreeze content. Next measure its alkalinity, and then calculate the reserve alkalinity still present to provide future protection. Repeat the same set of analyses—to determine the reserve alkalinity on a sample of unused antifreeze—and compare results with the first analyses.

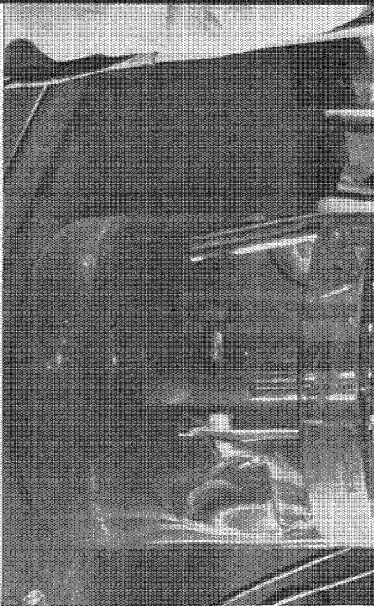
If more than half the reserve alkalinity is lost and the coolant is kept on the job, you're asking for trouble. Even if these analyses show the inhibitor in the antifreeze remains strong enough to keep the coolant on the safe side, salts, formed when the inhibitor neutralizes acids in the coolant, can get in their dirty work.

Making sure the coolant is safe for another year isn't a hopeless case, but it's rarely worth the money and trouble. If you take the chance, and guess wrong, it could really hit your pocket-book and lay up your car when you need it most.

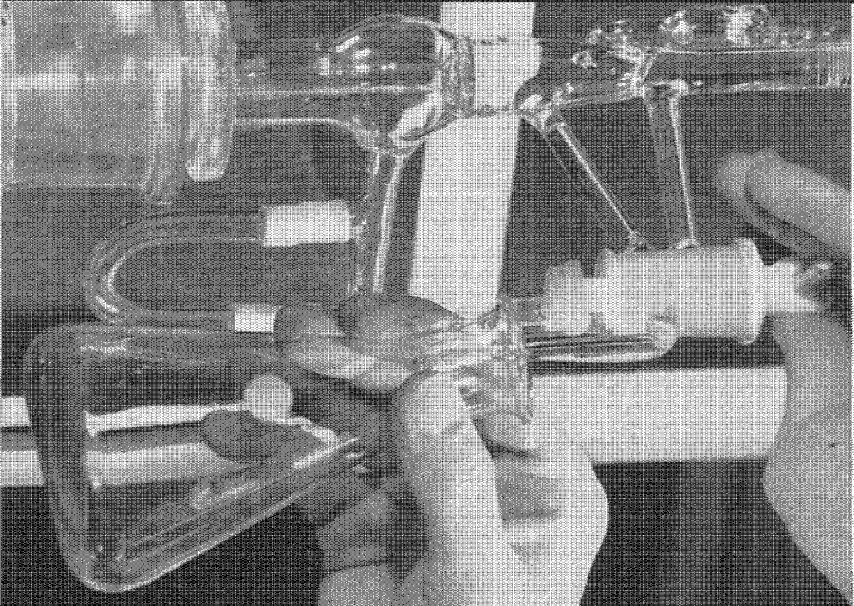
The American Automobile Association reports that some 700,000 radiators—and even more thermostats and water pumps—are replaced yearly because cooling systems didn't have proper care. And each radiator that goes on the scrap pile means an outlay of at least \$60 for a new one. When you start figuring it out, you'll discover it's smart to drain and flush the cooling system before heading for the open road.



I If you're bent on challenging the experts—and that's doing things the hard way—take a sample from the car while engine is running.



2 Next, you must accurately find out how much antifreeze actually is in the coolant solution.



4 If you don't happen to have a pH meter handy, you can titrate to find alkalinity of coolant.



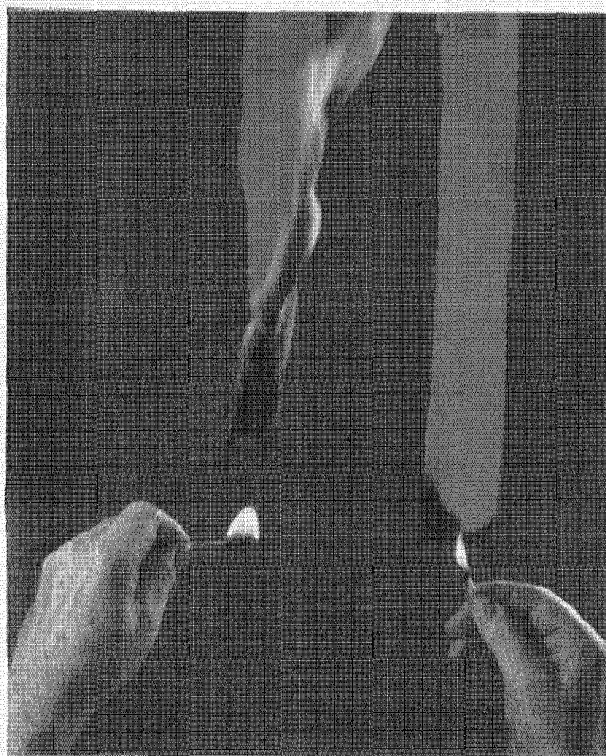
3 You now need to determine alkalinity so you can calculate reserve alkalinity of coolant. Test papers aren't accurate enough, and a pH meter is recommended.



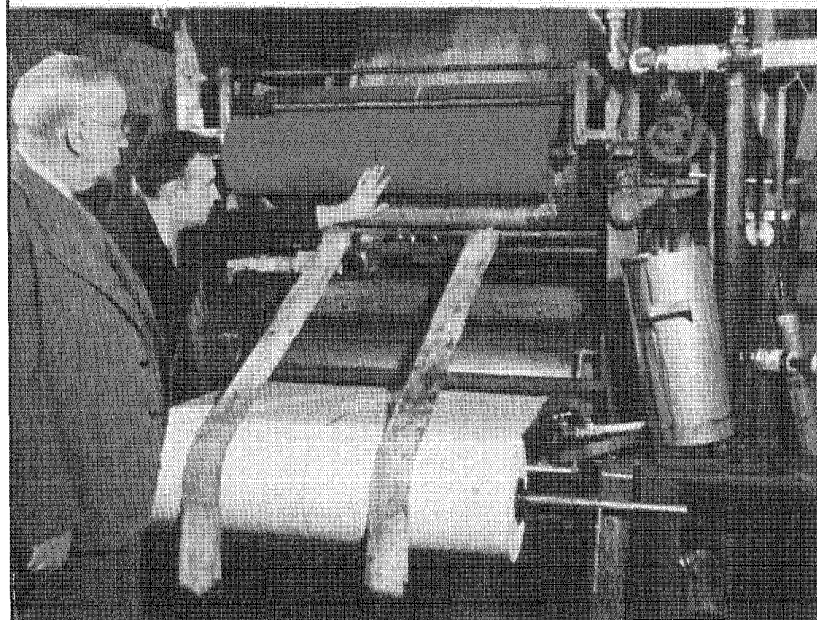
5 If more than half of reserve alkalinity is lost, coolant should be drained. Chemist shows types of rust and salts that can build up in a cooling system.



Decorating for a party is fun if the crepe paper is bright and flameproof. Tragic fires at public gatherings have made many cities require a flame retardant treatment of decorations.

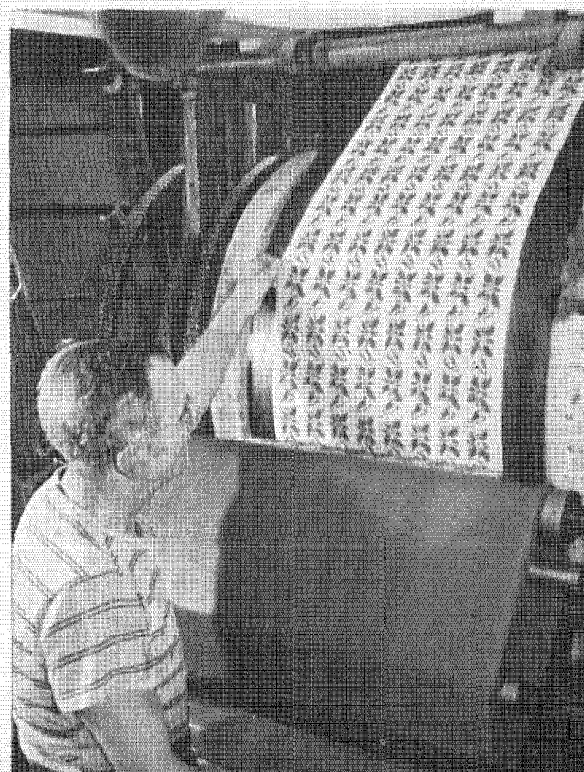


Paper treated with "X-12" (right) merely chars when in contact with a flame, while untreated crepe (left) bursts into a fire that reduces the paper to ashes in seconds.



Henry C. Bainbridge, long-time president of Brooklyn paper company bearing his grandfather's name, watches operation of machine that puts the crepe in paper, dyes it and treats it.

As many as eight colors are printed on crepe at Bainbridge. Dye formulas, suggested by Du Pont, assure hues that meet specifications.



Flaming red without a fire

Du Pont dyes and "X-12" cooperate to solve a problem at a Brooklyn paper company

By MARION ELIOT

Producing better products often proves the old saying that two heads are better than one. In many instances, two or more departments may pool their technical knowledge to lick a problem at Du Pont. The same cooperation through Du Pont development and technical services to other companies often clears the way for new or improved products.

Take, for example, a problem that arose at Charles T. Bainbridge's Sons, manufacturer of paper since the 1860s. This Brooklyn firm produces chiefly materials for artists—illustration board, drawing bristols, show card paper, display board and mat paper for framing pictures.

In recent years, Bainbridge has perfected a line of ribbon crepe paper in brilliant colors for decoration. As increasing numbers of cities required that decorative paper for public and other gatherings be flameproofed, Bainbridge turned to chemical flame retardants. If the consumer needed a paper that was safe against fire, Bainbridge hoped to give him that safety as well as quality.

Here the company hit the snag. Frank Fischer, superintendent who has been with Bainbridge 55 years, tried all existing flame retardants. One by one, he discarded the treatments. The flameproofing chemicals caused salting out of the dyes, which, in effect, prevented full development of proper color shades. Or, they decomposed during the drying step and caused a browning of the paper and serious loss of color. Flame retardant salts tended to bloom on the surface of the paper and make it harsh and brittle. Paper so treated wasn't up to Bainbridge quality, and Fischer despaired of ever reaching this goal.

QUALITY COMES FIRST

Quality of product is the foundation of the century-old firm, according to its president, Henry C. Bainbridge. Like his father and grandfather in their times, he has little use for fancy trimmings in a business. At 75, he still occupies a corner of the main office—when he isn't in the plant. The company does no advertising except in artists' journals. The chief reason is that Bainbridge sells exclusively through jobbers. But another reason is simply that the company prefers to make a quality product for its present market east of the Mississippi rather than expand to a point where quality might be in jeopardy.

By the close of 1953, Bainbridge was convinced flame retardants would jeopardize quality and he wanted none of them. In January 1954, F. Russell Morro, Bainbridge's vice president, read in a Du Pont publication that a paper manufacturer reported substantial savings from a simultaneous dyeing and "X-12" flame retardant treatment. He called the New York office of Grasselli Chemicals Dept. for more information.

With more information came Dan English, Grasselli

development and service representative, who had assisted in solving the flame retardant and dye compatibility problem for other paper manufacturers. At Bainbridge, he talked with Morro and Fischer.

English pointed out that "X-12" has a high degree of compatibility with dye formulations developed by the Du Pont Organic Chemicals Dept., and that colors remain brilliant. "X-12", he said, is temperature stable and is not affected by drying heat. He said that the flame retardant gives the paper a pleasing hand and that treated paper should be difficult to distinguish from untreated. This sounded good to Morro and Fischer, but experience had made them skeptical. The proof of this pudding would be in some treated ribbon.

With the help of English, Fischer gave "X-12" a trial run with the dye formulas they were using. It flameproofed the crepe paper all right, but the colors did not match the Bainbridge stock. This, said Fischer candidly, was about what he expected.

S.O.S. TO DYES TECHNICAL LAB

English then called in the Du Pont Dyes Division. F. R. Desmond from the Technical Laboratory, Deepwater, N. J., went to Brooklyn to evaluate the formulas and to improve their compatibility with "X-12". He brought back samples of untreated ribbon crepe and set about matching them with dyes that work with "X-12".

The resulting formulas dyed and flameproofed the paper in one bath. Colors were not only brilliant but matched the original stock. All information went back to Bainbridge. Last May, the company, using the formulas suggested, introduced a full line of flameproofed ribbon crepe paper. Quality had not been sacrificed for safety. Bainbridge says the paper is "one of the very best on the market today."

In over-all performance, "X-12" flame retardant allowed less expensive dye formulations to be used. It insured prolonged whiteness of the whites and gave longer shelf life to the paper. Easy to apply, "X-12" had required no additional equipment.

Treated crepe in 20 bright and pastel colors and in printed patterns is rolling out of dye baths at Bainbridge now. Some of the printed designs require six or eight colors in a single dyeing and printing operation. Large rolls of treated paper are divided into smaller rolls, then slit into ribbon, packed and sent on their way for future parties and celebrations.

Solving this problem at Bainbridge is typical of the jobs of Du Pont technical servicemen who work closely with companies determined to improve their products and methods of production.



“Orlon” wins acid battle

*Uniforms of this acrylic fiber
are still in good condition
after a year's wear in a fertilizer plant*

“Three years ago our men who work around heavy acids in making fertilizers complained about their uniforms lasting only two weeks,” says the manager of a New Jersey fertilizer plant. “Today they average a year.”

What happened? In 1952 some of the men making sulfuric acid came to see him with an idea. Would he look into the new man-made fibers to see if one would resist acids? If so, they wanted some coveralls made up. This business of buying a new pair every two or three weeks was expensive to say the least. The manager agreed. The company gave the men a clothing allowance, but it was eaten up as fast as sulfuric acid ate the coveralls.

The manager presented the idea to a New York uniform company. Not long after the call a salesman left swatches made of Du Pont's “Orlon” acrylic fiber along with other fabrics. The fertilizer men lost no time in setting up a test. They dunked all fabrics in equal concentrations of acid. The results made their choice easy. “Orlon” was still in good condition long after the other fabrics had disintegrated.

After nearly three years' experience with uniforms of “Orlon” the men say they wouldn't wear any other fabric around acid splashes and fumes. They like “Orlon” not only for its acid resistance, but also for its easy care. Washed at night, the work clothes can be worn the next day. They are lightweight and comfortable in any kind of weather.

Like any news on cutting costs, word about “Orlon” for acid workers has spread to other plants of this fertilizer company. For, although the original cost of the new uniforms is more, “Orlon” is slashing the work clothing budgets as much as 85 per cent. That's definitely good news in anybody's plant.

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Maybe you want to attach furring strips to concrete walls, install pipe hangers and conduit clips or fasten metal window frames in place. These jobs and many, many others can be made easier with the Remington Stud Driver.

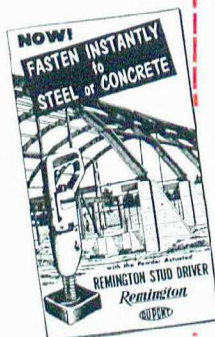


For more complete data on how the Remington Stud Driver can help solve *your* construction problems and for the name of your local distributor, mail the coupon at right.

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- ▶ ROSE SLUGS • APHIDS
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- ▶ BLACK SPOT
- ▶ POWDERY MILDEW



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New Du Pont Rose Insecticide and Fungicide contains methoxychlor, lindane and "Aramite" miticide, plus sulfur and "Fermate" ferbam fungicide for the control of rose diseases. It's prepared especially for the rose grower, but

also can be used on many other flowers and ornamentals.

A successor to familiar Du Pont Rose Dust, this combination product is being packaged in new weatherproof containers. It's handy to use, too, in a refillable 8-ounce dust gun or 1-pound package with a new sifter top. Also sold in 3-pound bags. Like Rose Dust, the new product can be applied either as a dust or a spray.

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