MAGAZINE April 1947

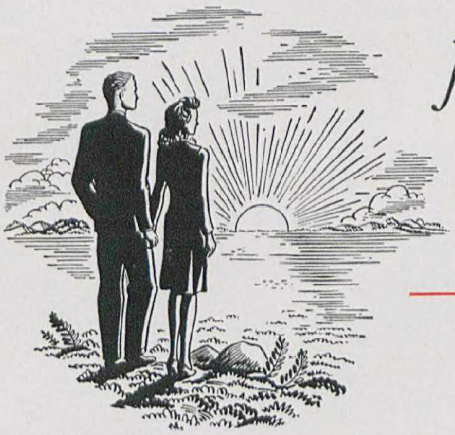


AGRICULTURE
and Du Pont

DUPONT

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

"So built we the wall... for the people had a mind to work!"



History has a way of repeating itself.

Over and over through the ages there have been days that tried the hearts of men, days of storm and stress and great confusion.

Over and over again, too, in times like these, there have been men who have dreamed, who have shared a dream, who have so inspired a people with their vision of what might lie within their reach that they have achieved new goals.

It was so in the days of Nehemiah when "the people had a mind to work," and rebuilt the great wall of Jerusalem. It was so when the city of San Francisco sprang rebuilt from the ashes of its greatest disaster. It is so for the world today.

At Du Pont everyone is at work. The scientists are working on chemicals that may revolutionize a hundred and one taken-for-granted procedures of daily living. Men and women in Du Pont plants are turning out a volume of products that exceeds any previous peacetime year.

Not just around the corner, but here and now... we can realize our dreams of a better America, an America that will bring the whole world along to higher levels of living comfort, higher levels of neighborliness and understanding than we have ever known before.

It can never be too early to build for the future. We can build the world we want for ourselves, for our children—"For the people have a mind to work."

BETTER THINGS FOR BETTER LIVING... *THROUGH CHEMISTRY*

DU PONT

REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DEL.

April 1947

DU PONT MAGAZINE

Vol. 41 No. 2

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

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MANAGING EDITOR, R. J. WOODRUFF, JR

AGRICULTURE AND DU PONT

While this country is acknowledged to be the greatest industrial nation, often overlooked is the fact that America is also the world's number-one agrarian state.

During five recent critical years, American agriculture met the most extraordinary requirements placed upon it by a world at war. Despite a declining farm population, our country produced one-third more food and fiber than during any like period in history. Contributing greatly to this production record were such technological advances as new and better uses of fertilizers, insecticides, fungicides and farm machinery, plus forward strides in plant husbandry and livestock breeding.

Throughout the 19th century, Du Pont provided the farmer with explosives to clear and drain his lands, and later, with vital nitrates for crop fertilizers. Today, the list of Du Pont agricultural products is long, and constantly expanding. In one group alone, insecticides, Du Pont now manufactures more than a score of special formulations.

This month's cover illustration salutes Agriculture in general, and pictures several beneficiaries of chemical science in agriculture.

Livestock benefits when phenothiazine is used to control internal parasites; poultry- and egg-production rises when "Delsterol" Vitamin D_3 fortifies the feed (see page 7); treatment of seed corn with "Arasan" seed disinfectant helps produce good stands; fungicides prevent disease in the vast and valuable field and truck crops. Chemical weed killers, and a new, powerful rodenticide, have lengthened the list of Du Pont developments for the American farmer. Other contributions include paints, enamels and pigments for farm buildings, wood-preserving chemicals, plastic-coated wire mesh, cellophane for packaging fruits and vegetables—even the fast dye in the farmer's neckerchief.

Clearly there is still room for progress. Not all diseases, or insects, or other farm pests have been brought under control. Du Pont and others are constantly working with scientific investigators to improve old products and develop new ones. The technological advances of the past decade provide an interesting speculation of developments still to come.

CONTENTS

1946 IN REVIEW 2
Highlights from the Annual Report

CHICK TIME AGAIN 7
There's plenty of "Delsterol" available to put "sunshine" in beginners' diets.

AFLOAT WITH "DULUX" 8
by Arthur M. Valz
Ocean liners, freighters and pleasure craft are kept shipshape with Du Pont Marine finishes

A DECADE WITH DU PONT "LUCITE" 10
It has served well, beautifying consumer products, and improving industrial equipment

FASHIONED FOR RAIN 12
To suit everyone rain and outdoor wear must be practical *and* good looking

EYE BUYING 14
A survey shows that two out of five food items are purchased on impulse

WINDOW DRESSING 16
"Tontine" shade cloth as a decorative material

HIT 'EM HARD—AND OFTEN 18
New flat-top crimp in Remington-Peters shells precludes "blown" patterns

X-RAY, FLUOROSCOPIC, AND INTENSIFYING SCREENS 20
by Frederic W. Reuter
Highlights on some indispensable equipment used in all x-ray laboratories

DID YOU KNOW 22
Odd facts about the Company and its products

WHAT'S NEW 23

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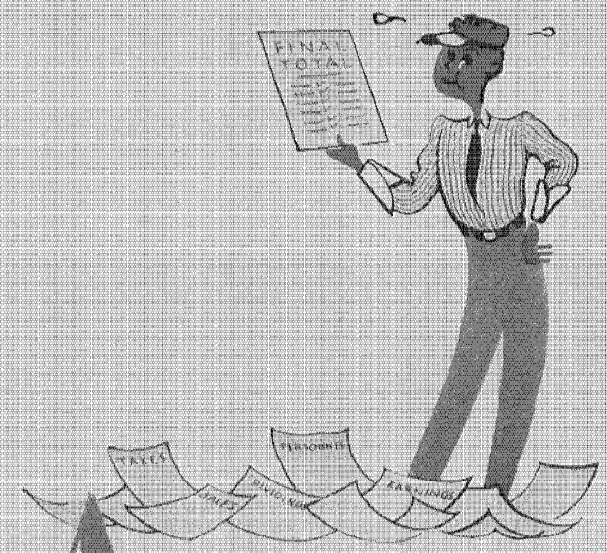
PHOTO CREDITS: Page 7, H. Armstrong Roberts; Page 8 (top) Grace Line; (bottom) Owens Yacht Co.; Page 9 (top) Bethlehem Steel Co.; (center) Electric Boat Co.; and (bottom) Morris Rosenfeld.

1946 *in review:*

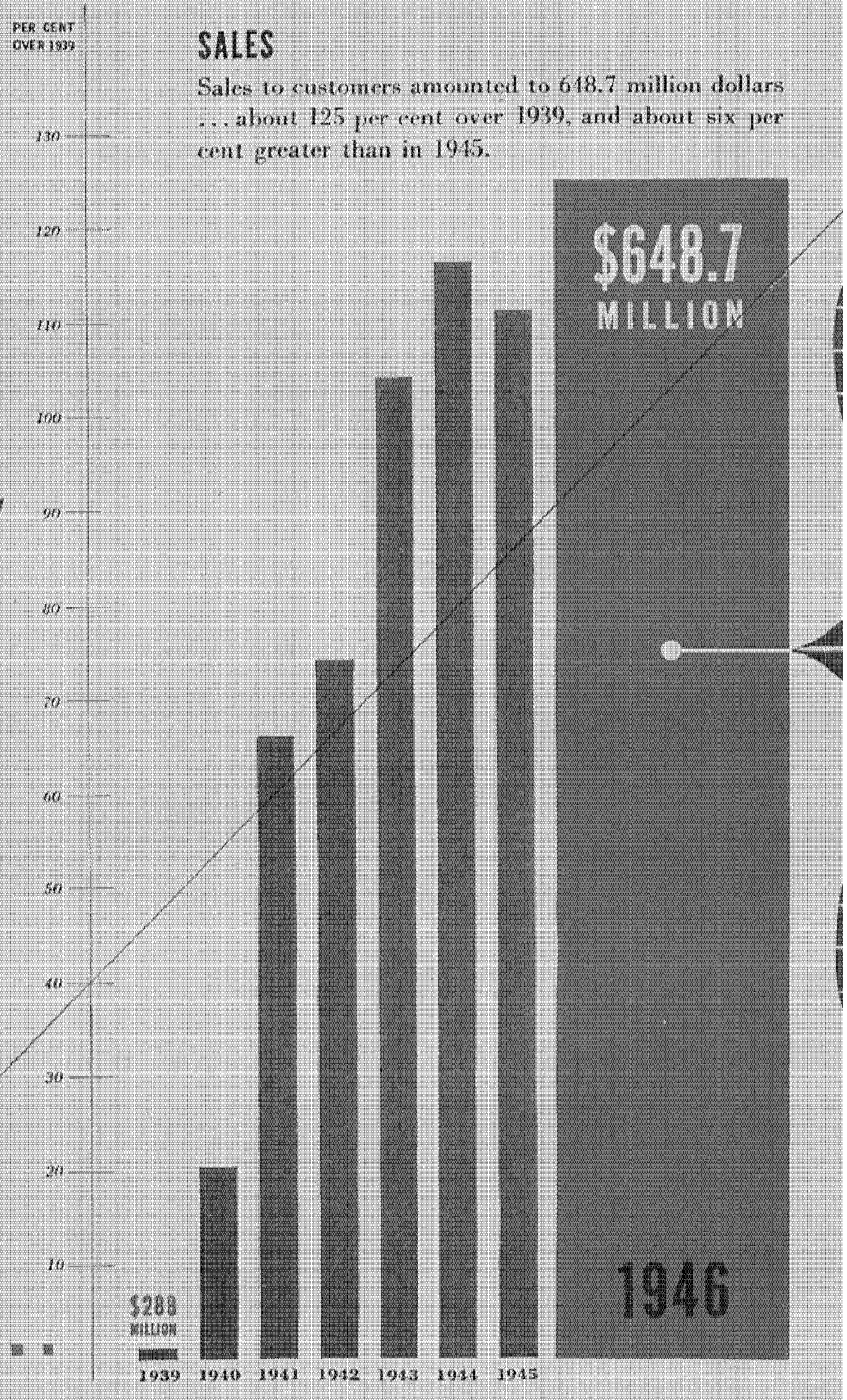


AS the Magazine goes to press, the annual report of President Walter S. Carpenter, Jr., covering the Company's activities during the past year—145th year of business—is being distributed. Highlights from the report, and other newsworthy items are presented on this and the four following pages.

at a glance . . .

SALES

Sales to customers amounted to 648.7 million dollars . . . about 125 per cent over 1939, and about six per cent greater than in 1945.

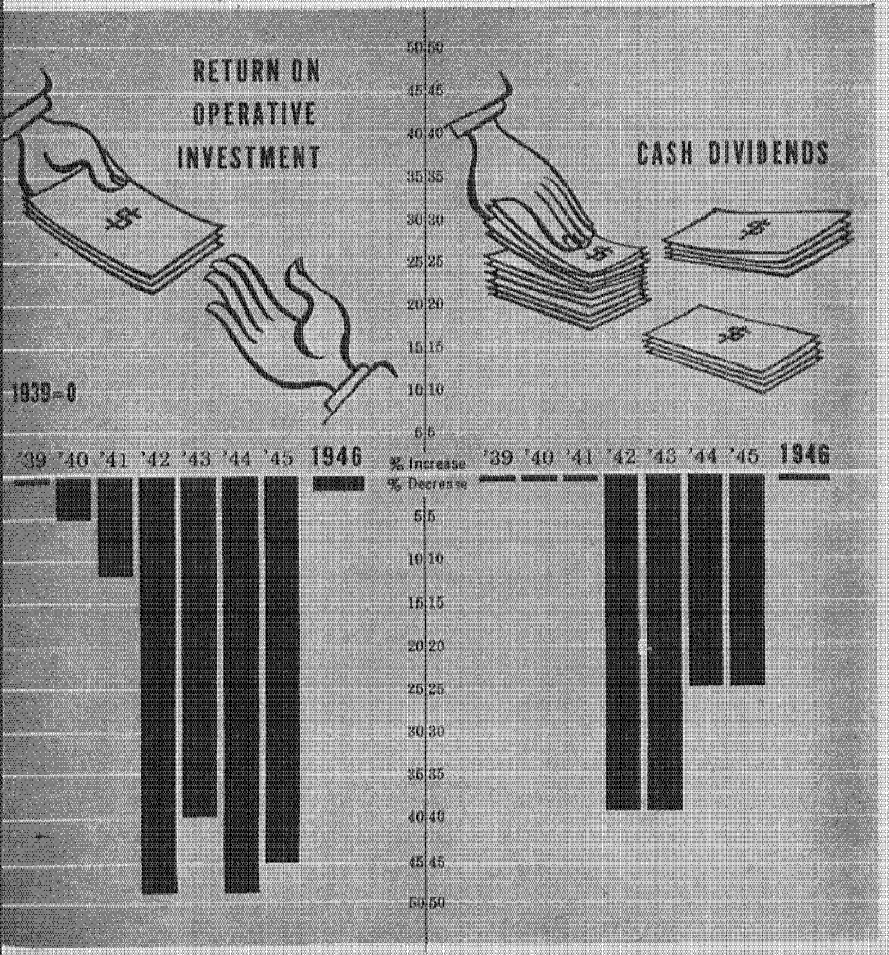


The chemical industry in 1946 enjoyed the high degree of industrial activity prevalent throughout almost all branches of industry in this country.

monthly sales peak

The '46 monthly sales peak, $60,102,000, higher than any month in Company history, was reached in November. Monthly average was $53,059,000.

Black bars on chart show percentage of drop in return on operative investment and dividends since 1939.



EARNINGS

Earnings on the common stock for 1946 were $9.44 a share compared with $6.29 a share in 1945, a war year.

DIVIDENDS

Common stock dividends were $7.00 a share in '46, as in '39, '40 and '41. Wartime payments were $4.25 and $5.25.

Dividends paid on Preferred stock were $4.50 per share

COST RAW MATERIALS +64%

ALL WHOLESALE PRICES* +57%

*U. S. Bureau of Labor Statistics

Since 1939, while the national index of all wholesale prices increased 57 per cent, there was almost no change in Du Pont sales prices, on the average, as measured by an index computed in accordance with commonly-approved price index technique. However, this does not fully reflect increases on certain products made effective, for the most part, in December, 1946. Raw material costs advanced while operating taxes dropped part way from wartime levels.

SALES PRICE INDEX (DU PONT) 0%

1 9 4 6

Decrease since 1939

the cost of doing business was higher

employment rose to a peacetime high...

The number of employes (Du Pont and wholly owned subsidiaries) at the end of 1946 exceeded by 20 per cent the highest previous peacetime employment figure.

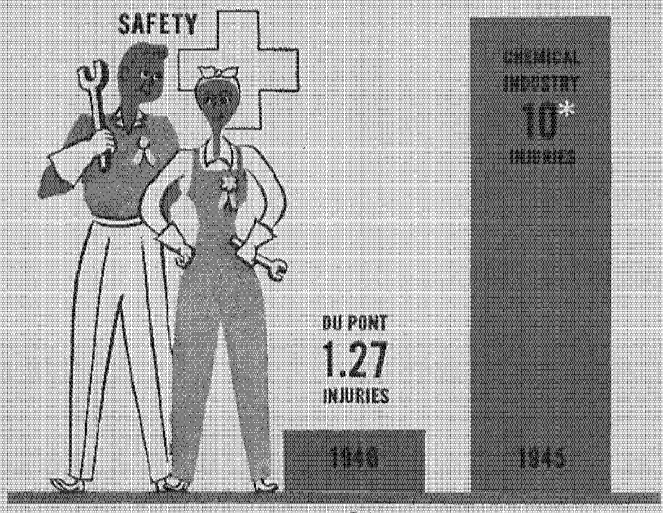
Reconversion was completed without any serious retooling problems, and production was substantially larger than that of any previous peacetime year.

Cost of benefits to employes during the year was $30,496,000.

Total wages and salaries paid during the year amounted to $224,306,000, compared with $195,280,000 in 1945.

Amount distributed to stockholders during 1946 was $85,453,000.

Number of disabling injuries per million man hours worked:



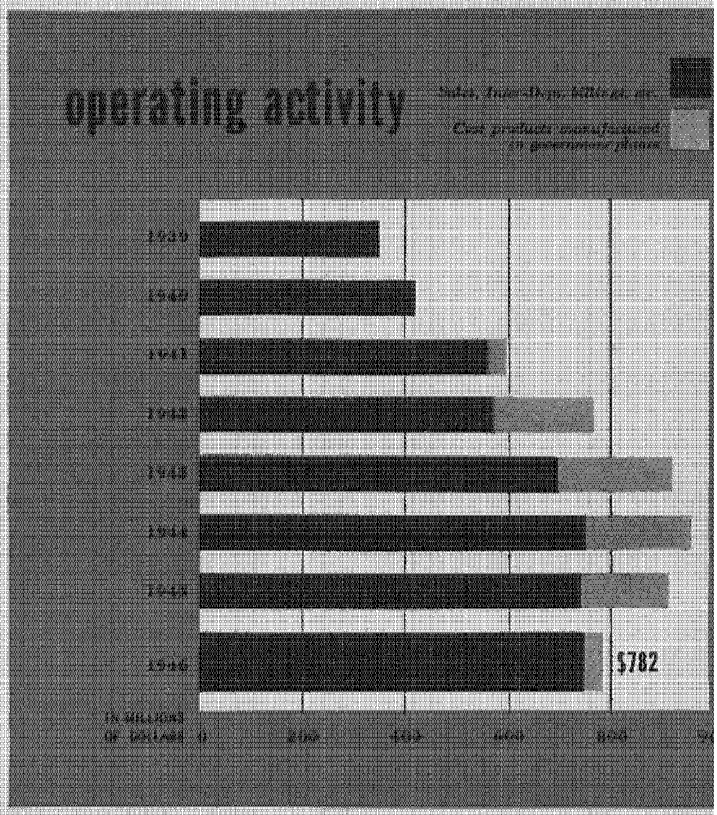
*National Safety Council figures for 1945

operations topped peacetime years...

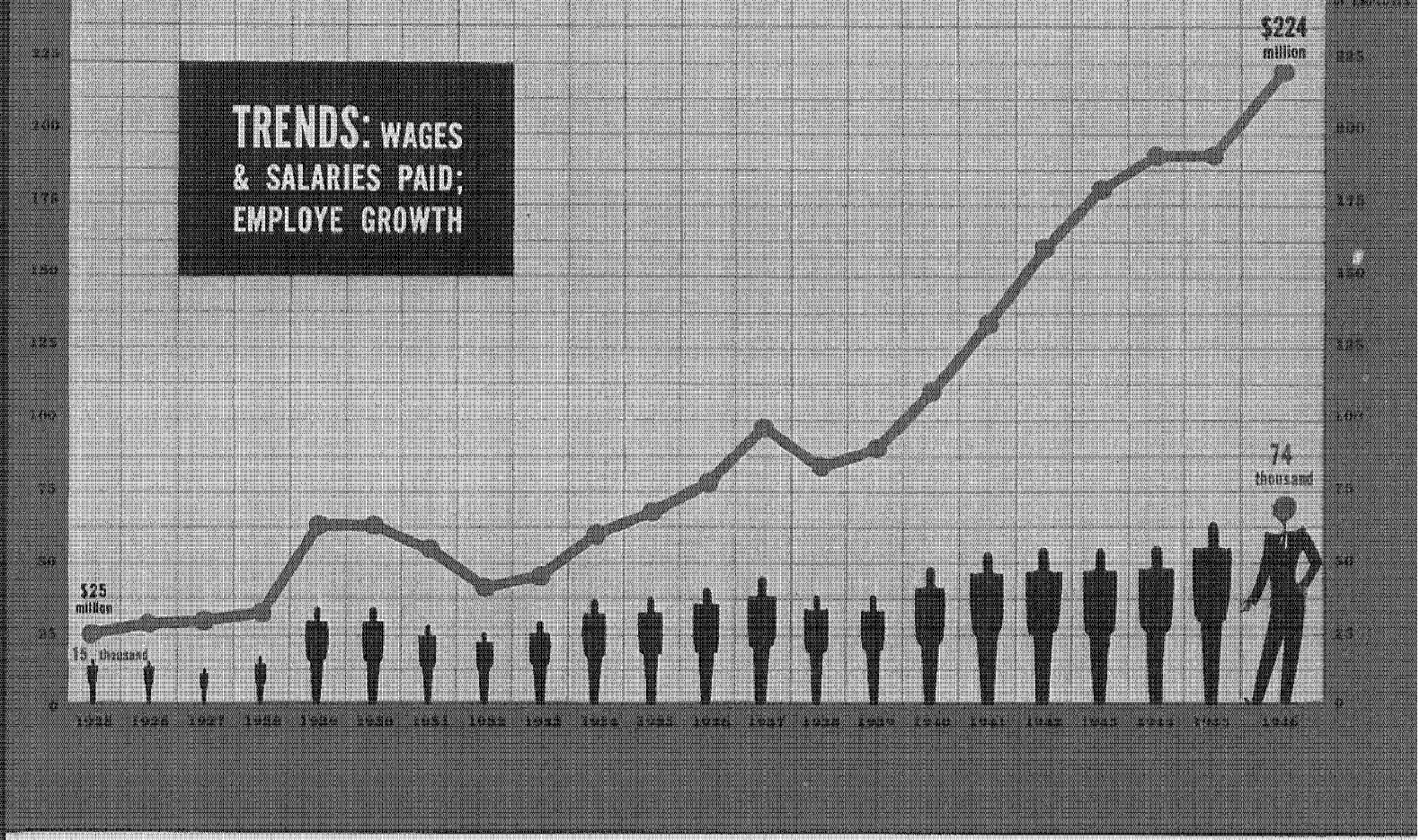
The volume of all operations amounted to approximately $782,276,000—16 per cent less than 1945, but higher than any *peacetime* year in the Company's history.

During the year $92,300,000 was spent for improvements to plants and equipment, compared with $34,700,000 spent in 1945.

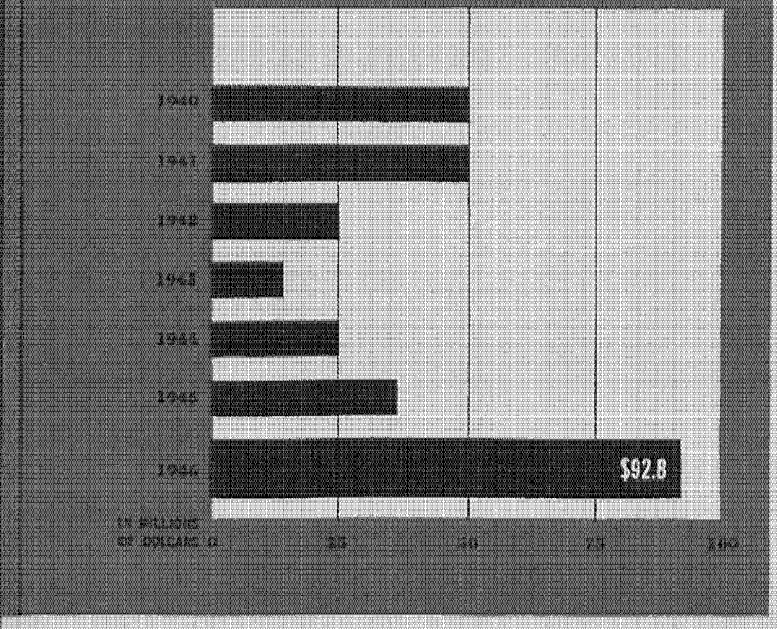
The expenditures in 1946 mark the first phase of the Company's post-war expansion program, and were principally for the manufacture of nylon, "Lucite" acrylic resin, acetate and viscose rayon, cellophane, synthetic methyl alcohol, ethylene glycol (for anti-freeze), and agricultural fungicides and chemicals.



TRENDS: WAGES & SALARIES PAID; EMPLOYE GROWTH

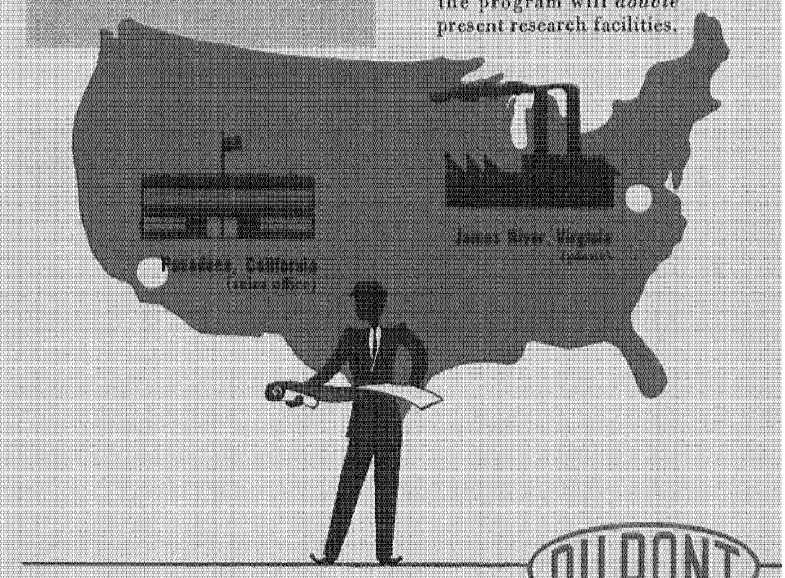


plant extensions & betterments



new plants & sales offices

New laboratories, or additions to existing laboratories are planned at *15* locations. When complete, the program will *double* present research facilities.



DU PONT

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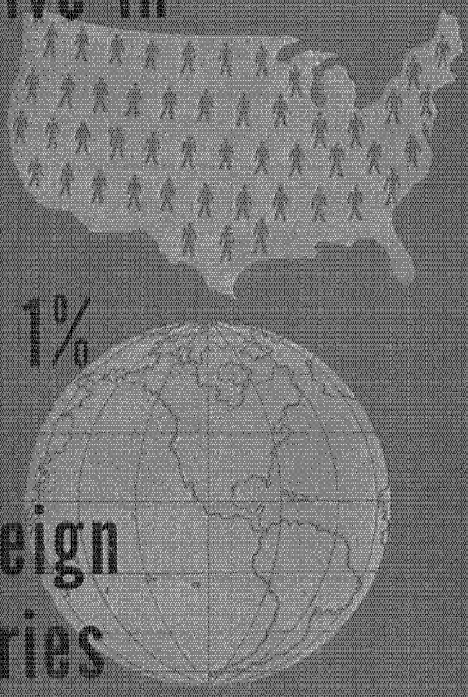
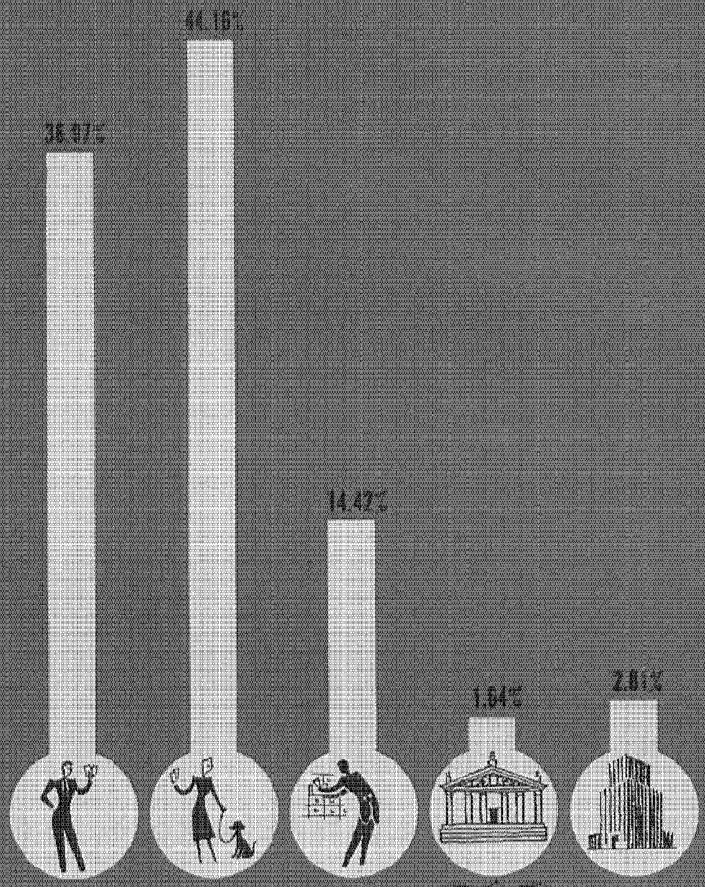
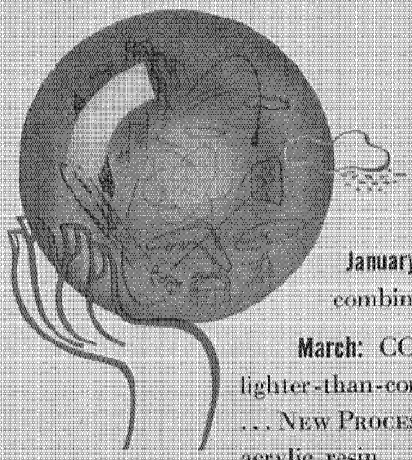
DU PONT is owned by 67,015 stockholders

they live in every state about 1% live in foreign countries





* *Eliminating duplications in holders of common and preferred stock.*



NEW *products*† *in 1946*

January: Rose Dust, sulfur "Fermate" combination, fungicide for rose diseases.

March: CCA, cellular cellulose acetate, a lighter-than-cork plastic used for laminations ... New Process to produce patterned "Lucite" acrylic resin.

April: Chrome and Metal Polish ... BCM, a new bonding resin .... Luminescent "Lucite", new form of acrylic resin ... Elastic Nylon ... "Teflon", new plastic ... "Duco" Metalli-Chrome nitrocellulose lacquer, new automotive finish ... 2,4-D, weed killer, and "Karmex" 2,4-D weed killer in tablet form ... Du Pont Garden Dust, an all-purpose insecticide and fungicide.

July: Anti-fume DE Paste, to inhibit fading of fast dyes ... "Fluorofilm", and three new television films.

August: Auric Brown, new pigment ... A New Process for the continuous manufacture of precipitated pigment ... 4665 industrial cement.

October: Three new "Fairprene" cements ... "Arasan" SF, slurry formulation to check seed-borne diseases of corn.

December: "Lexone" 50 insecticide composition especially effective as a cotton insecticide.

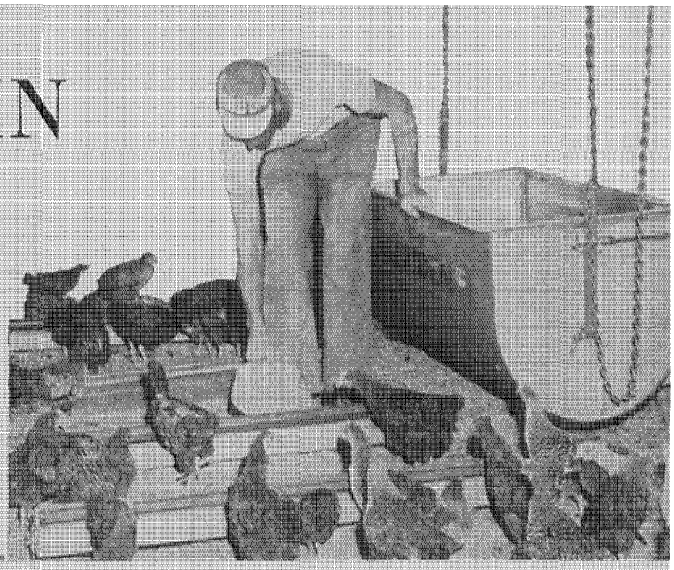
Also announced during the year were about a dozen research chemicals and intermediates, and several new coated fabrics.

†*Not mentioned specifically in the report, this product listing is included for reader information.*

About 32,000 Du Pont employes were making products last year which did not exist, or were not in commercial manufacture 20 years ago.

CHICK TIME AGAIN

AND THERE'S PLENTY OF "DELSTEROL" AVAILABLE TO PUT "SUNSHINE" IN BEGINNERS' DIETS



Young birds in confinement need "Sunshine" Vitamin in their feed.

At this time of year the chirping of baby chicks is a familiar sound across the land, for during 1947 over 5,000,000 farmers will be raising them. Within three months some of these baby chicks will be on the market as broilers. A little later, more will reach the market as fryers, and within a few months the first eggs from these chirping chicks will start to flow into wholesale and retail channels.

But, the early life of a chick is a critical period in its development. Nutrition plays a very fundamental role in determining its future well-being and usefulness, and becomes even more important under our modern system of poultry husbandry where chicks are reared and may spend most of their lives in confinement without access to sunlight. Under these conditions, the poultryman must depend entirely upon his feeds to supply all of the elements needed by the rapidly-developing chicks.

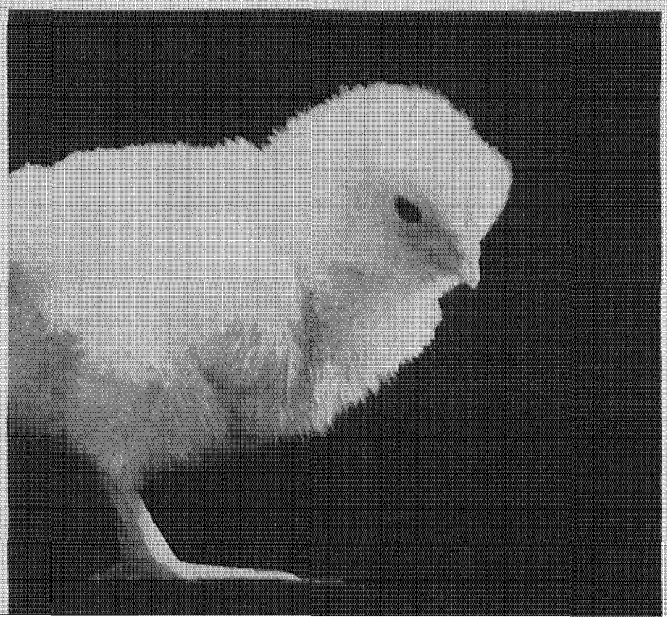
It was a little over twenty years ago that the presence of rickets in baby chicks was first associated with a lack of exposure to sunlight. Later it was observed that the ultra-violet rays of the sun activated a substance in animal tissues to form what is commonly known as Vitamin D. Since that time the importance of Vitamin D in the proper use and deposition of calcium and phosphorous in the body has become common knowledge.

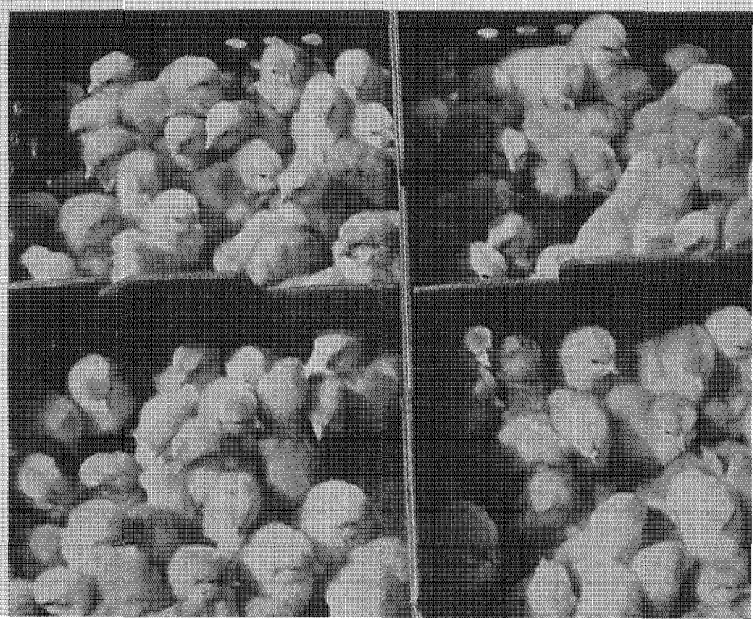
Du Pont biological chemists made the fundamental discovery that sterols of animal origin, when activated by ultra-violet light, produced the most effective source of Vitamin D for poultry. Based on this discovery, "Delsterol," Du Pont's Vitamin D product for poultry, was developed.

Logically enough the efficacy of Vitamin D in each batch of "Delsterol" is established by actual testing on growing chicks. Final evaluation of "Delsterol" before shipment to feed manufacturers rests with the chick as the test animal.

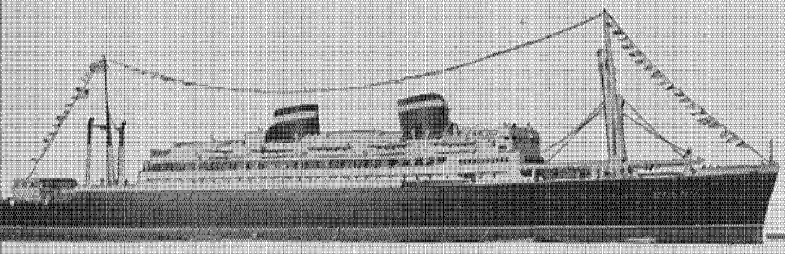
Poultrymen have become increasingly conscious of the value of "Delsterol" in their poultry feeds. So much so that they have learned to regard the trademark as a sign of higher quality.

● The critical period: they haven't eaten yet; need a good start.





AFLOAT WITH "DULUX"



by ARTHUR M. VALZ

MAJESTIC OCEAN LINERS AND GRACEFUL PLEASURE CRAFT ARE KEPT SHIPSHAPE WITH DU PONT MARINE FINISHES

Ever since Noah coated the gopher wood of the Ark "within and without with pitch," painting has been important in preserving the life of a vessel. The *U. S. S. Constitution*, of War of 1812 fame, for example, is still afloat in good condition at the Boston navy yard because the crew members have kept her well coated with paint.

Paint protects and also adds beauty and distinction to vessels. It keeps them neat and shipshape from topmast to keel. The ocean liner *S. S. America*, for instance, is commonly called "Queen of the Seas" because of her regal appearance. Her royal "robe" is the ermine white that coats the superstructure and the velvet black that covers her hull.

Paint materials are, of course, one of the expense items in the maintenance of a vessel. Of the $800,000,000 contracted for new yachts and commercial craft during the 1946-47 shipbuilding program, only about $8,000,000 is earmarked for the paint bill. But it is an important one per cent.

Many landlubbers are of the opinion that any paint is suitable for maritime use, which is an erroneous idea. Enamels and varnishes for ships and boats are specially-prepared products; they must be able to withstand the unusual conditions of a water environment. That is why they are called marine finishes.

Moisture is always present aboard ship to rust steel, disintegrate wood, and rot deck canvas. This condition remains throughout a ship's service life from the time it is launched until it is scrapped.

Salt air and brine at sea are continually on the offensive to corrode metal parts and to discolor painted surfaces. The exposures are very severe; within a single month a vessel may be subjected to arctic blasts or to the blistering rays of a tropical sun.

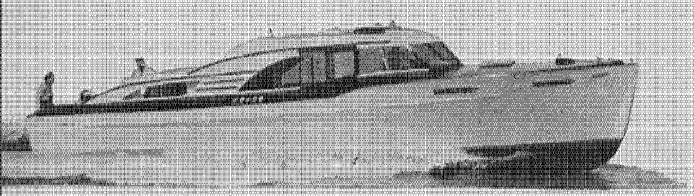
Harbor waters, too, are often polluted. They may emit obnoxious hydrogen sulphide fumes, and these plus oil and gasoline wastes, tend to darken white hulls. Smoke and soot often envelope a ship at berth or while underway leaving every exposed surface coated with a dirty film.

All vessels receive hard knocks in mooring. Coarse hawsers cause friction burns, crusty pilings and timbers of unprotected docks scratch and disfigure even the toughest paint film. Rust from the anchor, and the mud and muck raised with it from the harbor floor, stain and mar the prow. Marine finishes, to be serviceable, must resist abrasion.

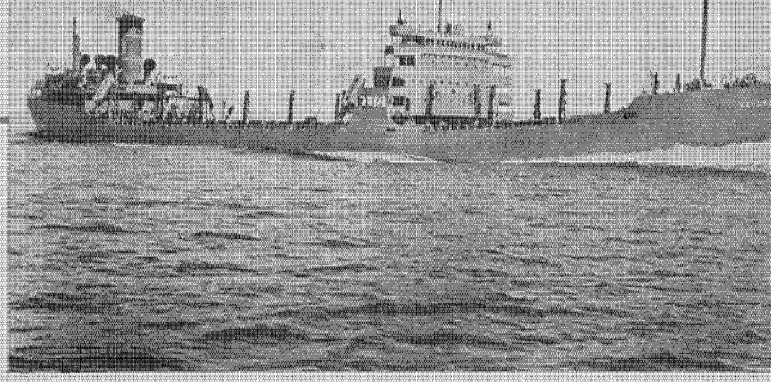
SPECIAL FINISHES

For many years the Du Pont Company has carefully studied the paint needs of steamship operators as well as those of pleasure boat owners. As a result, the marine finishes produced by this company are formulated to meet the exacting requirements of the trade. The products offered make up an extensive line.

There are two factors which contribute to the quality of any finishing material. First—the pigment, which gives color, hiding power and body; and second—the vehicle, or liquid portion, which holds the pigment particles in place forming a continuous adherent film. Experience has shown that the vehicle of a paint or enamel is the first to disintegrate. So in developing Marine "Dulux," the research chemists first developed an entirely new vehicle to increase durability along with a product of good appearance.



"Dulux" gleams on this 1947-model cabin cruiser.



Sea-going vessels like this steel ore carrier are protected with Du Pont Marine Finishes from corrosive salt air.

The "Dulux" vehicle is the reason for the outstanding quality of Du Pont marine finishes. This material is not a varnish and has no relationship to the commonly-used mixtures of brittle resin and drying oil. It is a distinct chemical compound—an alkyd resin—and its composition can be manipulated to meet a variety of finishing requirements. Thus, special vehicles, possessing distinct basic film characteristics, make possible the "Dulux" line of marine finishes.

They have exceptional leveling and flowing qualities which give surfaces a smoothness unusual in a paint-type product. Hulls and cabin exteriors, in particular, require a tile-like finish. The hiding and spreading capacity of "Dulux" Yacht White Gloss, for example, makes such a surface possible. This finish won't collect dirt readily and cleans easily without injury to the surface.

ADVANTAGES

"Dulux" dries fast. Staterooms refinished with Du Pont Cabin Interior Enamel one day may be occupied the next. A surface coated with "Seakrome" primer hardens overnight. These finishes dry harder than ordinary oil-types, which accounts for their outstanding resistance to scratching, marring and other mechanical injuries.

This film is considerably more impervious to the destructive action of moisture and the corrosive attacks of salt air and brine, and remains bright even after a winter lay-up. That is why "Dulux" Exterior Clear spar varnish is used by hundreds of boat owners. Service applications of "Dulux" on ocean steamships have proved that it retains a better appearance in a salty atmosphere than any other known type of finish because of its high film impermeability.

These finishes retain their original gloss and color much longer, due to the ability of the vehicle to maintain a tight grip on the pigment particles. Color and adhesion are remarkably retained when used in engine rooms where extreme temperatures exist.

A mild chalking process self-cleans a "Dulux" surface of dirt, soot and grime particles; keeps it in excellent condition for repainting. Yacht White Semi-Gloss, for example, is designed to protect hulls, but it does more than that—it gives them good appearance that lasts for the entire life of the film.

"Dulux" is washable. A bucket of water and Du Pont Paint Cleaner are all that is necessary to keep the surfaces gleaming.

(continued on page 24)





Pleasure craft like this sleek schooner and the trim motor yacht shown above stay white longer with Marine "Dulux."

A DECADE WITH DU PONT "LUCITE"

IT HAS SERVED WELL, BEAUTIFYING CONSUMER PRODUCTS, AND IMPROVING INDUSTRIAL EQUIPMENT



Prior to 1937 industry had long been waiting for a strong, tough, light-weight plastic with the clarity of crystal and the beauty of precious stones. In that year Du Pont introduced a new one—"Lucite" acrylic resin.

Since then this plastic has been fabricated and molded into hundreds of products. You are, of course, familiar with "Lucite" combs and hairbrushes, but did you ever see an oil-level window in a milk separator or the roller-bearing in a rotary citrus-juice extractor?

PROCESSING TECHNIQUE

Starting with simple raw materials, the acrylic monomer—a clear, colorless liquid—is produced by chemical synthesis. Further processing yields the solid polymerized resin, in the form of transparent, translucent or opaque colored sheets, rods, tubes, or molding powders. In these forms the material is shipped to manufacturers who fabricate or mold it into finished articles or parts for later assembly.

One most important wartime application was in the field of aviation, where its light weight, excellent transparency, weather and shatter-resistance dictated its use in forming enclosures, noses and turrets for every major type of combat aircraft. Today, it is employed in the windows, windshields, and enclosures of most civilian airplanes; also in compass housings, landing-light covers, and interior fixtures.

Certain applications in aviation—instrument panels and lenses, for example—had been introduced previously by the automotive industry. The edge-lighting ability of "Lucite" is the foundation for its employment in instrument cluster dials, clock dials, panels, horn buttons, radiator ornaments, tail-light lenses, emblems and medallions. In all, fifty-eight separate parts of "Lucite" were found on fifteen makes of pleasure cars last year.



A VERSATILE MATERIAL

"Lucite" readily lends itself to mass-production techniques. It can be molded rapidly in existing injection, compression or extrusion machinery, and large-volume output can be obtained quickly and economically with a minimum of finishing operations after molding. Machining, too, is easy, for "Lucite" can be sawed, drilled, polished, and otherwise fabricated with tools like those

Auto lenses (above) and the brush used by actress Carol Landis pose different fabricating problems, solved equally well with "Lucite."

The same plastic is adaptable for such widely diverse items as gauge windows on industrial machinery, and the heels and soles of "mules."

used in working wood. It can be cemented to wood, metal, or other plastics—or to itself. Forming is readily accomplished at temperatures of from 220°F. to 300°F.

This ease of fabrication, plus the sparkling beauty of "Lucite," also accounts for its use in personal accessories. For example, many of the finest, most beautiful pens and pencils are encased in barrels of lustrous "Lucite." Watch crystals, ladies' sandals, "mules," hairbrushes, and costume jewelry are being fashioned of this plastic.

Decorative lamps, graceful drapery tie-backs, mirror frames of twisted rod, period trays and centerpieces, table mats, carved cutlery handles, towel rods and wall shelves, attractive cigarette boxes, coasters, and tumblers are numbered in household articles made of this delicate-appearing but tough plastic.

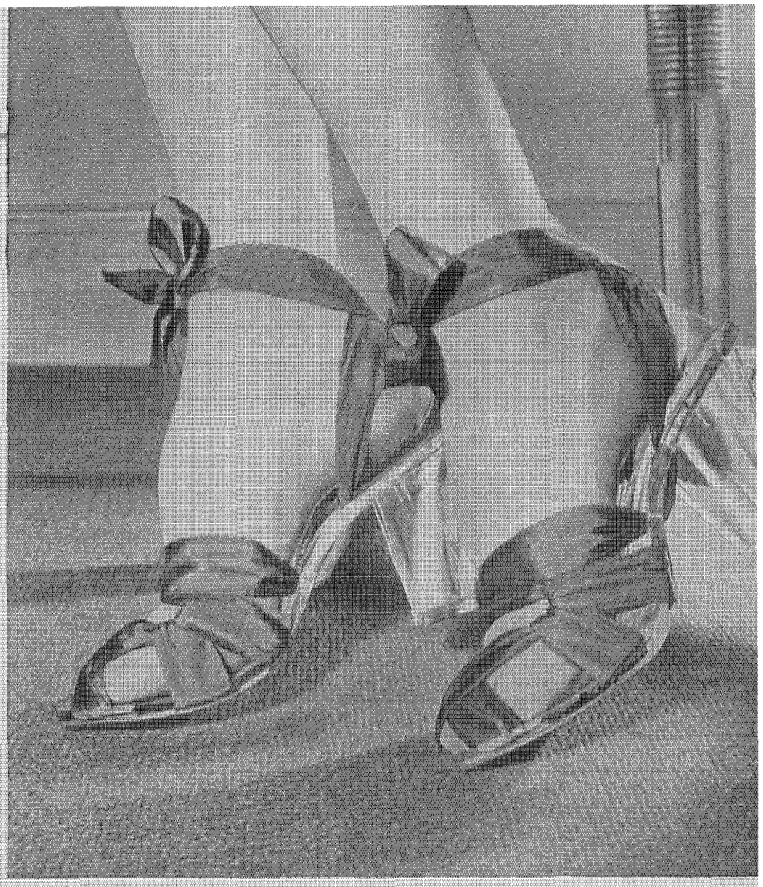
Display fixtures of "Lucite" for retailing everything from batteries to cosmetics are usually designed for window or counter use. Window dressers use these plastic fixtures because their sparkling beauty complements the quality wares displayed.

INDUSTRIAL USES

Notwithstanding the wide variety of consumer applications, this plastic finds perhaps its greatest functional use in the industrial market. For it is here that its transparency, strength, toughness and resistance to chemicals, and its light weight and ease of fabrication and molding are required. Here utility is sought rather than beauty.

Machinery safety guards and entire machine housings of "Lucite" are sturdy, shatter-resistant, and not affected by alkalis, oils, and dilute acids. Their transparency lets an observer see inside. The same is true of machinery windows and gauges and instruments, and in working models of many types of equipment. Drafting instruments are molded with extreme precision. Coil forms and insulators make use of the dielectric strength of this plastic. Excellent optical properties—the ability to transmit over 90 per cent of the light rays—account for the use of "Lucite" in making television lenses.

In beautifying consumer products, in improving industrial equipment, "Lucite" has served well during the past decade. As fabricators and molders become more familiar with proper techniques and design, this plastic will continue to offer greater opportunities for product improvement through its versatile, and workable properties.





The salad bowl, fork and spoon show several properties of "Lucite" acrylic resin: clarity, strength, and lightness of weight.



Aqua Togs, Inc.

FASHIONED FOR RAIN

TO SUIT EVERYONE, RAIN AND OUTDOOR WEAR MUST BE PRACTICAL *AND* GOOD LOOKING

The predilection of women to stay pretty even though caught in rain; of men to stay comfortable, casual yet "tailored"; of parents to keep youngsters snug and clean, though outdoors, poses a neat problem for designers and makers of outerwear.

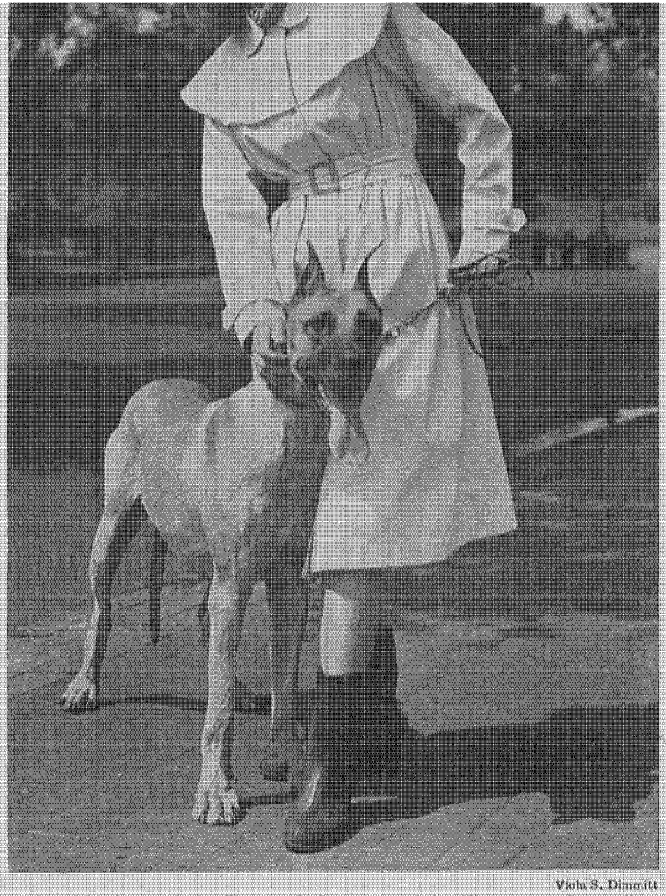
An advance look at Spring rain fashions shows that the garment makers have done well by all age groups. Women will get the colors, and attention to tailoring detail they demand. Men's rainwear is smart, yet casual. A glance at the younger set shows that designers are catering to them, too.

Common denominator of the sportswear, and rainwear shown here is Du Pont "Zelan" durable water repellent which is applied to the fabric before cutting and offers weather protection and spot repellency that will last through many washings or cleanings. This finish is being applied to fabrics in the widening range of colors featured in this season's rainwear.



Whether he's spectator or player, he insists on freedom of movement. Jackets weather-protected with Du Pont "Zelan" insure that "easy feeling" of sport togs.

Shirtcraft Co., Inc.



Viola S. Dimmitt

Suitable for a wide range of fabrics, textures and colors, Du Pont "Zelan" gives dependable weather protection to rainwear.



M. & S. Solomon

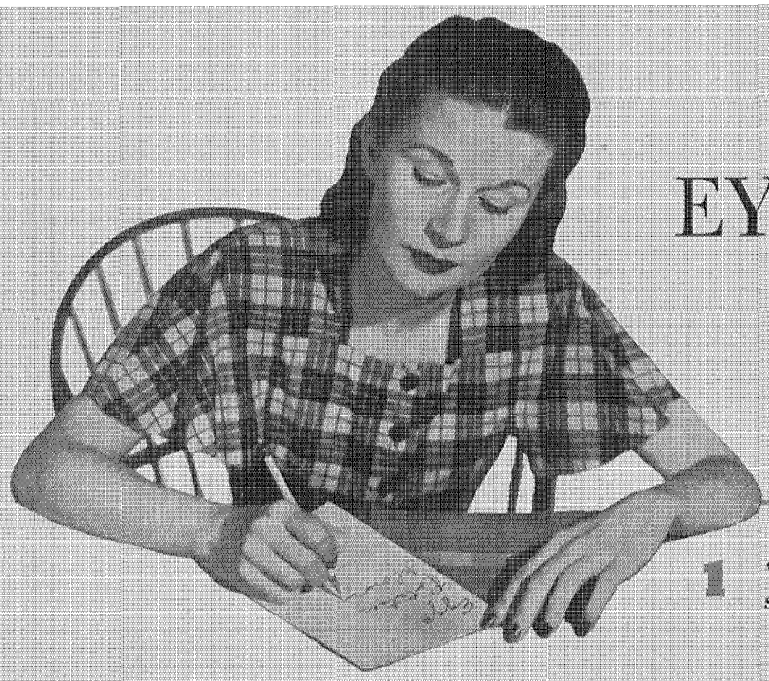
Leading designers of shower togs are using "Zelan"-finished fabrics because "Zelan" lasts through many washings or cleanings.



Cable Raincoat Co.



Marsh and Wendt



EYE BUYING

1 "Let's see, what else do I need?" muses Mrs. Consumer while jotting down her market list at home.

NATIONWIDE SURVEY ON CONSUMER BUYING HABITS SHOWS THAT ALMOST TWO OUT OF FIVE FOOD ITEMS IN SUPER MARKETS ARE PURCHASED PURELY ON IMPULSE

When in a super market, you probably are not aware of the fact that you make two different types of purchases. Marketing authorities agree that consumer food buying may be divided into two broad classifications as follows:

Demand Purchases—planned in advance. For example, staple items on a shopping list like flour, soap powder and butter. You go to a store to buy them because you need them and have nothing else definitely in mind.

Impulse Purchases—decided upon in a store with little or no advance planning. For instance, Mrs. Consumer may go to the store for a loaf of bread and a pound of coffee. However, she arrives at the check-out counter with the bread and coffee, *plus* macaroni, cheese, candy and doughnuts.

In this case, the homemaker had no intention of buying the extra items until she saw them at the store. She made her decision to purchase on the spur-of-the-moment because the articles looked good or otherwise attracted her.

2 On entering the super market, she begins to look for the items on her list. Here, at the point-of-sale, is where "eye buying" starts.

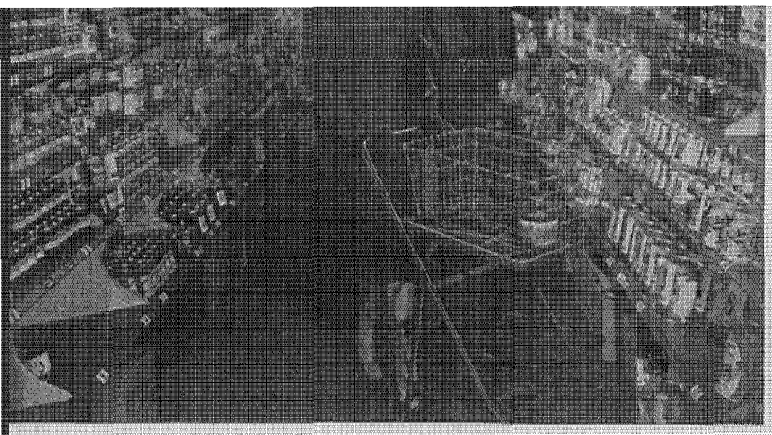
BEFORE THE WAR

A pre-war survey made by the Du Pont Company among foodstore shoppers proved conclusively the strength of the tendency to make impulse purchases. At that time it was revealed that 24.6 per cent of all food purchases—or approximately one out of four items—were decided upon by a consumer after reaching the store.

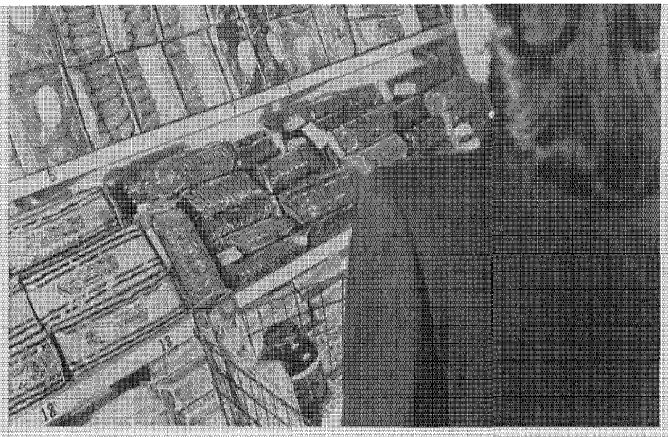
How widespread is this practice now? What effect did war-time shortages, rationing and other limitations have on consumer buying habits? That's what the Cellophane Division of the Du Pont Company wanted to know, so its Market Research staff set out to get the facts.

Trained investigators interviewed nearly two thou-





3 Her search leads to various sections of the store. Impulse to buy is stimulated by actually "seeing" items.



4 Attractive packages at the cookie counter "command" attention and stop the shopper. These are favorites with impulse buyers.

sand shoppers in super markets located in seven cities throughout the nation—Atlanta; Cincinnati; Minneapolis; St. Louis; San Francisco; Springfield, Massachusetts; and Yonkers, New York, checking the purchases of thousands and thousands of items.

SURVEY TECHNIQUE

Interviews were conducted in this way. As women entered a store, they were asked what they intended to purchase. Shopping lists were checked whenever possible. No intimation was given that another interview would be made. Then after shoppers had completed their buying, they were approached a second time and lists of actual purchases were recorded. Thus, it was possible to find out how many extra items were bought, and what percentage of all foods purchased were bought purely on impulse.

When the total purchases were evaluated, it was disclosed that 38.2 per cent of the items—almost two out of every five—were unplanned. The results showed that impulse buying increased from 24.6 per cent pre-war to 38.2 per cent post-war.

SWEETS ARE TOPS

What were some of the highest impulse items? How did they figure percentage-wise against total purchases of those items? Here are the answers: candy, nuts, and candied fruits—71 per cent of all purchases were on impulse; cakes and cookies—67.4 per cent; macaroni and spaghetti—54.9 per cent; and crackers, pretzels and potato chips—51.3 per cent.

Manufacturers and retailers have shown considerable interest in this study because it indicates the importance of point-of-sale factors like display and effective packaging in attracting the attention of impulse shoppers to self-service merchandise.

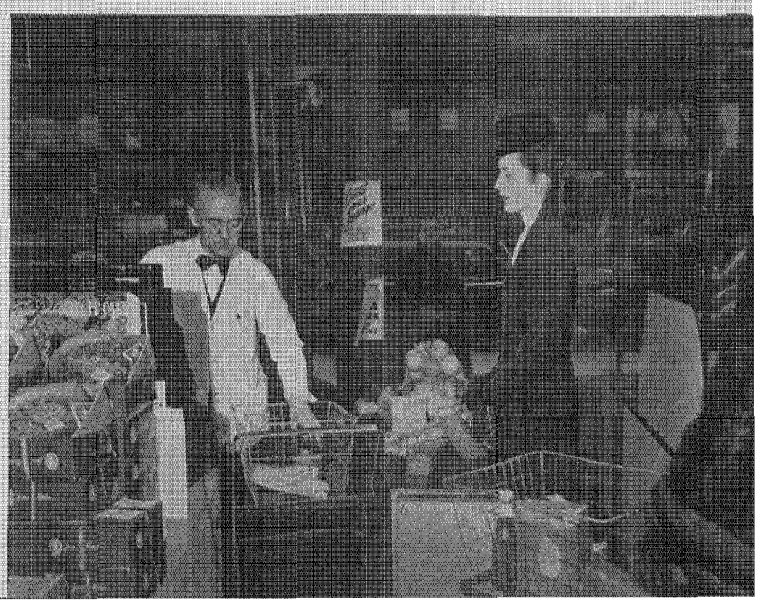
The next time you are in a super market, look at the items displayed. You will notice that, in many cases, the most attractively packaged merchandise is "out in front" so the roving eye of the marketer cannot escape seeing it.

Manufacturers and dealers interested in the complete report of this survey may obtain a copy by writing to the Cellophane Division, Department DM-47, Wilmington 98, Delaware.

5 "These cookies look so good, I'll take them too," says Mrs. Consumer to herself as she reaches for those in the Cellophane bag.



6 "I didn't intend to buy all these things, but they looked so good I couldn't resist!" exclaims the shopper to the cashier.



WINDOW DRESSING



A LITTLE MORE LIGHT ON "TONTINE" SHADE CLOTH AS AN INTERIOR DECORATIVE MATERIAL



Would you live in a windowless house? Certainly not from choice. We all prefer to be housed in airy, sunlighted rooms.

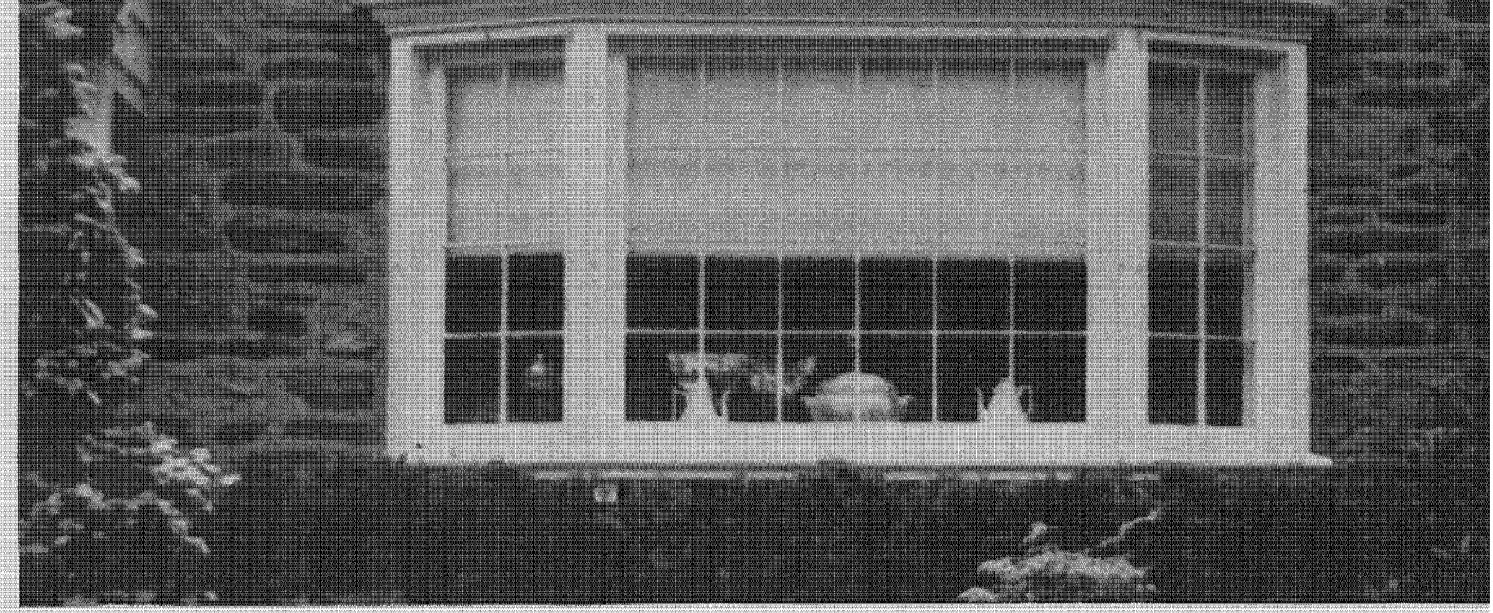
But sometimes too much light is objectionable, which is one of the reasons for window shades. Useful for light control? Yes, they are. Easy to operate? Sure. Pull them down if you don't like strong sunlight or need more privacy. Raise them if you want more light for any reason at all. Decorative? Definitely so—and that's one of the advantages of Du Pont "Tontine" window shade cloth, for you can help to make any desired interior decorative scheme effective, merely by exercising a discriminate choice of colors.

"Tontine" is made by impregnating a high-grade cotton fabric with colored pyroxylin or liquid cotton. This thoroughly water-resistant shade cloth resists fading from sunlight, staining and discoloration from rain, and fraying and cracking from whipping in the wind. Shades made of this material protect fine fabrics, rugs and furnishings from strong sunlight, and they can easily be kept clean with soap and water as one accompanying illustration shows.

ON THE DECORATIVE SIDE

If a color scheme of your choice calls for shades to match the woodwork or the walls, glass curtains or draperies, or if you plan merely to accent a particular color in a figured wallpaper or fabric, "Tontine" can be made to serve that purpose.

"Tontine" shades resist sun rays. This property helps protect the colors in the rug and in the flowered chair covering. Shades are washable.

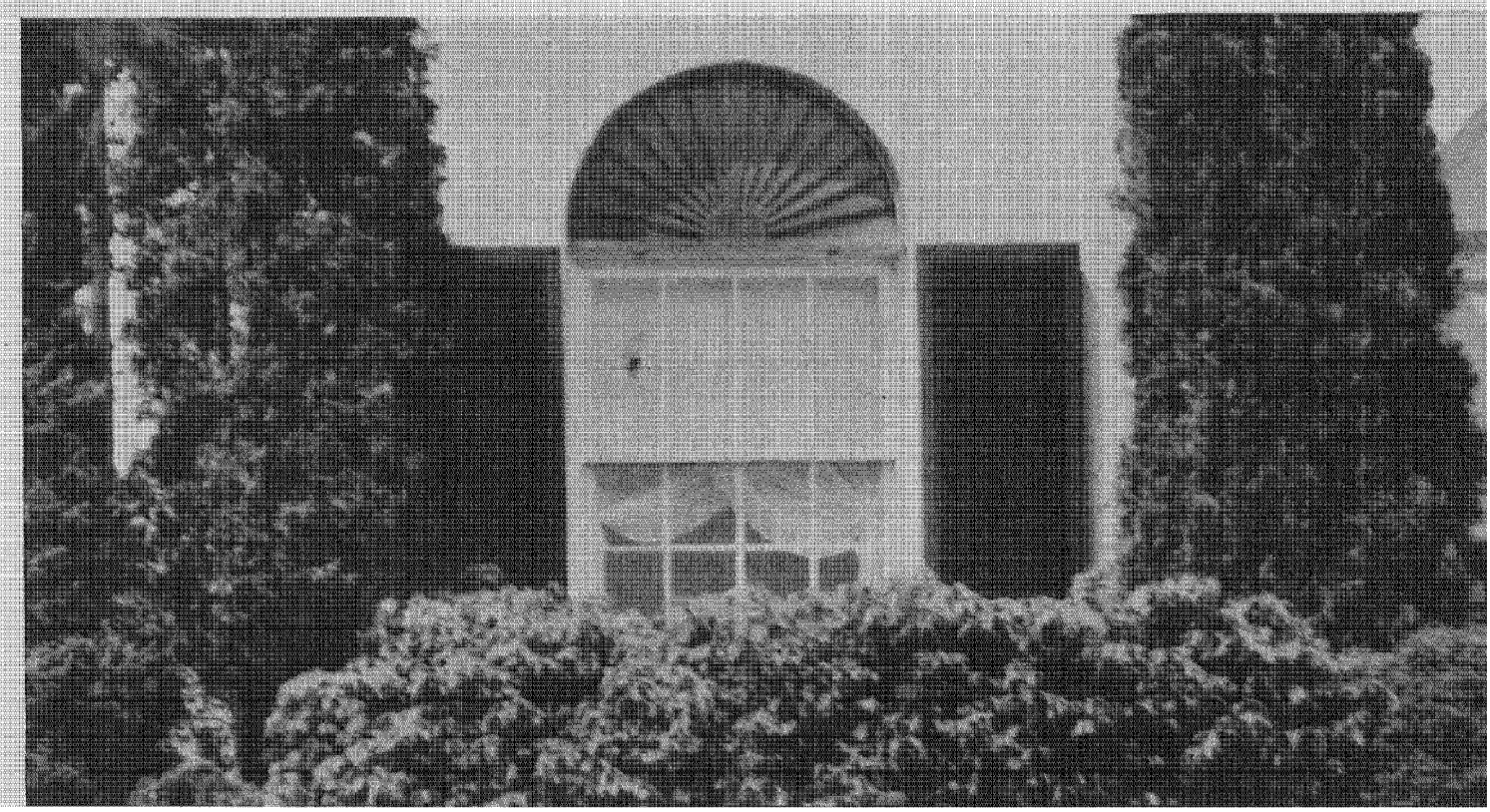


No problem to get proper width shades for this attractive "bay", "Tontine" shades fit any window up to six feet wide.

Window shades can also help to solve those special problems. For example, deep green shades help to cool an excessively sunny room. A dark room, as you know, can be made lighter by installing shades in warm buff or mellow colors. Rooms can be made to appear larger than they really are, if the shades match or blend with the color of the walls. If the opposite effect is desired, then use shades in contrasting hues. All of which is to say that light and color are important factors in the development of effective color schemes.

Window shades of "Tontine" enjoy high repute for quality and color. They add charm to homes of distinction, large and small, in all parts of this country, whether viewed from the inside or outside. When the time comes to replace the shades in your home with extra serviceable ones—select the kind that will wear for years and years.

Landscaped, and framed with shutters, this window is set like a gem. The shade harmonizes, and is very practical.



HIT 'EM HARD--AND OFTEN!



REMINGTON-PETERS' LONG-RANGE LOADS ARE NOW AVAILABLE IN LIMITED QUANTITIES WITH THE NEW FLAT TOP CRIMP

"Blown" patterns, the thorn in the side of shotgun shooters for generations, become a thing of the past with the announcement by Remington Arms Company that Remington Express and Peters High Velocity long range loads are now available in limited quantities in 12, 16, 20, and 28 gauges with the famous Remington and Peters New Flat-Top Crimp.

This means that the average shotgun fan, through the use of these shells, is afforded a better chance of making clean kills from the duck blind and on upland game, as a result of increased shot pattern effectiveness at all hunting ranges.

The development of the New Flat-Top Crimp, which does away with the top shot wad and, thereby, eliminates any possibility of "blown" patterns, is hailed by ballisticians as the greatest single advance in this field since the invention of choke boring about three quarters of a century ago.

Before choke boring was invented, shotgun patterns were often very poor and very erratic. Constricting the bore at the muzzle brought about a decided improvement. It did not, however, eliminate the five to eight patterns out of every hundred which, no matter how hard skilled gunsmiths worked to improve the boring, were much more widely scattered or "blown" than the others.

WHY FAULTY PATTERNS

Intensive research revealed that the fault lay not with the guns but with the shells themselves. The trouble was traced to the cardboard disc resting on top of the shot charge and known as the top shot wad. How to eliminate this top shot wad, which often got in the way of the shot column and caused its distortion and still keep the shot charge from falling out of the shell presented a knotty problem.

With the development of the New Flat-Top Crimp this problem has been solved.

The unique and efficient closure of the new shell does away with the roll crimp, which was standard procedure for so many years, and allows an even and instantaneous opening of the shell with a clear field for the shot to travel unhampered by any obstruction.

The shell is sealed with a thin water-proofed paper disc, only three-thousandths of an inch thick, which breaks into segments adhering to the end of the shell body.

DISTORTION

Any shot shells employing the ordinary top wad closure will give some "blown" patterns. The reason for this is the fact that the top wad, which is ordinarily blown out of the way of the shot column, will occasionally become imbedded in the column thereby distorting the evenness of the "string." When this occurs the pellets are sometimes so widely scattered that barely more than 30 per cent of the shot charge goes into a 30-inch circle at 40 yards.

The extent to which "blown" patterns may occur in a given number of conventional roll crimp shells varies, and the shooter never knows when they will occur. With the newly developed New Flat-Top Crimp he may expect 100 per cent uniformity of pattern.

Spark photography, pictures taken at extreme high speed, was the "detective" which finally pinned the "crime" of "blown" patterns on the top shot wad. One photograph, page 19 shows an actual "blown" pattern in the making. With the top shot wad ahead of it, the shot charge rushes from the muzzle at about 1,200 feet per second (818 miles an hour). The terrific resistance of the air on the flat surface of the top shot wad at this velocity checks its speed and causes it to get in the way of the shot. Most of the time it slides

along the outside of the shot column or is flipped entirely out of the way and does little damage. But in every hundred shots the top shot wad will be guilty of obstructing the shot column in several instances.

In addition to causing "blown" patterns, the top shot wad, when torn by the shot, is shredded into "confetti" which oftentimes distracts the shooter.

Some might be prone to question the importance of "blown" patterns when the exceptionally long runs of skeet and trapshooters, using the conventional roll crimp, are noted. In addition to flawless gun pointing, there are two reasons for this.

In the first place, the crack trapshooter, shooting from the 16-yard line, gets his bird at about 30 to 32 yards, and sometimes less, and even in a badly "blown" pattern, more of the area has pellets in it than has not; that is, the holes do not take up the majority of the 30-inch circle. As a consequence, as long as the target is in the 30-inch circle, there is a greater chance of its getting hit than not.

And secondly, since the bird, except in straight-away shots, is moving across the pattern, there is, therefore, more chance of it moving from a hole into a shot area than vice versa. These two factors, plus superb shooting skill and a fair amount of luck, permit phenomenally long runs.

From the 25-yard line, however, the picture changes. Records show that 100 straight from this distance was accomplished only three times in the history of trapshooting, before the advent of shells with the new crimp closure. Immediately following the pioneering of the new loads by Remington for trapshooting, a score of 100 straight from 25 yards was made twice in one week by *one shooter*.

Remington Express and Peters High Velocity shells with the new flat-top crimp will add five to ten yards to the shooter's effective range. And the elimination of "blown" patterns will provide him with even, uniform patterns which are bound to improve his shooting ability.

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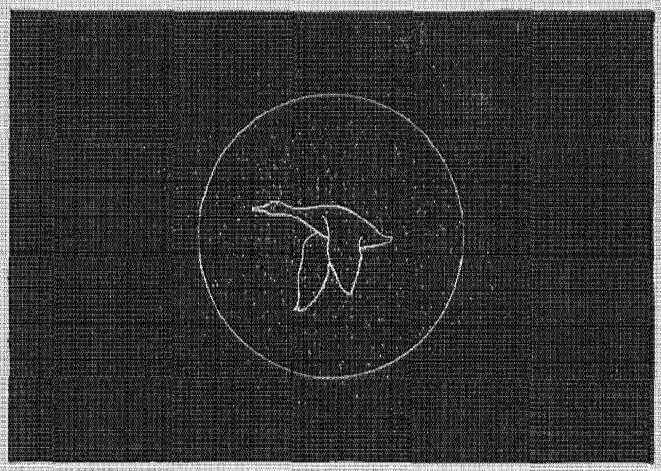
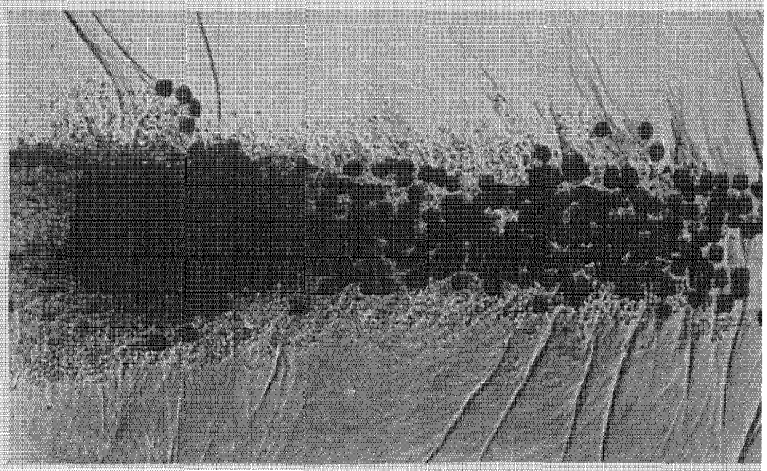
upper left: An even pattern, typical of Remington and "Peters" shot shells, of new flat-top crimp.

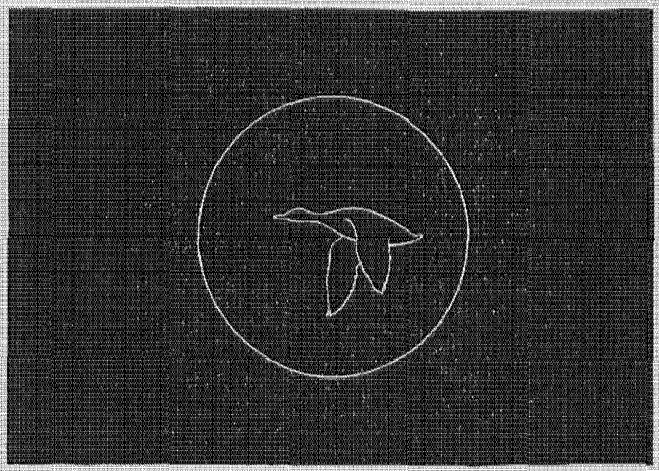
upper right: Shot column fired from a shell having the new Remington and "Peters" flat-top crimp.

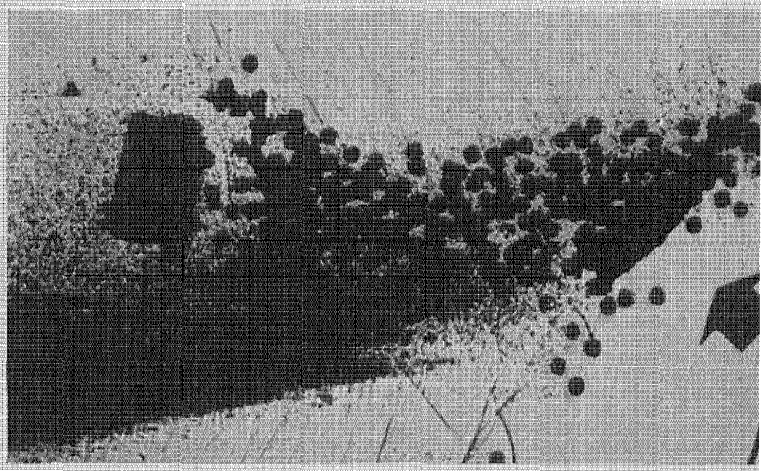
lower left: A typical "blown" pattern. Only 135 of the 440 pellets are in 30-inch circle at forty yards.

lower right: A "blown" pattern in the making. Shot wad is already deflecting the pellets.



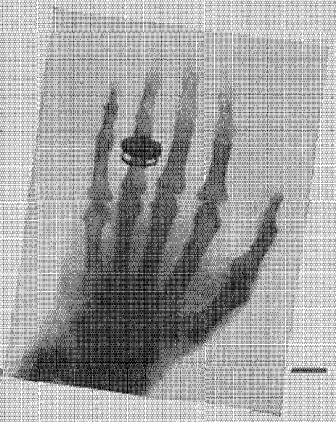






X-RAY FLUOROSCOPIC AND INTENSIFYING SCREENS

HIGHLIGHTS ON SOME INDISPENSABLE EQUIPMENT WHICH IS USED IN ALL X-RAY LABORATORIES



By FREDERIC W. REUTER

In 1895, William Conrad Roentgen was experimenting with a Crookes tube—a small, pear-shaped glass bulb into the walls of which were fused two electric wires. Inside the tube was a partial vacuum. After carefully shielding his equipment with black paper so that no light from the tube could escape, he turned on the electric current.

Lying on a nearby table was a piece of chemically-treated cardboard, which at once became faintly luminous. What caused this? Invisible rays. That cardboard—Roentgen's fluorescent screen—had led to his amazing discovery of x-rays.

Almost everybody now knows something about x-rays and some of their scientific uses. But outside of professional circles comparatively few people know much about x-ray screens, or that there are two kinds—fluoroscopic screens made for human eyes to see and intensifying screens for recording images on photographic film.

Physically, both types are much the same. Each has a non-x-ray absorbing base, such as cardboard. Both are coated with specially-prepared luminescent chemicals so that they will convert x-radiations into visible light, but the difference is in the luminescent chemicals for screen applications to be noted later.

PENETRATION AND DENSITY

X-rays can penetrate and pass through substances that are opaque to ordinary light. This does not mean that these rays cannot be intercepted and absorbed in varying degrees. Resistance of any substance to penetration by x-rays does not depend on any visual transparency, or lack of it, but rather on the density of the elemental components. For example, aluminum—atomic weight 27—is quite transparent to x-rays, whereas lead—atomic weight 207—is an excellent absorber. Similarly, human bones absorb more x-rays than tissue does, a fact disclosed by Roentgen's early work in the interests of medical science.

FLUOROSCOPIC SCREENS

These screens are made for visual examinations and because the human eye is most sensitive to green, the luminescent chemical used in making them is prepared so that it will glow or fluoresce with a green color when x-rays are allowed to strike the screen. When x-rays are passed through one's body, because bones absorb more x-rays than tissue, those passing through bones are reduced in power and do not cause the affected area of the screen to glow so brightly. Consequently, the visible result is a shadowy image with a marked differentiation between bones and tissue. You have probably noticed this yourself in shoe stores where fluoroscopes are installed to show you how well that new pair of shoes fits your feet.

The organs of one's body, chiefly tissue of about the same density, are not so easily observed without preliminary conditioning. If you've ever had an x-ray examination made of your alimentary canal, you will recall having obliged the radiologist by swallowing a creamy white concoction called a barium meal. Why? Because he needed this relatively dense material inside to outline the tract, the better to observe any suspected obstructions, ulcers or other lesions that might show up on the screen.

With modern fluoroscopes to visualize broken bones, the exact position and depth of a bullet under one's skin, or to study one's heart, stomach, or other body organs and their functional efficiency, a competent roentgenologist using a fluoroscopic screen, can usually bring to light the facts needed for accurate diagnosis.

INTENSIFYING SCREENS

Like ordinary light, x-rays will expose photographic negatives, although only about one per cent of these rays directly affect a sensitized plate or film; the rest pass through and are lost. So in making x-ray photographs, known as radiographs, to show smaller density differences than the human eye can see on a fluoroscopic screen, and in short time periods to stop motion, a radiographer must capture and utilize as many x-rays as possible. This means that special x-ray film and intensifying screens are required.

FIRST, THE FILM

The equipment for making radiographs is different from that used in making photographs. Ordinary photo film is emulsion-coated on *one* side only. When loaded in a camera, it is ready to be exposed to sunlight or artificial light which is reflected from the surface of the object.

X-ray film is emulsion-coated on *two* sides. In use it is sandwiched in absolute contact between *two* intensifying screens one of which is mounted in the bottom and the other on the lid of a flat, light-tight film holder called a cassette. This unit is placed under or behind the object being radiographed. X-rays passing through the object strike the screens, causing them to fluoresce brilliantly with a blue light. This light exposes the film. By using the double-coated film and two screens, radiologists can utilize 30 to 50 per cent of the rays, and exposures can be made in about one-fortieth the time that otherwise would be required if the film were exposed to x-rays alone.

SNAPSHOTS NECESSARY

"Why bother with these screens," you ask, "when radiographs could be made with a long exposure?" The answer is, that in x-ray work, as in ordinary photography, when making pictures of moving objects, one does not use a time exposure. Snapshots are necessary to arrest motion if one expects to obtain an unblurred picture. Imagine what a radiograph of your heart or lungs would look like if it were made with a long-time exposure instead of a fraction of a second.

Or you may say, "Why not make x-ray machines powerful enough so that instantaneous exposures could be made without screens?" That is not practical either, for the machines would have to have tremendously larger capacities than those you see in a radiologist's office or in hospital laboratories.

In short, these screens are very important accessories in all x-ray laboratories, because they make possible snapshot radiographs with equipment of practical size.

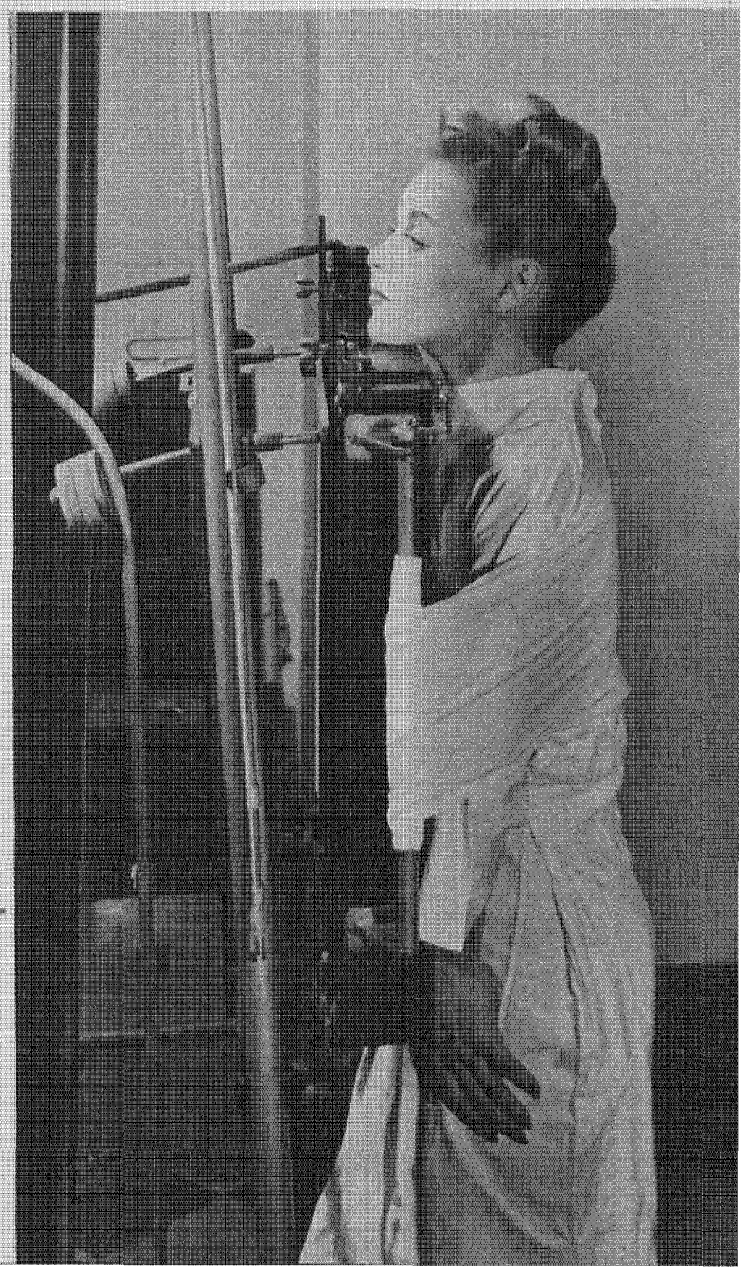
A BASIC REQUIREMENT

X-ray screens have been improved greatly in composition and construction since Roentgen's day. But before discussing how luminescent compounds react to x-rays, we must tell you that not all materials of this kind are suitable for making screens. Some *fluoresce* as long as the rays are turned on. Shut off the current and the emission of visible light stops—at once. Some also *phosphoresce;* that is, they continue to emit light for some time after the exciting cause is removed.

A satisfactory chemical for an x-ray screen must fluoresce, but not phosphoresce. Here's why: Suppose for example, a fluoroscopic examination were being made of the muscular action of your heart. If there were any retention of the image on the screen, due to afterglow; the sharp outlines would be lost.

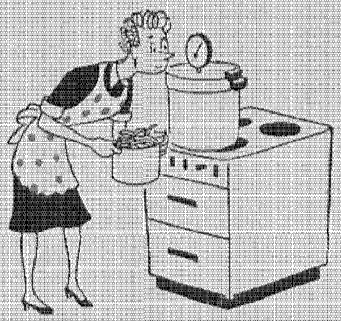
Similarly, with intensifying screens, if a radiologist made an x-ray picture of A's skull and the luminous image persisted on the screen while the next radiograph was being made of B's stomach, some alarming pathology would be disclosed on the negative. A's skull would show up in B's stomach.

(continued on page 24)



A 14 x 17 inch chest radiograph in the making. Du Pont intensifying screens also make possible high-speed radiography which "stops action" of internal organs.

DID YOU KNOW

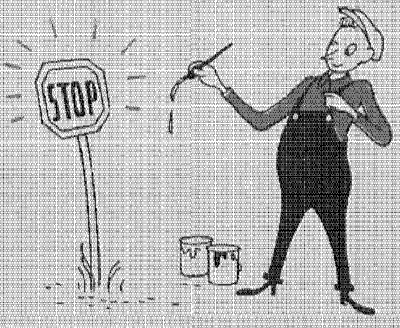


THAT . . . the resilient gasket in most pressure-cooker lids is Du Pont neoprene? It is long-wearing because this man-made rubber has great resistance to heat, steam and animal fats.

THAT . . . at least half of all women's stockings produced in America in 1946 were made of Du Pont nylon —only one out of five pairs in 1941?

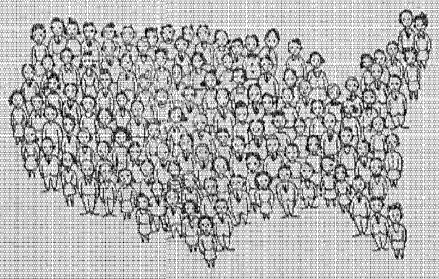
THAT . . . the core of a laminated glass fiber-plastic aircraft wing successfully developed by U. S. Army engineers is Du Pont cellular cellulose acetate, a lighter-than-cork material?

THAT . . . a dozen types of nylon plastic are now in commercial production? Eventually many more will be offered, ranging from material even more flexible than wristwatch straps to material more rigid than bathroom tumblers.



THAT . . . the highway departments of seven states —Alabama, Iowa, Kentucky, Massachusetts, Michigan, Minnesota and Missouri—are using a priming paint containing zinc yellow pigment to protect new and old road signs against rust? Primers formulated with this pigment dry rapidly and provide a hard, adherent surface for the finish coat.

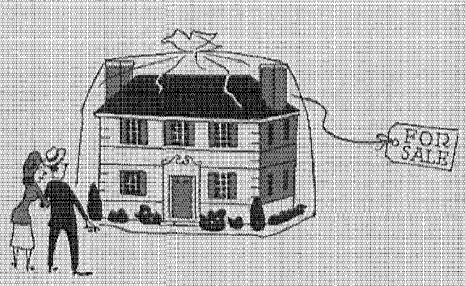




THAT . . . more than 87,600 people are the owners of the Du Pont Company? They live in every state of the Union. Nearly 40,000 are women.



THAT . . . 33 technical libraries are maintained by this Company in 11 states to keep employees abreast of scientific developments and the progress of industry throughout the world?



THAT . . . the Cellophane Division of the Du Pont Company makes over 50 different varieties of transparent films which are used by the packaging industry? They are chemically "tailored" to meet a wide range of protective requirements.



● FOR BAGGAGE IDENTIFICATION. An appropriate "bon-voyage" gift for travelers is this smart, distinctive luggage tag of Du Pont "Lucite" acrylic resin, which is light weight, virtually unbreakable and unaffected by weather. The owner's name and address is lettered in gold either on the crystal-clear plastic or on the opaque white or black material. Travel-Tags are made by W. R. Moody of Burbank, California. Look for them at department stores and stationery shops.



● ANCHORS AWEIGH in a craft like this "Airubber Pak Boat" product of the New York Rubber Corporation of New York City—adds to the enjoyment of many boating enthusiasts. It is an inflatable model made of duck impregnated and coated with neoprene to make the boat waterproof and resistant to deterioration from exposures to sunlight and the weather. Neoprene also withstands injury from gasoline and oil, an important feature when an outboard motor is used.

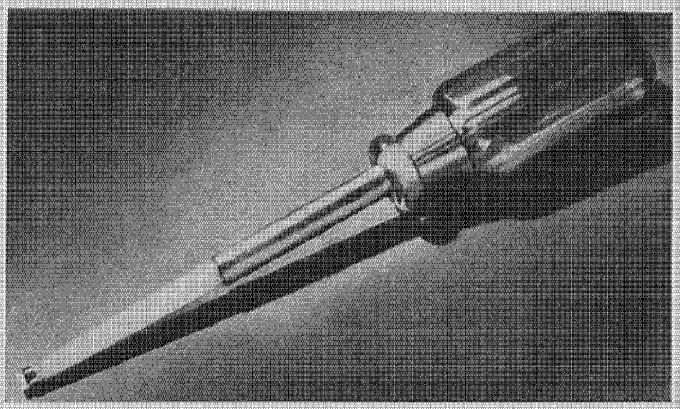
washed, ironed, dry-cleaned and stored—these are some of the subjects discussed and illustrated in the text. Copies are available in limited quantities without cost. If you would like a copy, write to the Promotion Section of the Nylon Division Box D-M, at its Wilmington office.



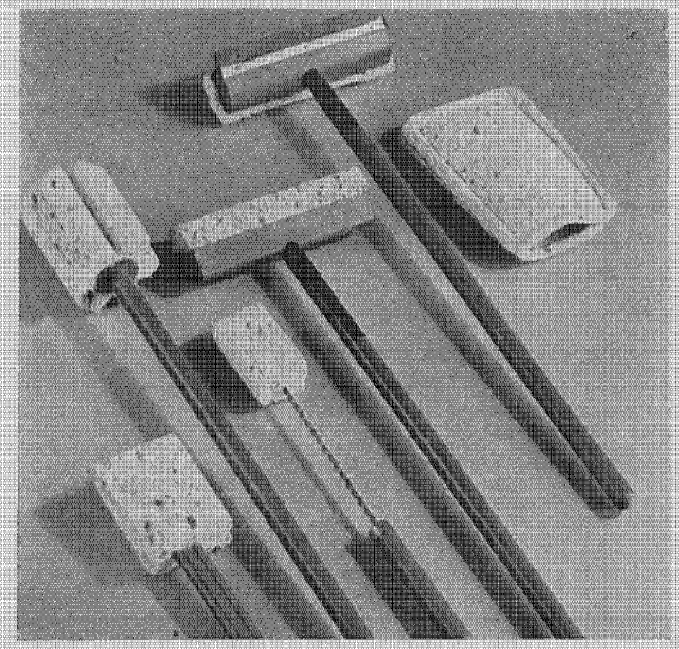
● DU PONT BLASTING TIMER: Operated by a synchronous motor, this new machine, with automatic safety controls, distributes power current into as many as seven individual circuits, each primed with instantaneous electric blasting caps connected to Primacord detonating fuse outside the holes. By this means quarrymen can initiate a series of delay shots timed precisely to millisecond intervals, thus insuring reduced ground vibration, better fragmentation, and greater safety. For additional details, write to Technical Section, Du Pont Explosives Department, DM-3, Wilmington, Delaware.

● AN ELASTIC CEMENT FOR INDUSTRY. A new thermoplastic synthetic, waterproof adhesive more resistant to oxidation than similar natural rubber compounds has been developed by the Du Pont Fabrics Division. The product, designated as No. 5118 "Fair-

prene" Adhesive Cement, is recommended for bonding Buna-N type synthetic rubbers and vinyl films or sheets to steel, aluminum, glass, wood, concrete or other rigid surfaces. This cold-setting cement does not require vulcanization to obtain maximum adhesive strength. It becomes tacky hard a few minutes after application and dries completely within several hours.



• **FILLS A SPECIAL NEED.** This nylon-shafted screw driver, developed during the war by a leading manufacturer of electronic equipment, is one of the first developments of nylon as a material for producing insulated alignment tools. The plastic was adopted because it provided the necessary rigidity and strength in a shaft of extremely small diameter and also met requirements of heat resistance and moisture absorption. Many uses are foreseen for instruments made of nylon because it does not mar soft metals.



• **SWIFT, SAFE AND SANITARY.** The household tools illustrated here are well designed to lighten the homemaker's chores. As you can see, Du Pont cellulose sponges are mounted for such purposes as dish washing, cleaning bath bowls and tubs, bottles, windows and so on. Each implement is easy to keep sanitary, and may be sterilized by boiling without injury to the material. The manufacturer, Minute Mop Company, of Chicago, Illinois, has established many retail outlets.

AFLOAT WITH "DULUX" *(continued from page 9)*

The complete line of "Dulux" Marine Finishes includes primers, enamels, clears, and thinners, in addition to those already mentioned. They can be used on "topside" and "below deck"—in fact, on all parts except bottoms, which require special coatings. Owing to present raw material shortages, however, "Dulux" Marine Finishes for pleasure boats are currently available only in Yacht White Gloss, Semi-Gloss and Flat; Black; and Clear. Just as soon as conditions permit, the complete line will be obtainable.

"Dulux" gives old vessels that "'47-model" look, and new ones a striking finish of enduring protection and beauty. But best of all, its advantages will bring lower maintenance costs and greater satisfaction to week-end skippers and commercial operators.

X-RAY SCREENS *(continued from page 21)*

CRYSTALS AND COLORS

With few exceptions all inorganic chemicals with luminescent properties must be crystalline to fluoresce; thus, much depends on the shape, the size and the character of the crystal.

Color of fluorescence, too, is most important. While it is possible to produce visible light in many color effects, only a few meet the exacting requirements. For a fluoroscopic screen it is paramount to have a color to which the human eye is most sensitive, and for intensifying screens, a color that will best expose a sensitive x-ray film.

With these facts in mind, it may interest you to know more about some developments and improvements in x-ray screens that have made fluoroscopy and radiology so valuable in medical science and in the industrial arts. That story will be unfolded in a subsequent number of this magazine.

COMMERCIALLY AVAILABLE!

DU PONT TRIOXANE

HARNESSED FORMALDEHYDE

Research chemists can now plan to make full use of this unique chemical

TRIOXANE
Cyclic trimeric polymer of Formaldehyde

PROPERTIES

Colorless, crystalline compound	
Molecular Weight	90.05
Odor	Mild, Pleasant
Melting Point	61°C
Boiling Point	115°C
Vapor Pressure	
25°C	13 mm.
86°C	283 "
114.5°C	759 "
129°C	1212 "
Flash Point	45°C
Density (molten) @ 65°C	1.170
Solubility	
Water	Readily Soluble
Alcohols	" "
Ketones	" "
Ethers	" "
Esters	" "
Chlorinated Hydrocarbons	" "
Aromatic Hydrocarbons	" "
Vegetable Oils	" "
Naphthalene	" "
Phenol	" "
Petroleum Ether	Slightly Soluble

HERE's an "opportunity" chemical for the development of new and profitable products, better products or improvements in processing. Trioxane is a most unusual chemical.

It is an excellent solvent for many classes of materials. Concentrated aqueous solutions of Trioxane have solvent properties which are not possessed by Trioxane itself. Molten Trioxane dissolves numerous organic compounds, such as Naphthalene, Urea, Camphor, Dichlorobenzene, etc.

Here are some other unusual features about Trioxane. It is stable in alkaline or neutral solutions, yet it is depolymerized to formaldehyde by small amounts of strong acid or acid-forming materials. And the rate of depolymerization can be readily controlled.

Trioxane can be used as a source of anhydrous monomeric formaldehyde for reaction with various compounds, such as phenols, amides, amines, proteins, hydrocarbons, and in general, with compounds with which formaldehyde will react in acidic media. It provides means for better control of reaction, better yields and quality of product, shorter reaction time, smoother reaction than is possible with aqueous formaldehyde or other formaldehyde polymers.

For technical assistance and copies of Bulletin F-300-1146, which gives more information about Trioxane, write or call our nearest District Office. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, DM-2, Wilmington 98, Delaware.

DISTRICT OFFICES: Baltimore, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, El Monte, New York, Philadelphia, Pittsburgh, San Francisco.

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