THE DU PONT MAGAZINE

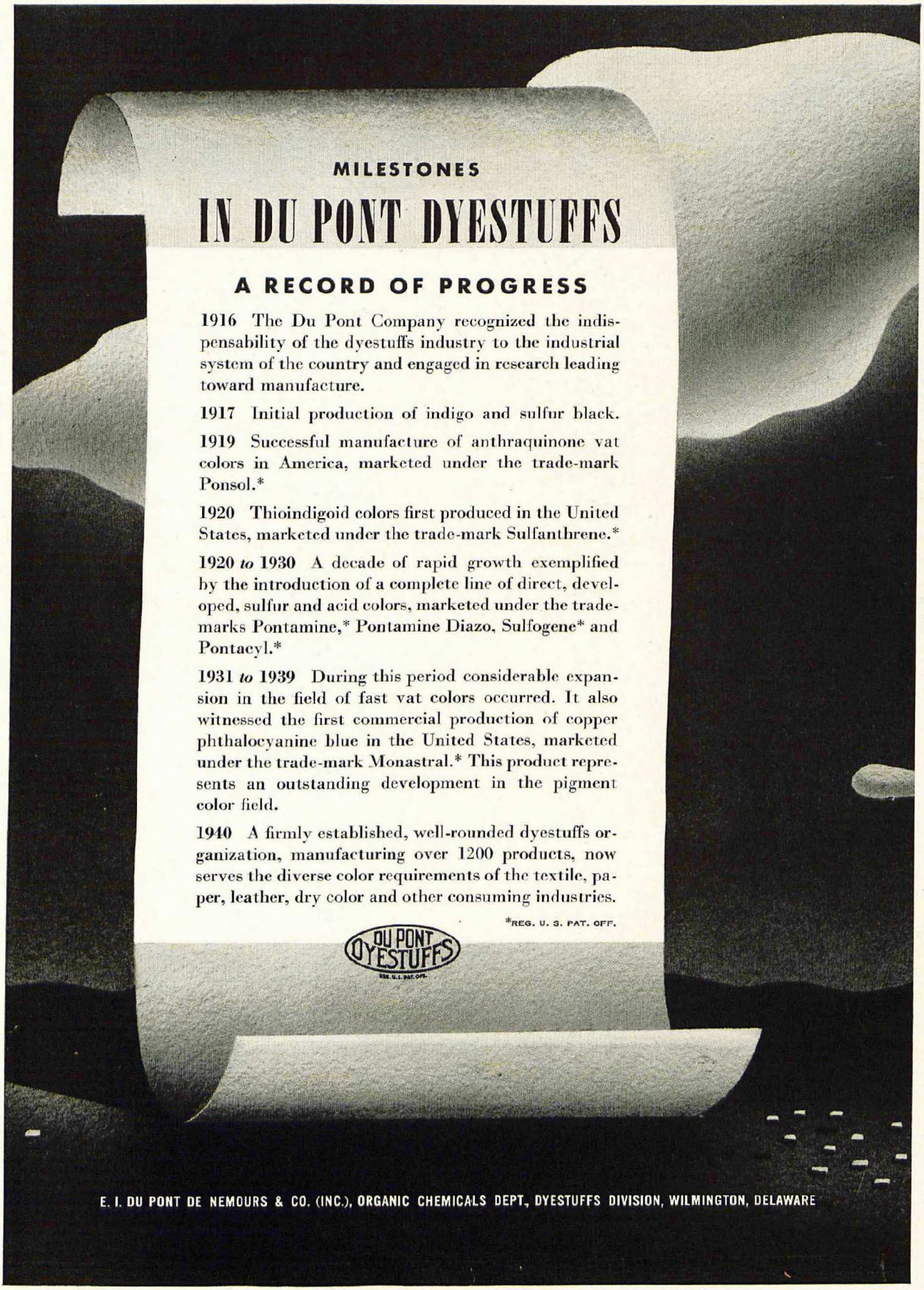
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

APRIL 1940



PEST CONTROL

SEE PAGE TEN



MILESTONES

IN DU PONT DYESTUFFS

A RECORD OF PROGRESS

1916 The Du Pont Company recognized the indispensability of the dyestuffs industry to the industrial system of the country and engaged in research leading toward manufacture.

1917 Initial production of indigo and sulfur black.

1919 Successful manufacture of anthraquinone vat colors in America, marketed under the trade-mark Ponsol.*

1920 Thioindigoid colors first produced in the United States, marketed under the trade-mark Sulfanthrene.*

1920 *to* **1930** A decade of rapid growth exemplified by the introduction of a complete line of direct, developed, sulfur and acid colors, marketed under the trade-marks Pontamine,* Pontamine Diazo, Sulfogene* and Pontacyl.*

1931 *to* **1939** During this period considerable expansion in the field of fast vat colors occurred. It also witnessed the first commercial production of copper phthalocyanine blue in the United States, marketed under the trade-mark Monastral.* This product represents an outstanding development in the pigment color field.

1940 A firmly established, well-rounded dyestuffs organization, manufacturing over 1200 products, now serves the diverse color requirements of the textile, paper, leather, dry color and other consuming industries.

*REG. U. S. PAT. OFF.

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E. I. DU PONT DE NEMOURS & CO. (INC.), ORGANIC CHEMICALS DEPT., DYESTUFFS DIVISION, WILMINGTON, DELAWARE

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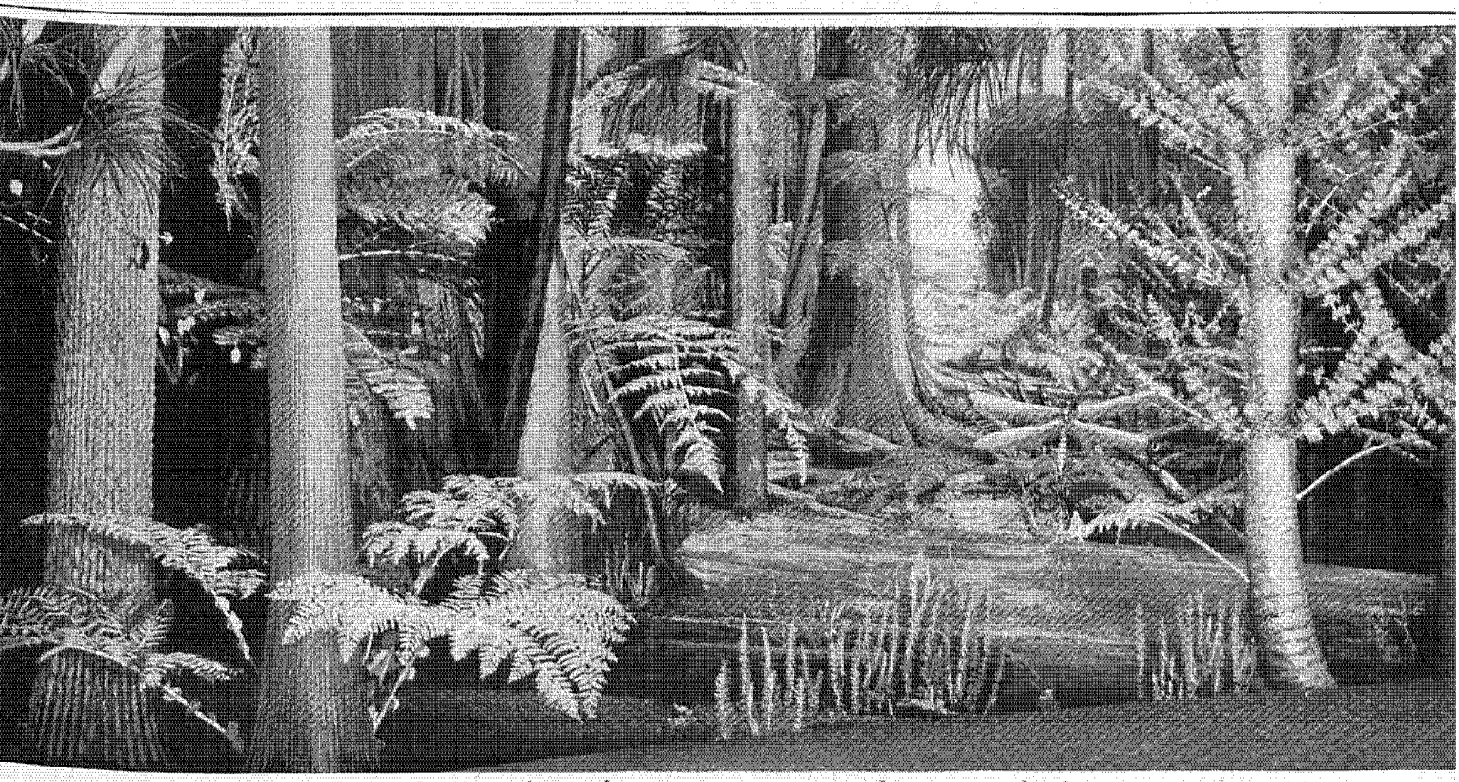

From carboniferous forests of ages ago, come our present-day resources of coal

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Coal in a Chemical Age

By LUCILE NELSON

MILLIONS of years ago the earth was covered with massive forests and jungles of giant ferns. As these great forests toppled into swamps, the decaying vegetation was crushed deep into the soil and transformed by the pressure of centuries into carbon deposits: diamonds in a few locations, coal scattered widely over the earth.

Men burned coal at least 2000 years ago. Historians have found records back to 370 B.C. of blacksmiths in Greece using it to heat their forges. Marco Polo discovered coal being used in the Orient. But its usefulness has not always been appreciated. At one time, around 1240 A.D., it was a capital offense to burn coal in the city of London! Since then coal has become a most powerful genie in the service of mankind, warming his dwellings, turning factory wheels, propelling him over land and sea with the throb of mighty engines.

Now, in this latest chapter, coal has become an Aladdin's lamp which, rubbed with the chemist's art, yields a host of beautiful and serviceable things to enrich our daily living.

Once only kings could wear colorful garments. The phrase "born to the purple" commemorates a time when purple dye was such a rarity that its use was restricted to royalty. It was as recently as 1856 that a young English chemistry student produced the first synthetic dye from coal tar. Perkin's synthesis of mauve led to the discovery of a whole rainbow of colors.

A generation ago the United States depended upon foreign sources for practically all its dyes and many pharmaceutical products. Today, America has its own dye industry and leads the field of organic chemistry. Our color-consuming industries are assured a complete range of high-quality, domestically-produced dyes for practically every purpose.

Which do you think would make the better perfume, a fragrant bouquet of lilies-of-the-valley, or a black lump of coal? Strangely enough, the answer is—coal. No one has ever produced the true lily-of-the-valley odor by extracting the natural oils from the flowers themselves; the essence is too delicate to survive the process of extraction. But from coal tar, chemists can synthesize compounds which give the desired fragrance.

Such an elusive odor as the scent of new-mown hay can be re-created in a test tube. The natural odor is due to the presence of a chemical called coumarin,

formed by the action of a ferment on a chemical component of the plant as the hay dries. It is of course impractical to try to capture this essence from hay as it is being formed. But the same compound, coumarin, is synthesized from coal tar. It is used as an ingredient of many fine perfumes today, blended with other odors into subtly pleasing combinations.

In addition to duplicating many natural odors, chemists have created fragrances which Mother Nature never thought of, employing in this work over a thousand aromatic compounds derived from coal tar.

Musk, used for blending many odors into one adding life, warmth and "lasting power" to perfumes, was once obtainable only from the glands of the male musk deer of Tibet. The demand for musk was so great that, if it had been possible to secure a pound in a pure state, that pound would have been worth many thousands of dollars. Enter the research chemist. Musk was synthesized basically from coal tar. Perhaps many a musk deer racing happily across the rocky slopes of Tibet owes his life to this synthesis. More important (to us)—the use of this man-made musk, trade-marked "Astrotone," is available at costs which permit millions of people of modest means to buy and enjoy exquisite perfumes.

These perfume chemicals and dyestuffs are derived from the volatile components of coal: that is, coal tar, coal gas and light oil fractions, when it is "destructively distilled," meaning heated in the absence of air. These volatile parts of coal provided one of the first frontiers to be explored by the organic chemist. They have continued to yield a rich harvest of varied compounds: improved antiseptics, non-habit-forming anesthetics, drugs for the healing of disease; "Zelan" durable water-repellent finish for fabrics; mildew inhibitors, moth repellents, insecticides—to mention only a few. But another extremely valuable starting point is the coke left after the volatile products have been removed. Coke itself is the basis for some highly important chemical discoveries.

Coke plus lime in the electric furnace gives calcium carbide, which upon the addition of water produces acetylene gas. Acetylene, once used in automobile and bicycle headlamps, still used in the oxy-acetylene blow torch for cutting and welding metals, has of late filled a more important rôle as a chemical intermediate. Acetylene gas plus hydrochloric acid gives, after a series of complicated reactions, neoprene—*man-made rubber.*

Neoprene is the culmination of a long search for a material embodying the good points of natural rubber without its disadvantages. Natural rubber latex, you know, is a fluid secreted by a tropical tree to protect itself from damage by insect bites and other injuries. Obviously nature didn't design rubber for the specialized human requirements of such products as gasoline hose and safety shoes! Men used it for lack of anything better until chemists skilled in molecular architecture built neoprene. It has all of rubber's advantages and in addition resists the action of sunlight, oils, greases, alkalis, and other destructive agents. Although neoprene —a comparatively new product—is still higher in price than rubber, it is more economical than rubber for numerous uses.

From coal, through first coke and then acetylene, comes also "Butacite" polyvinyl acetal resin, which makes possible super-safety glass. "Butacite" has tremendous stretch and elasticity, and adheres tightly to the sheets of plate glass between which it is sandwiched. Thus it not only absorbs the impact of blows against the glass, but when the glass is broken, all the fragments are bound securely to the transparent resin, eliminating the hazard of flying splinters. *Time* Magazine calls the development of this improved safety glass the most important advance in automotive technology made during 1939.

Starting again with coke, plus air and steam, the chemist begins a recombining of atoms at high pressures which yields a host of important chemical products. Urea is one. Used in the manufacture of "Uramon" fertilizer compound, it is the chemist's answer to the problem of making nitrogen available to maintain or help restore the fertility of America's farm lands. Urea is also the basis of many chemical manufactures, such as the urea-formaldehyde plastics, flameproofing agents, and a finish which makes velvet crush-resistant.

The coke-air-steam reaction also produces the basis of "Zerone" anti-rust, anti-freeze compound, various industrial solvents, special fuels and lubricants.

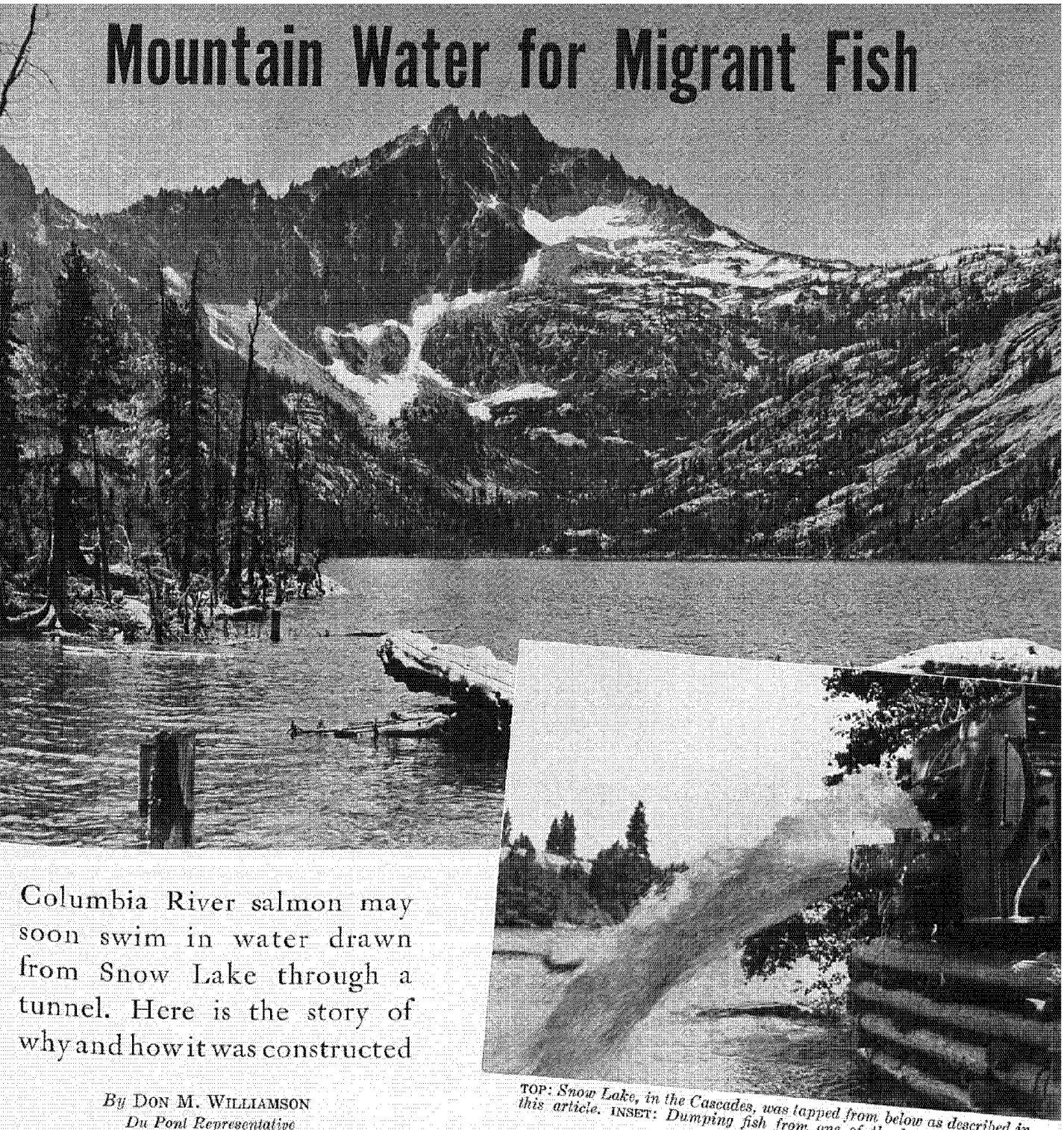
A veritable Cinderella among the products derived in part from coal is "Lucite" methyl methacrylate plastic. This crystal-clear, lighter-than-glass and practically unbreakable material is used extensively in the decorative arts, from jewelry to furniture, and the list of its applications grows apace. Most spectacular is its ability to transmit cool light around curves—a property utilized in modern surgical and dental instruments which themselves conduct light to the spot where it is needed.

But the most dramatic achievement of research chemists, working with products from coal, is that recently announced 20th-century marvel—nylon. Nylon, the result of ten years' fundamental research in du Pont laboratories, is officially and scientifically defined as "a man-made protein-like chemical product (polyamide) which may be formed into fibers, bristles, sheets and other forms which are characterized, when drawn, by extreme toughness, elasticity, and strength." Translated into terms of human needs, that means an almost endless list of possible uses. Nylon yarn, spun fine as a spider's web, is especially well adapted for making ladies' hosiery that is sheer, lovely and long-lasting. This use is expected to consume the major part of the new nylon plant's production for some time. Fishing lines and sewing thread are other immediate uses, and in single filament form nylon is employed for surgical sutures and bristles for toothbrushes, hairbrushes, and certain industrial brushes.

Although chemically the compounds which make up the nylon family can be made from a number of different raw materials, at present nylon is derived basically from air, water and coal.

Coal as a fuel, plus mechanical invention, in the 19th century was instrumental in bringing about the Industrial Revolution. Coal as a chemical raw material is bringing a new one in our times, a revolution resulting in better things for better living!

Mountain Water for Migrant Fish



Columbia River salmon may soon swim in water drawn from Snow Lake through a tunnel. Here is the story of why and how it was constructed

By DON M. WILLIAMSON
Du Pont Representative

TOP: *Snow Lake, in the Cascades, was tapped from below as described in this article.* INSET: *Dumping fish from one of the large tank trucks.*

LATE in September last year, U. S. Bureau of Reclamation engineers completed a remarkable project at Snow Lake, near Leavenworth, Washington, one requiring so much originality and skill that high praise is due those responsible for its success. The work involved driving a 2,500-foot tunnel under a ridge of the Cascade Mountains to tap this lake at a point approximately 165 feet below its surface level.

Projects of this nature have been reported before in connection with water power and irrigation developments. This one is different; it was carried through with remarkably steady progress, and the work was done in the interests of conserving migratory fish. Snow Lake is now potentially a reserve water supply for the elaborate Leavenworth Fish Hatchery, six miles distant by way of Snow and Icicle creeks.

Because this tunnel is only one connecting link in the Migratory Fish Control Project of the Columbia Basin Development, let us consider first some of its broader aspects before describing the intricacies of the

tunneling operation. This fish-control program became necessary when Grand Coulee Dam prevented the passage of fish up the river to their spawning grounds. It was foreseen that this barrier, 550 feet high and 4,300 long, would be much too high to permit the ascent of salmon beyond the dam. Even if mature fish could get over it on their way upstream, how could fingerlings be expected to survive when going back downstream?

Previously, thousands of steelhead trout, blueback salmon and chinook salmon each year passed the site of Grand Coulee Dam bound for the extensive spawning grounds in the upper Columbia River tributaries. Last year, however, with the dam impeding the migration, and the fish-salvaging facilities not yet completed, it became necessary to provide emergency measures for the relief of the 1939 run.

An elaborate trapping system was established at Rock Island Dam, forty-two miles downstream from Leavenworth, and a fleet of eight specially-designed, 1,000-gallon tank trucks was constructed to transport the live, adult salmon to the four tributary streams below Grand Coulee Dam. All the transplanting operations were supervised by biologists and fish culturists of the U. S. Bureau of Fisheries.

Meanwhile, between the fish transplanting seasons, the main hatchery station at Leavenworth is being constructed under several contracts. This work calls for a large, modern hatchery building to accommodate 60,000,000 eggs, extensive holding and ripening ponds in Icicle Creek, complicated dual water-supply systems, screen and settling chambers, seventy rearing ponds for fingerlings, a fish-food plant, garage and warehouse building, a 10,000 second-foot floodway channel, eight residences and numerous other buildings.

Smaller sub-hatcheries are being planned for the Entiat, Methow and Okanogan rivers, tributaries above Rock Island Dam and below the Grand Coulee Dam.

It is expected that the U. S. Bureau of Fisheries will operate the hatcheries to follow up their attempted plan of rehabilitating the salmon. Adult fish trucked from Rock Island Dam will in future be placed in ripening pools at Leavenworth. There, the eggs taken from the matured salmon will be "eyed" and then either hatched out at Leavenworth or transported to the other sub-hatcheries for that purpose.

The resulting fingerlings from their respective streams will migrate down to the sea and upon reaching maturity, it is expected that they will ascend the Columbia River and arrive—three to six years later—to spawn in the same tributary in which they were released, thus avoiding the Grand Coulee Dam altogether. Why adult salmon return to the same stream from which they originally came as fingerlings is a mystery, but they do, presumably in response to hereditary instinct.

The entire program, including facilities for trapping, trucking, hatching and rearing the fish, will cost approximately $2,500,000. The Leavenworth hatchery alone is estimated to cost about $1,000,000, when completed. The refrigerated tank trucks previously mentioned are valued at about $8,000 each. Considering that the estimated value of the catch from runs of fish formerly migrating above Coulee Dam during the period 1928–1937 averaged about $225,000 annually, and that there was clearly a need of preserving a large percentage of one of the Northwest's leading industries, it would appear that this entire program is well justified.

Because of the possible lack of cool water for the successful operation of the Leavenworth station during the warm, low-water months, it was decided that about 8,000 acre feet of stored water could be drawn from Snow Lake by constructing the half-mile tunnel first mentioned. Water from this source could then pass into Nada Lake, Snow Creek and Icicle Creek where holding and spawning facilities are being constructed.

This tunnel project was begun during the winter of 1938 with the building of a camp site and the transporting of equipment and materials by pack-horse over an extremely hazardous mountain trail. Progress was slow at first due to deep snow and the fact that the switch-back trail was frequently wiped out by slides. However, the pack train managed to maintain a periodic schedule of trips to the camp and daily contact with the Leavenworth office of the U. S. Bureau of Reclamation was made by means of short-wave radio. A crew of thirty-five men working in three shifts was regularly employed to handle the routine work.

The tunnel, of the arched type, was driven with a five by seven-foot dimensional face on a one per cent grade to facilitate mucking operations and allow for proper drainage. The rock encountered was extremely hard granite. Although comparatively easy to drill, it was hard to break and required considerable dynamite, averaging throughout the tunnel about eighteen pounds of powder to the cubic yard of rock. Several different varieties of rounds were experimented with in an endeavor to reduce the explosive consumption. Finally, it developed that a "pyramid cut" and a "triangle cut," depending on variable conditions, worked to the best advantage. Du Pont Special Gelatin 60% (1¼ x 8") was used in the cut holes and Du Pont Special Gelatin 40% (1¼ x 8") in the relievers, top, rib and lifter holes. Daily progress in the tunnel averaged about fifteen feet in three shifts, as early developments had proved that a five-foot round was the most economical; for one crew could drill, load, shoot, and muck out all in one shift.

The engineers encountered their main problems in this tunnel when it had been driven to a point approximately fifty feet from the intended point of entry to the lake bottom. Work was temporarily halted here and experiments were conducted with a diamond drill to ascertain the character of the remaining rock, for the disclosure of faults, seams, etc., in order to determine the logical entry where the miners could work with the greatest safety. Nine "feeler" holes were diamond drilled through a two-inch valve using a 1½-inch bit.

Unfortunately, the first holes drilled disclosed that the rock surrounding their original point of entry was faulty, which would result in extremely hazardous working conditions if continued. The engineers therefore back-tracked thirty feet to a point where the diamond drills had disclosed solid rock, and a sixty-degree angle stope was driven upward to within five feet of the lake bottom. The face of this stope, in which the last, all-important round was to be placed, was four by five feet

in dimension. Diamond drills were again used, and thirty-two holes were driven around a seven-hole "burn-cut" to within eight inches of the lake bottom.

Meanwhile, the engineers had time to construct gate valves near the portal of the tunnel and do other work necessary to insure the success of the final shot.

Immediately below the stope a sump, eight feet deep, thirty feet long, was sunk in the tunnel floor to catch the broken rock and over-burden which would be shot into the tunnel from above. To insure further against blocking the tunnel or the gate valves by broken rock, similar sumps were blasted in the tunnel floor every 500 feet from the stope to the outer valves.

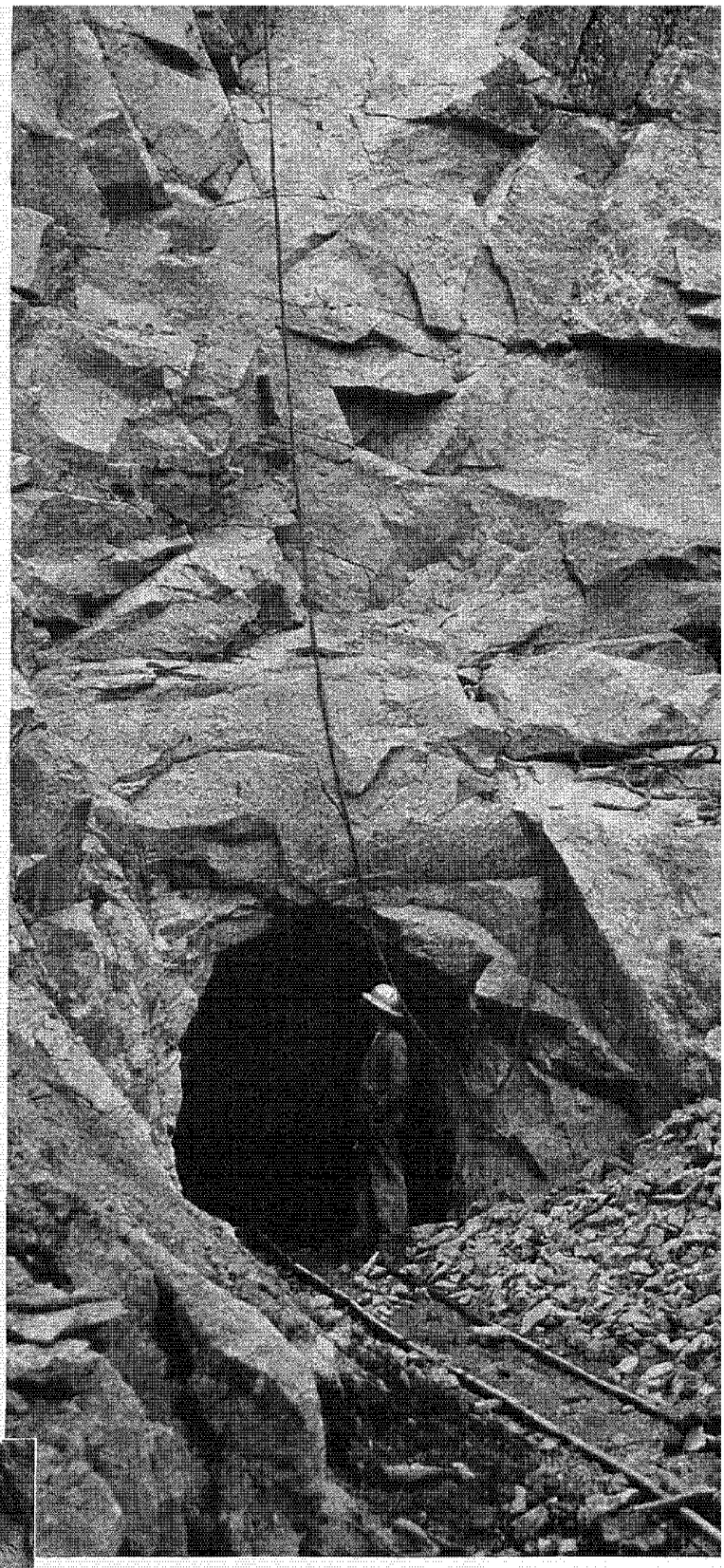
Approximately 150 feet from the portal of the tunnel a control room to house the valve mechanism was drilled out of the rock, and an adit tunnel parallel to the outlet tunnel was driven to allow entrance to this room. At the interior end of the control room a thirty-inch diameter outlet pipe, thirty-five feet in length, was imbedded in eight feet of concrete, forming a bulkhead strong enough to withstand the force of the explosion and the pressure from the impending waters. On the outer end of the pipe a thirty-inch gate valve and twenty-eight-inch tube valve were installed.

On completion of the valve mechanism, the final round was loaded. All holes were loaded to the collar with Du Pont Special Gelatin 40%, primed with delay-electric caps, ranging from instantaneous to sixth delay, and wired in parallel series. Then all the superstructure in the tunnel was removed and the gate valve shut tight. No water was allowed in the tunnel prior to the shot, except for natural seepage, for it had been calculated that the air would act as a cushion against the bulkhead.

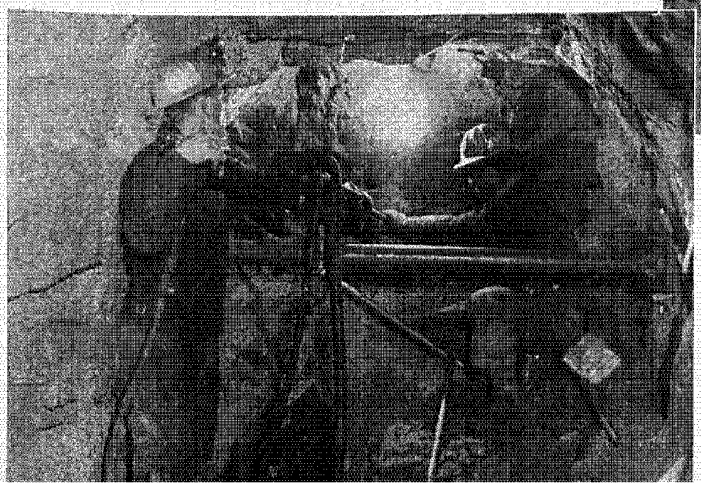
The shot was then fired with apparently successful results. Within a few seconds the pressure gauge recorded a maximum of eighty-six pounds per square inch, later dropping to eighty pounds, which had been the calculated pressure allowed for. The bulkhead withstood the explosion in good shape and no leaks were noticeable.

Approximately 75,000 pounds of Du Pont dynamite and 13,000 delay and instantaneous electric blasting caps were consumed on this project. Thus was completed a very technical part of the Columbia Basin Development Project through the use of dynamite.

NOTE: For assistance rendered in the preparation of this article, the author desires to express thanks to Messrs. V. W. Russell, resident engineer and L. B. Ackerman, field engineer, U. S. Bureau of Reclamation, Wenatchee, Washington, and to Mr. Hanford Thayer, superintendent of construction, U. S. Bureau of Fisheries, Seattle, Washington.



ABOVE: *Portal of the 2500-foot water tunnel. At the extreme right center in this picture may be seen a black area; it is the entrance to the adit tunnel leading to the control room.*



LEFT: *Drilling a round in the Snow Lake Tunnel, five by seven feet in dimension. The blasters used du Pont dynamite.*

Shades of "Beau Brummell"!

By STELLA EPSTEIN

It's Spring again. Men know it by the balmy air, bright sunshine and a new liveliness in their gait. Women, the sensitive creatures, feel it in an entirely different way. A perky straw bonnet with a gay sprig of flowers heralds the primavera for some; a smart new dress with "chic" lines, for others. Yet all will take an intense interest in fashion's creations this season, for the latest innovations of the Spring mode hark back to the whimsies of the fashion-plate of a bygone era, and a man at that!

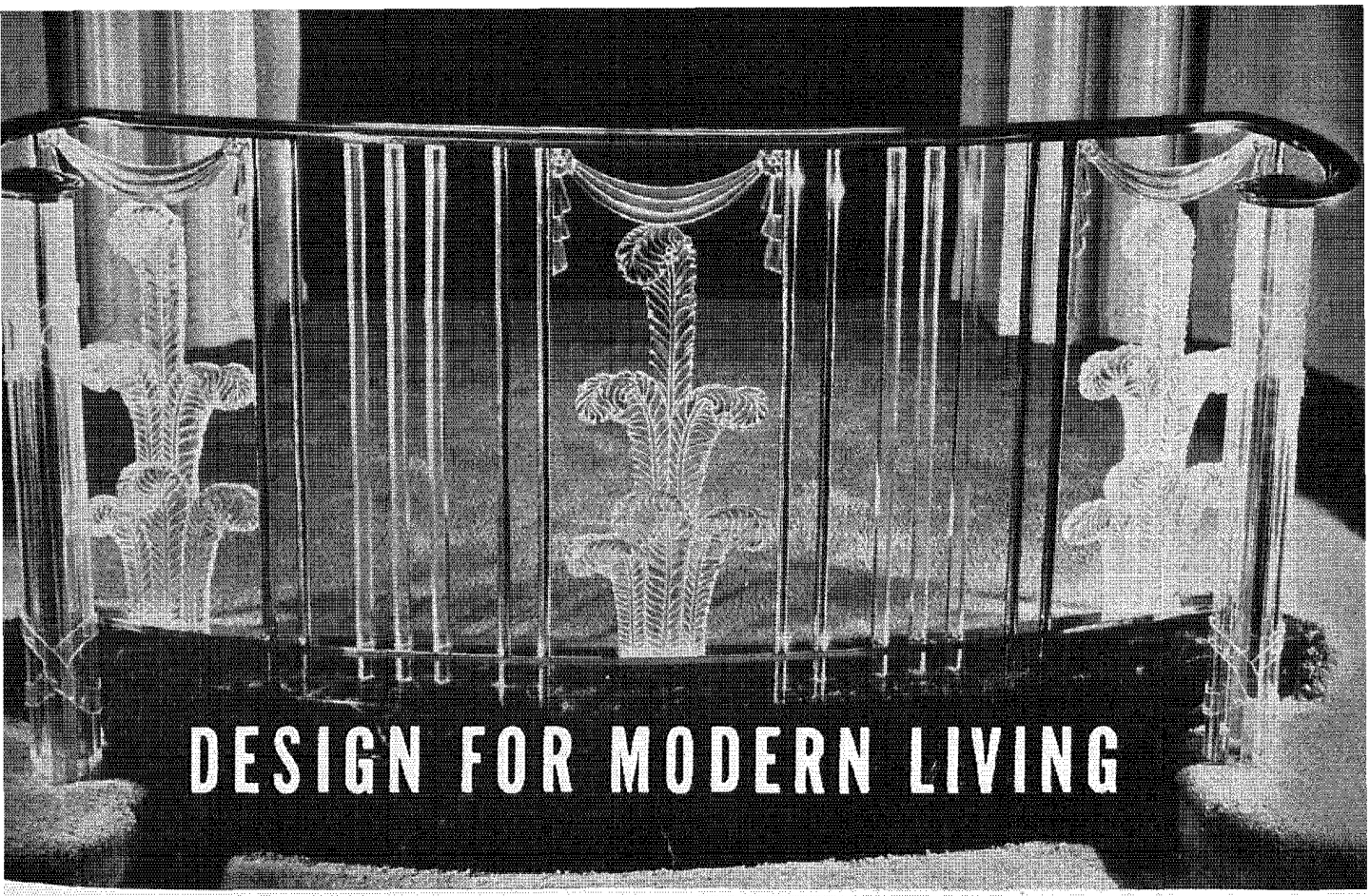
None other than "Beau Brummell," who set the styles for men in the early 1800's, inspired the softly-tailored trend in feminine fashions for 1940. Costume suits, such as the bolero jacket over a simple dress with flattering white details at the neck and a full skirt, the hip-length jacket over a frock with flared skirt, the long sleekly-fitted jacket over a tailored classic with pleated skirt, and the popular Redingote coat-and-dress ensemble, share favor with the fashion-minded.

But not only are the styles news. The fabrics, too, are high fashion notes in themselves. Predominant among these are rayon sheers with deeply textured crepe surfaces and interesting armure, faconné, check and diamond weaves, skillfully executed by American weavers. Rayon materials have been chosen by America's cleverest designers because of their inherent dullness, clothy texture, full-draping qualities and crisp lightness of hand. These are the qualities which distinguish Du Pont Rayon and make it eminently suited for the chic lines and dressmaker details of today's fashions.





Here are three of the distinctive styles that feature the crisp lines and dressmaker details of the early Spring fashions. The fine draping quality of Du Pont Rayon makes it easily adaptable to this new trend in the mode.



DESIGN FOR MODERN LIVING

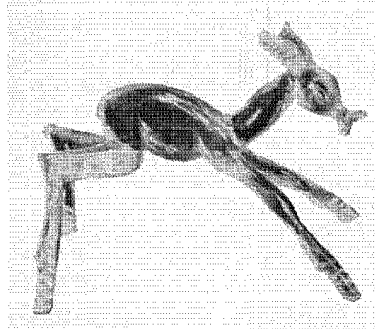
By E. J. PECHIN

ECONOMIC conditions of the last decade have induced many changes in our habits and mode of living, and as a result have influenced substantially the trend in contemporary design and decoration. This trend has been, of recent years, from the elegance of the overstuffed Victorian era and other period reproductions toward current designs with beauty and function better adapted to present-day living.

Added impetus has been given to this depression-born movement by new materials, especially plastics, which make possible new individuality and originality because of characteristics not heretofore available. Today, plastics occupy a definite place in the fields of both interior and exterior design and decoration. While still far from a thorough exploitation of all possibilities, their progress is continuous and far reaching. Architects, designers and interior decorators are displaying so great an interest in these new materials, that already association conferences have been held to discuss their applications and publications are now including sections devoted exclusively to plastics.

One of chemistry's recent and perhaps one of the most significant plastic contributions to architects and decorators is the development of "Lucite" methyl methacrylate resin. With the durability of wood, clarity of crystal and smoothness of porcelain, "Lucite" has been acclaimed, not as an imitation of something else, but as a material capable of standing upon its own merits. Along with these properties, this material has unusual lighting characteristics. Then too, it is unaffected by normal exposure to atmospheric conditions, can be easily and economically fabricated, is unharmed by many chemical solutions and has unusual form stability. These inherent qualities of "Lucite" have caused its enthusiastic acceptance as a material for practical and decorative effects.

One extremely diversified and large potential use for "Lucite" is in the field of interior decorative construction, an excellent example of which may be seen in the luxurious



Du Pont's crystal-clear plastic provides architects, designers and decorators with a superb material for their art



cocktail lounge of San Francisco's Hotel St. Francis. Over 2,500 crystal-clear "Lucite" panels, each formed from a cast sheet, and in six predetermined designs, were used to make the ceiling. Each panel was formed and fabricated to an allowable tolerance of one-sixteenth of an inch and all were so carefully installed as to give the ceiling the appearance of one solid piece. Taking advantage of the edge-lighting and light-transmission properties, striking effects are obtained by indirectly flooding the ceiling with constantly changing colored lights. Adding to the beauty of the room are the graceful bar stools perched on a metal core surrounded by "Lucite" rods.

Sak's Wilshire Boulevard store in Hollywood has employed large cast "Lucite" sheets for a gracefully-curved, artistically-etched group of panels over the back bar in the cocktail lounge and cafe. By edge-lighting the panels with a neon tube placed along the top, the etchings stand out sharply and clearly. A balustrade at the store entrance is also decorated with thick, carved "Lucite" sheets. Another group of etched panels separates the cocktail bar from the lounge in the Hotel Woodstock in New York City. The panels, featuring scenes of the city, were made of this plastic because of its light weight, resistance to breakage and ability to be etched.

Around the corner, on Times Square, is the Glass Room of a popular restaurant, where over 200 chairs carry back-bars of "Lucite." Haddon Hall Hotel, next to the Du Pont Exhibit in Atlantic City, also makes use of "Lucite" for wall-light fixtures and settee-dividers in the new cocktail lounge.

Several of Hollywood's new ultra-modern stores have found "Lucite" an ideal material for ornate light fixtures and chandeliers in keeping with the design of the store. In I. Magnin's, reading lamps have been formed from sheets and trimmed with rods, while gigantic chandeliers partially of "Lucite" rods illuminate several of the elaborate salons. In Sak's store "Lucite" appears in many of the light fixtures, and the new Hollywood branch of the May store has numerous ceiling fixtures formed from frosted sheets of the material. They serve to eliminate glare and to spread a soft, even light over the rooms.

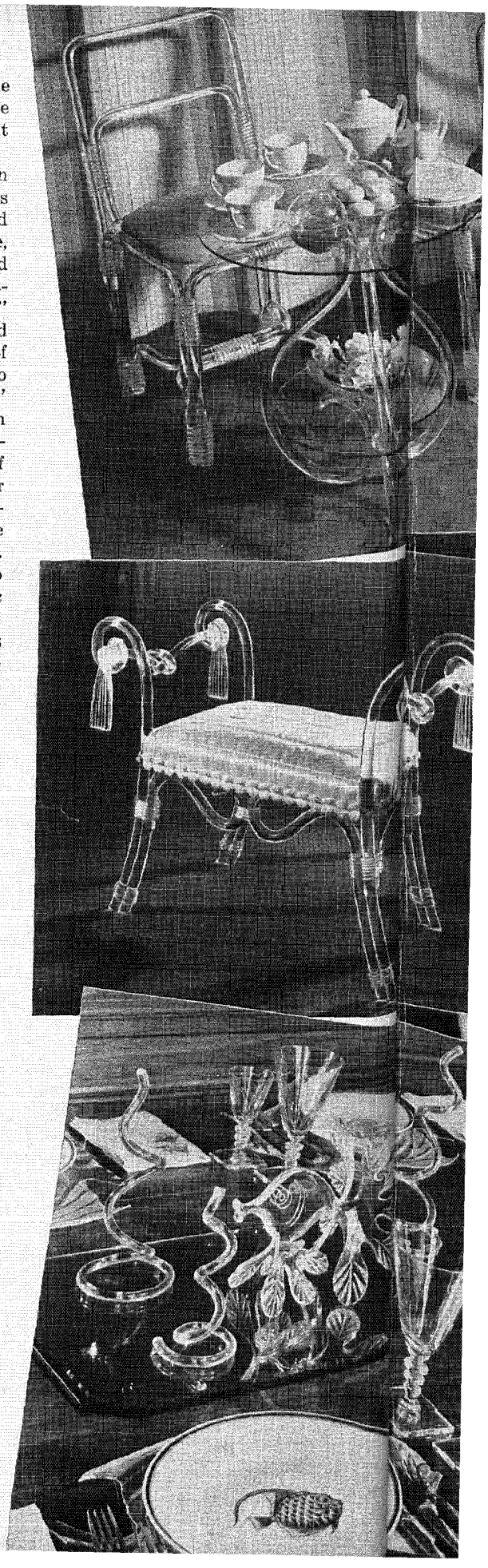
Railroad designers have been quick to recognize the potentialities of "Lucite." One special lounge and buffet car on a crack Delaware, Lackawanna & Western Railroad train is cleverly divided by light-carrying columns made of "Lucite" tubes. At the base they are decorated with transparent flower boxes of the same material. On the Chicago & Northwestern's swift "400" train, "Lucite" has been used in bar cabinets and for shelving, adding effectively to the appearance of the special buffet car. On another line, several Pullman cars are provided with sand-blasted panels of the plastic for dividing compartments.

The ability of this material to withstand ordinary atmospheric conditions without apparent change, makes it applicable to exterior as well as interior uses. Already two years old is a set of terrace furniture with chair seats and backs made from halved tubes of the material for one of America's motor executives. A progressive firm of New York architects has specified "Lucite" for a two-story center decoration on the front of a proposed Pittsburgh department store building.

Clever applications already made by other architects indicate that "Lucite" will bring new innovations into the home. In Washington's Cafritz House, the grand stairway has been artistically modernized by the inclusion of edge-lighted "Lucite" carved pieces in the balustrade. In Rochester, Minnesota, one of the Mayo family homes has utilized the material for an ornate dining-room dome lamp and as a light-diffusing lens on a fixture to illuminate special paintings. In many other homes from coast to coast, door-push rods and plates of "Lucite" are now in service.

Perhaps the most rapidly expanding use of "Lucite" for interior decoration, however, is in the furniture field. Stores throughout the country are offering tables, vanity chairs and other pieces both of a standard line and their own design. One skillful fabricator offers to execute any design in this material,

(Continued on Page Sixteen



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Pest Control

SPRINGTIME perennially starts the world anew when fields turn green and budding trees give promise of luxuriant growth. Human hopes, too, rise with warmer days. Farmers, growers of flowers, fruit, cereals and vegetables like to believe that this year will be a better one; that hard, faithful work—barring floods, fires, droughts, plant diseases and insects—will bring its reward. However, between seedtime and harvest it is certain that fungi and insect pests will exact a heavy toll unless control measures are adopted.

Pests always have competed with man for subsistence. They attack on all sides in overwhelming numbers. A prominent entomologist has said that one would have to learn the names of 10,000 species of insects per year for sixty years to know them all. There are also thousands of species of bacteria and fungi, not to mention rats, weeds, worms and the like. Practically all pests multiply and develop much more rapidly than man.

Some of them are native to our soil. Others from foreign lands have invaded the United States despite all precautions. To mention Dutch elm disease, chestnut blight, cotton boll weevils and pink boll worms, European corn-borers, gypsy moths, Mediterranean fruit flies, Japanese beetles and Mexican bean beetles, is to list a few of these unwelcome and destructive immigrants.

Farmers could not cope with these foes without pest-control chemicals. For many years compounds of arsenic, copper, fluorine and sulfur have been used. Meanwhile, chemists have sought to produce more effective fungicides and insecticides that are safe, suitable and economical, and new organic chemical compounds are being prepared, tested and evaluated.

Our cover illustration shows one phase of the testing work. At the top you see leaves of a chemically-treated bean plant, untouched by Mexican bean beetles. Below are untreated leaves, with the voracious insects at work and others in the pupal stage. By developing pest-control chemicals du Pont helps agriculture to carry on, and this work goes forward daily in the spirit of the du Pont pledge "Better Things for Better Living . . . through Chemistry."

Awards

AMERICAN industry has moved forward, in part, because of new discoveries and inventions originating in our nation's physical and chemical laboratories. From them have sprung up new plants and factories affording profitable employment to thousands of people who need work, besides making available to the public many new and improved products, non-existent before. On either count that is reason enough for giving due recognition to those whose work has made possible such achievements.

During the past six months more awards than usual have been made to individuals identified with the chemical industry, some of them to members of the du Pont organization. You may recall that the Charles Frederick Chandler Medal was presented last November to Thomas H. Chilton, technical director of the Engineering Department, for his outstanding work in chemical engineering.

In January of this year, Dr. C. M. A. Stine, vice-president of the Company, received the internationally famous Perkin Medal.

Early in February, President Lammot du Pont accepted on behalf of the du Pont Company a gold medal and scroll presented by the Philadelphia Merchants' and Manufacturers' Association in recognition of the Company's contributions to the hardware industry.

In February, the National Association of Manufacturers commemorated the 150th anniversary of the American Patent System by holding a series of dinners in various cities to honor the Modern Pioneers, a large group of individuals carefully selected for the services they have rendered our nation in expanding employment and improving the standard of living. Engrossed scrolls, with appropriate citations, were presented to the honored guests.

At Rochester, Dr. W. H. Charch of the "Cellophane" Division was one of the recipients for his work in connection with development of moistureproof "Cellophane" cellulose film.

At Cincinnati, Harold W. de Ropp and Harry C. Hetherington of the Ammonia Department were termed "Modern Pioneers" because of patented discoveries on the synthesis of urea.

At New York City ten du Pont research chemists were similarly cited for their group effort relating to the invention and development of nylon, and scrolls were presented to Willard E. Catlin, Donald D. Coffman, Winfield W. Heckert, Benjamin W. Howk, George D. Graves, Wilbur A. Lazier, John B. Miles, Jr., Wesley R. Peterson, Frank K. Signaigo, and Edgar W. Spanagel. By a special ruling the name of the late Wallace H. Carothers was included among those honored. Dr. Carothers conducted much of the fundamental research that led to the discovery of nylon.

Of current interest is another medal award which is being made next month by the Western New York Section of the American Chemical Society—the Jacob F. Schoellkopf Medal for outstanding chemical work in that area. The medalist is Mr. W. H. Bradshaw, research director, Viscose Rayon Section of the du Pont Company's Rayon Department, and the award is in recognition of his work on the development of the process of manufacturing "Cordura" rayon yarn for use in automobile-tire cords.

WHAT'S NEW

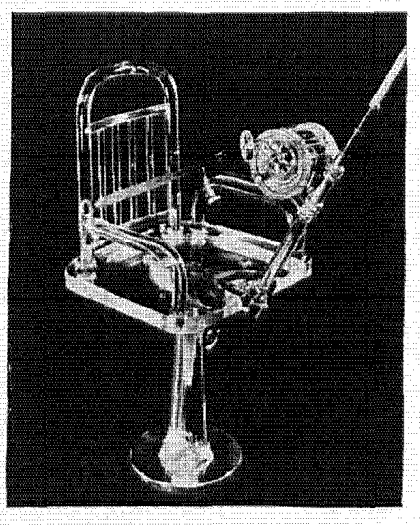
A NEW finish in 6200 Armor Quality "Fabrikoid" has been introduced by the du Pont Company. "Cordoba" is the designation which identifies a refined and enhanced version of the Mat Plastic and Mat Antique finish effects previously developed. This one represents a faithful reproduction of a fine veal leather, both in texture and grain. This finish is made in a wide range of popular colors, including bright, pastel and dark shades, and, like other materials of this type, it can be cleaned with soap and water.

A NEW laboratory for research on insecticides and fungicides will be constructed for the Grasselli Pest Control Research Section of the du Pont Company at the Experimental Station near Wilmington, Delaware. It will be a three-story brick and tile structure 38 x 50 feet, conforming to the architectural style of other buildings on the grounds. Excavation work has begun and it is expected the building will be completed sometime in July.

A NEW penetrating wood finish, which differs from old-type materials in that it leaves almost no surface film, has been developed by the du Pont Company. Although designed primarily for floors, it may be employed economically on interior woodwork, trim and paneling. This finish is described as producing satisfactory and durable results with less labor and expense. It can be used in homes, schools, gymnasiums, and industrial plants. More complete details are presented in a folder issued by the Finishes Division of the Company at Wilmington, Delaware.

DU PONT "HTS" is practically unique as a heat transfer medium for the temperature range of 400 to 900° F. This salt mixture has been used in large plants for over two years with very satisfactory results. For example, in the Houdry process plants for catalytic cracking of petroleum, the molten "HTS" is pumped through cooling coils in the catalyst case at temperatures up to 900° F., and then through heat exchangers to preheat oil or to generate steam. Another interesting use is for temperature control in the new "Thermofor Kiln," which was recently developed by the Socony-Vacuum Oil Company for the regeneration of decolorizing clay.

The specific heat, heat transfer coefficient, viscosity and specific gravity are all favorable for its use as a heat transfer medium. Detailed information on the properties and uses of this product can be obtained from the Chemical and Miscellaneous Sales Division of the Explosives Department.



CUSTOM-BUILT is this deep-sea sports group of chair, pole, and reel worthy of gracing the finest of yachts. Almost completely "Lucite" methyl methacrylate from stem to stern, the group offers a tribute to the machinability, ease of working, strength, resistance to salt air, and beauty of this unique plastic.

The base, arms and back of the chair have been expertly fabricated from sheets and rods of the material and mounted on a pedestal of cast aluminum alloy. Likewise, the handle of the rod, and the side walls and spool flanges of the reel have been fashioned from crystal clear "Lucite." The remaining metal fittings are of chrome plated bronze. Perhaps reports will tell of fish swimming right up to the boat to have a look at this striking deep-sea ensemble.

Produced by the Acraglas Company, Michigan Avenue, Santa Monica, California.

A NEW textile softener, trademarked "Avitex" L, with high lubricating properties and essentially complete rinsability from textile fibers, has been announced by the du Pont Company's Dyestuffs Division. It is a viscous, brownish, oil-like product which disperses to form clear-type emulsions in water. It is soluble in the presence of high concentrations of salts and is resistant to high degrees of hardness in water. It is highly stable in solution on prolonged boiling.

"Avitex" L is recommended for use where a well-lubricated finish is required on fabrics or yarns. It increases the absorbency of textile fibers, making it effective for finishing fabrics to be sanforized, and it has a pronounced anti-static effect on staple viscose fibers.

"DUPONOL" G alcohol sulfate emulsifying agent, derived from lauryl alcohol, is a new product of the Fine Chemicals Division. It is a translucent amber-colored paste to be added to the oil phase for preparation of emulsions. "Duponol" G is particularly effective when employed in conjunction with *Ocenol* or *Stenol*. It forms limpid solutions with mineral and vegetable oils in the presence of "soluble" oils.

"REM OIL" lubricant has been improved for household uses by a chemical treatment which gives it a pleasant odor. This oil prevents rust, cleans, polishes and lubricates firearms, and is also well recommended for use on light machinery, locks, squeaky door-hinges and the like in the home. It is made with du Pont extreme pressure lubricant and is a product of the Remington Arms Company (Inc.).



Rendezvous of Notables



By JEWEL B. DE BONILLA

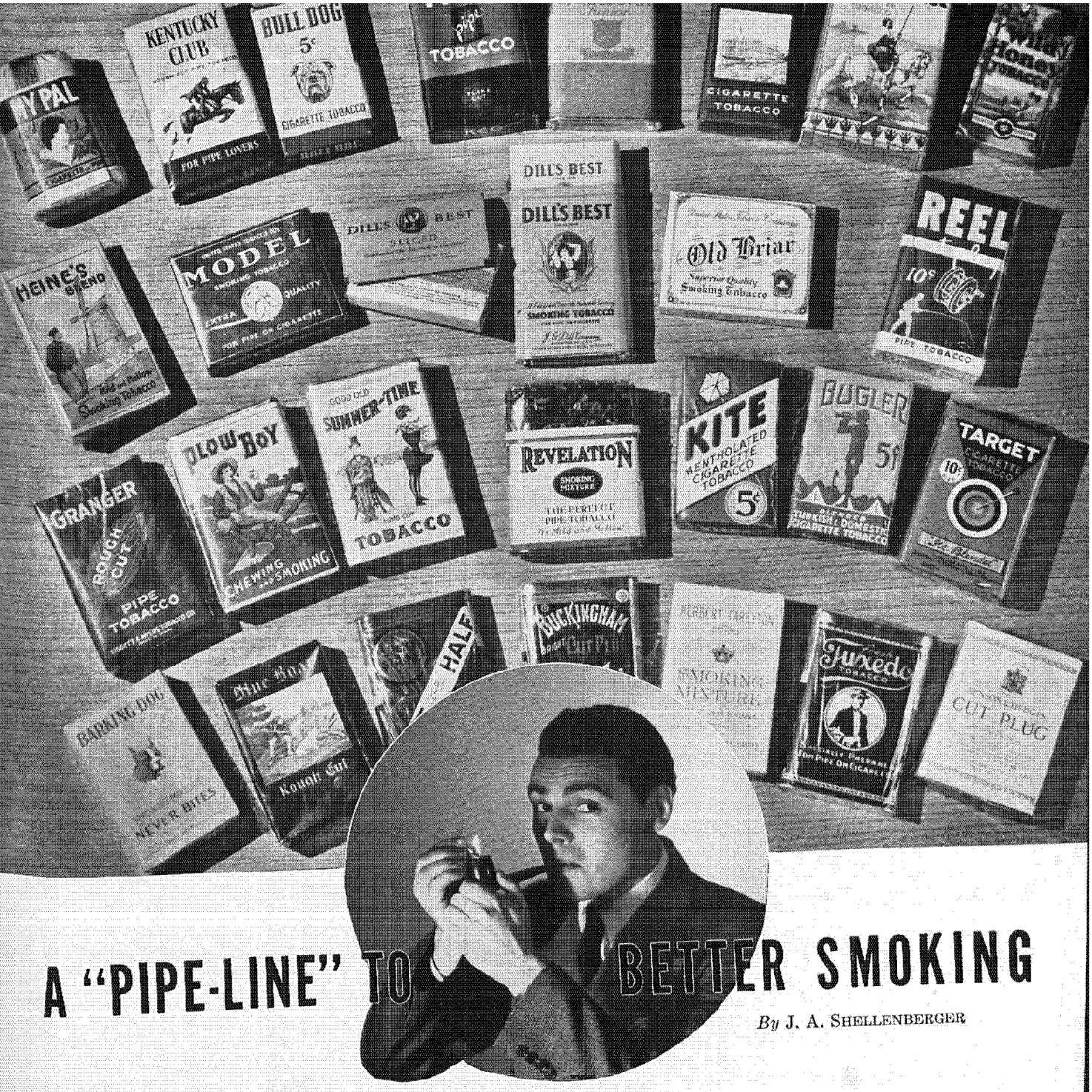
IN the midst of bustling New York is a delightful oasis where one can relax and watch the world go by, for, sooner or later, almost everyone who is "anyone" visits this charming spot. Towering forty stories above Central Park, fashionable Essex House is rapidly personifying that fabled hostelry of cinema and story, Grand Hotel.

Attracted by its cosmopolitan air and excellent cuisine, many diplomats, statesmen, social and business leaders, and celebrities in the musical and theatrical worlds are making this smart hotel their temporary or permanent home. Apparently they like the personal touches of its suave European host, Managing Director Oscar Wintrab, whose cordial greeting arrives with a bowl of fruit or vase of flowers, and one's home-town newspaper under the door in the morning.

The comfort of guests has been carefully considered, too. "Velvetex" rug-cushion under the carpeting makes standing in elevators much easier on tired feet. A "Freon" refrigerant keeps the atmosphere fresh and agreeable in the Casino-on-the-Park, Omar Room and Cocktail Lounge. In every apartment, soft light is diffused and sun-glare eliminated by "Tontine" washable window shades. Thus, unobtrusively, du Pont products contribute American practicality and convenience to the continental charm of Essex House.



In the "Casino-on-the-Park" one may dine and dance in air-conditioned comfort to the music of famous orchestras.



A "PIPE-LINE" TO BETTER SMOKING

By J. A. SHELLENBERGER

IT has long been a popular fable that Sir Walter Raleigh, on his trip to Virginia in the 16th century, was introduced to the pleasure of smoking tobacco by the American Indians. He is said to have been the first to astonish Europeans with the gentle art of puffing on a pipe.

Actually, tobacco's birth certificate lies hidden deep in a Central American jungle, in the ruined Mayan city of Palenque. On the crumbling walls of the Cross Temple are carvings made at least a century before Christ and as artistic as those of ancient Egypt. One of them shows a priest holding a tube from which was blown tobacco smoke, used as incense in religious ceremonies of the Mayas before pipes were smoked for other purposes.

The natives, making crude pipes out of reeds, appropriated this privilege of the priesthood and carried the pleasurable custom to the highly civilized Aztecs, perhaps even to the more northern tribes of American aborigines as well as to the islanders of the Antilles. In the North, where reed and bamboo were not known, the Indians fashioned pipes of bone, wood or clay. However, the religious aspects of smoking continued, and the pipe was—and still is in some countries—an important feature of tribal rites.

(Continued on Page Sixteen

Styling with Paint

. . . creates ILLUSION of newness

. . . brings out best features, subdues the unattractive

. . . modernizes outmoded home exteriors and interiors



By WILLIAM T. GORDON

PEOPLE like to dress in style, to drive in style, and to live in style. New clothes keep us constantly in step with the seasonal changes. Last year's automobile can be traded-in for this year's more modern model.

But our homes must remain basically the same from year to year. And rightly so, for time has a way of making homes more charming and liveable as the years roll along. But they can be kept "in style," too. And paint is the means by which they can be kept up-to-the-minute with changing trends in decoration.

Short, stout men and women don't call the world's attention to their stature any more than do tall and thin individuals; they smooth over their seeming deficiencies as best they can. The short and stout seem to gain height and slimness by wearing vertically-striped suits and dresses. Tall hats and dark colors aid materially. The reedy types lean toward horizontal effects woven into apparel, and this seems to give added weight and more of a symmetry to their over-all appearance. Likewise, this practice of calling attention to the better features and subduing the more unattractive ones extends into the world of commerce and trade. Everywhere are a myriad of "stylish" practices that we have wisely come to accept.

Homes, like humans, should be kept in style. Why? Simply to make them more attractive, comfortable, restful, better-looking, more liveable, more "homey." Both from within and without, our homes should be made to look and bring forth the best that is in them.

So, why not subdue with paint unpleasant and irregular house gables, gaping roof dormers, squatty down-to-the-ground roofs, square living rooms and colorless woodwork? Soften, subdue the more unattractive features of your home; brighten, emphasize, bring to the fore the intrinsically better features.

Now, let's take your house. You would like to "style" it. First, as in everything, you should study the house carefully. Note well the lines and features that form the exterior. Does it seem too high for its length? Then *paint the roof a dark color*, which will tend to make a house appear lower on the ground.

If the too-high house has shutters, paint those of the upper story the same color or tone as the roof. This will visually bring the roof line lower, as the eye will travel to the bottom of the dark shutters. Paint the remaining shutters the color of the body of the house.

Is the roof line cut up with too many gables? Simple . . . and here's the answer. Everything about a many-gabled roof should be dark. Nothing should stick out in color—

no dormers, no stacks, no chimneys. The longest, straightest lines on a many-gabled house are those nearest the ground. Feature the front door. Feature the shutters on the lower floor only, so that the eye does not subconsciously lift above the first floor, but is held to where the lines are longest.

Lots of modern houses boast of dormers—those third-story windows that stick right out of the roof. Maybe your house has some of them, and perhaps they stick out too much or not enough. Dormers can make a small house seem larger by painting their faces the same color as the side-wall of the house. This will carry the side-wall color up into the roof and give the appearance of additional height.

Dormers on a tall house should be painted the dark roof color. They will visually become part of the roof and not of the side-walls, making the house seem lower.

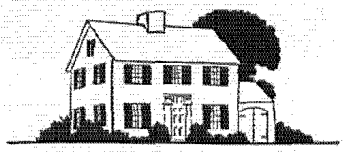
Chimneys are other architectural spots that sometimes blight an otherwise pleasing exterior. To make large chimneys appear smaller, they should be painted the same color as the body of the house. Then they will blend with it and their size will not be noticed. Likewise, if your chimneys are small and weak-looking, they, too, should be made to melt into the body color of the house.

If window openings are of different sizes, paint them the same color as the body of the house. Otherwise they will disturb the unity of its over-all shape. If window shutters are of various sizes, remove all smaller ones and leave only those of the larger and more uniform size.

A dark, warm-colored door on a light house, or a light, cool-colored door on a dark house, gives a welcoming note.

So that's what we mean by styling your house with paint. The tools you use are dark colors and light colors. All that need be remembered is that light colors always help to make things look larger. Dark colors help to make them look smaller. Warm colors—reds, oranges, yellows, yellow greens—seem to bring things toward you. Cool colors—blues, violets, blue greens, blue grays—seem to push them away.

Now that we have established certain rules governing the exterior of your home, let's go inside and see what improvements can be made there.





If your little house seems much too tall,
Dark roof and upper shutters will make it small.



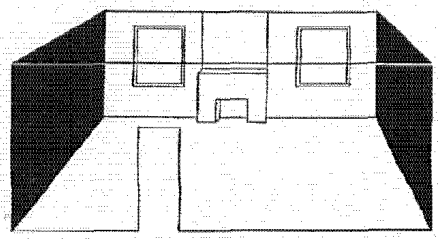


If your chimney's much too large, use a little camouflage.

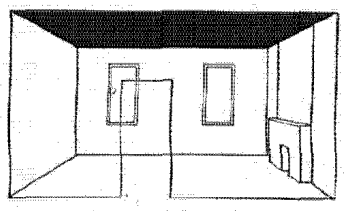




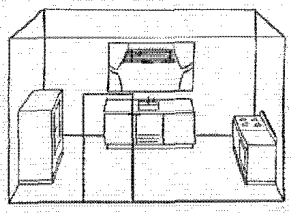
If your chimney's much too small, use one color over all.



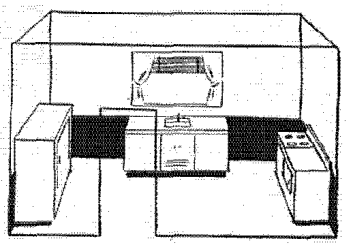
If your living room is much too long,
Paint the ends in color very strong.



If certain ceilings seem too high,
You then should darker colors try.



For cheerful kitchens—when they're small,
Paint one color over all.



A kitchen which is nice and roomy,
With many colors can't be gloomy.

Throw wide the front door and there, greeting you, is the hall—the "handshake" of the home. It should greet people with a bright, cheery smile—the Gee-I'm-happy-to-see-you sort of feeling. Most halls are dark because they are so placed that the surrounding rooms receive most of the outside light. The answer is always . . . paint your halls with bright, cheerful colors.

Long, narrow living rooms can be made to look wider by placing a dark color on the wall at each of the narrow ends, and a lighter color on the side-walls and ceiling.

Living rooms that are square and uninteresting in shape may have one wall in a different color or pattern so as to provide a focal point of interest. If there is a fireplace in the room, the wall surrounding it is generally of greatest interest.

If the ceiling seems too high, paint it a darker color than the side-walls. This will visually tend to make the ceiling lower and the room larger. If the room is too small, it may be made to look more spacious when painted with a light single color on all walls and the ceiling.

Most dining rooms may be seen from the living room, so it is best to paint them in a color which har-

monizes with that used in the living room, or in a complementary color.

Now, consider the kitchen, the laboratory of your home, for here are mixed and compounded ingredients which go to make the whole family healthy and happy. Most of the equipment, such as the stove and refrigerator, today is white. Any color is harmonious with white. So if your kitchen is small, paint it in one bright color. If it is large, paint it in two tones of the same color—one dark, one light. Feature the most interesting wall with the darker, richer color. In the kitchen you can let yourself go with all the bright colors you like. Paint with gay, bright hues the insides of cabinets and drawers . . . and on wood trim and ceiling.

If the breakfast nook is really what its name implies and is off by itself, any color you really like will do. There may be some small stenciled or applied decalcomania design used so that the room is intimate and artistic.

The test of a successfully painted bedroom occurs when you arise in the morning. Your bedroom should help fill you with good cheer and start you off right for the day. Let the sun stream in and pick up your favorite wall color. Let it vibrate and glow. So paint brightly, cheerfully in your bedroom.

Due primarily to the ever-present artificial light in bathrooms, paint stylists suggest the following fundamental rules to govern ambitious housewives in their desire to modernize. The walls and ceiling should be light in color. White, lemon yellow, flesh, ivory, pink or grayed sky blue receive the proper nod of approval. Bathroom trim should be white, light cream or ivory.

Again, this is "styling with paint," with no accent on any one color or combination of colors. There is plenty of room for choice in dark, intermediate, light, warm and cold colors. Styling consists merely in emphasizing the good points and playing down the bad points in anything you paint. So don't just paint . . . "Style with Paint!"

NOTE: The foregoing article is adapted from a booklet entitled "The ABC of Paint Styling" issued by the National Paint, Varnish and Lacquer Association, Inc.

Design for Modern Living

(Continued from Page Eight)

while another features a complete line of home furnishings. Among the articles which have already been built are bar stools, dressing tables, vanity chairs, office tables, beds, bedside tables, consoles, dining room sets, benches and the like. While some are reproductions of existing pieces, the majority are originals.

With homes smartly decorated and furnished in "Lucite," we may next consider home accessories. Here again many possibilities are open to ingenious designers and decorators. Some of these have already been exploited; among them are dainty crystal-clear table lamps, curtain rods, picture frames, salad bowls and utensils, vases, wastepaper baskets, bird cages, carved ornamental centerpieces, "Lucite"-trimmed woodenware, mirror frames, coat trees, hangers and so on.

A glance at one fabricator's all-plastic room gives an indication of what lies ahead in a new realm of decoration. There is a bed made, head and foot, of transparent "Lucite" sheets. Over the top come bent rods of the material, piping light from the floor to the book of the lie-in-bed reader. On either side are tables surmounted by lamps, both made of the same plastic. On the walls are pictures and mirrors framed with "Lucite." Bureau-drawer pulls are machined from this material, and a "Lucite" dresser set completes the ensemble.

A "Pipe-Line" to Better Smoking

(Continued from Page Thirteen)

Enter Columbus . . . . 1492. Among the gifts brought to him by the natives when he landed on the island of San Salvador in the Bahamas, were dried leaves with a strange and remarkable odor. Two of his men, making a trip of exploration in Cuba, were amazed to see the natives light such leaves, puff on them, and inhale the smoke.

The earliest English settlement in America failed as a colony, but succeeded as a school for pipe smokers. Drake brought the colonists back in 1586 and they astonished the people of England when they smoked their pipes.

During the Thirty Years' War, in the first half of the 17th century, pipe smoking became general throughout Europe. It was supposed to be a valuable protection against disease, and an antidote to the dread plague. A Dutch physician, Isbrand von Diemerbroek, wrote a vivid description of the way he made instantaneous recovery from the plague of 1636, simply by the aid of his pipe and tobacco. The noted English diarist Samuel Pepys makes similar note in 1665 of the beneficial effects of smoking. Small wonder that the pipe rose to its high place of esteem, and that smoking taverns were established for convivial gatherings and profound discussions.

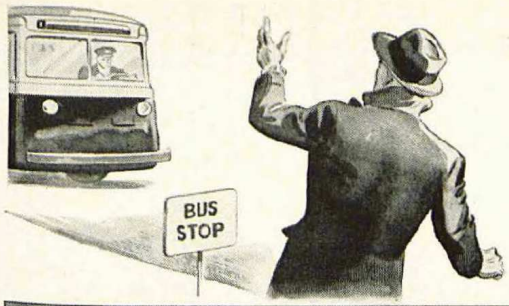
Small wonder, too, that there was established a ritual of care for precious pipes and tobacco. Rich young gallants of the 1600's carried their tobacco in boxes of silver, gold, ivory, mother-of-pearl or tortoise shell, all artistically carved or decorated. And in far-off America, the Indians carried their smoking tobacco in elaborate pouches of skin, decorated to the best of their ability.

Through the centuries, care has persisted in the cultivation of tobacco also. Growers have constantly been trying to improve the quality of the leaf. Many different processes have been developed by manufacturers in blending, toasting and curing the ripened leaves. All this research has been carried on with the object of giving the consumer greater smoking pleasure.

One of the greatest advances in the tobacco industry has been the development and use of moisture-proof "Cellophane" cellulose film to preserve the freshness and delightful aroma of the many fine blends of tobacco. This transparent sheeting has been used as linings for smoking tobacco boxes and tins and as overwraps for each packaged unit, thus insuring smokers against dried-out, stale, crumbly tobacco.

Today, with the "Cellophane"-wrapped package, smoking enthusiasts are assured a uniform, fresh and fragrant smoke.

NOTE: Grateful acknowledgment for many of the facts in this account of pipe smoking is made to Harcourt, Brace & Company, publishers of "A History of Smoking" by Count Corti.



It happened one night ... ON A BUS



It wasn't the crowded bus I was muttering about. It was the boss's talk about a pay cut if shoe sales didn't pick up. Suddenly the bus lurched and I made a grab for a strap that a cute little trick already had a hold of. She frowns at me, and then turns back to the copy of Vogue she's reading. She's turning the pages with one hand when all of a sudden she stops.



A wire-haired pup disappointed at the toughness of a heel on a lady's shoe jumps out of an ad at us. I'm reading the copy over her shoulder, when she looks up. "Do you wear *Scuffless* heels, too?" she asks sarcastically. Feeling the way I do, I growls, "No; do you?" "I'd never be without 'em," she sizzles, "especially when men like you step all over them!"



Later, I did some thinking. There must be plenty of women around putting good shoes out of commission because of scuffed heels. Boy, we'd have a wow of a sales point if the boss would specify *Scuffless* heels on our shoes! The next morning I said to him: "Mr. James, here's a way to jack up sales..." When I'd finished, he said, "Baxter, maybe you've got something there. We'll give Du Pont *Scuffless* Pyraheel a try!"



And, man, that trial ended two months ago! You couldn't get the boss to have anything but *Scuffless* "Pyraheel" now. Business sure has perked up since all the boys are calling attention to our heels and saying, "Madam—here's something else our shoes offer you—heels that won't dent, check or scuff, and look new as long as you wear them!" And instead of that pay cut, there's a rumor going around about a raise.

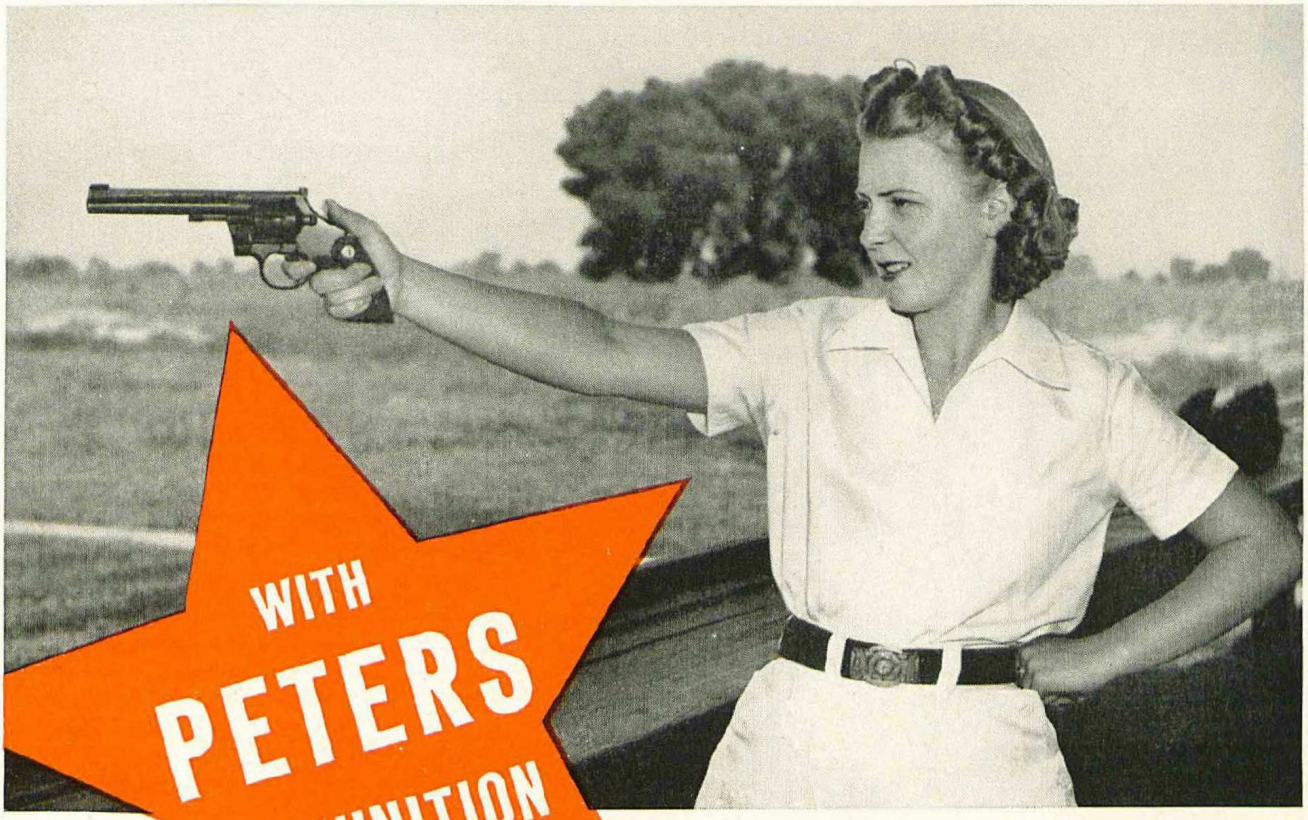
Tell your retailer you want Scuffless **"PYRAHEEL"** *plastic heel covering on your shoes, too.*

DU PONT *Scuffless* **PYRAHEEL**
REG. U. S. PAT. OFF.

Du Pont on the air—Listen to "The Cavalcade of America" every Tuesday, 9 p.m. over National Broadcasting Company Networks.

E. I. DU PONT DE NEMOURS & COMPANY (INC.), PLASTICS DEPARTMENT, ARLINGTON, NEW JERSEY

GLORIA JACOBS SETS NEW NATIONAL RECORD AT FRISCO



WITH PETERS AMMUNITION

1 Some of the most sensational shooting ever witnessed by anyone—anywhere, any time—was the performance of Gloria Jacobs, seventeen-year-old star from Woodland, California, who set a new all-time NATIONAL RECORD at San Francisco, December 17, 1939. Shooting over the .22 calibre Camp Perry Course in the San Francisco Traffic Police Registered Tournament at Fort Funston, Gloria ran up the phenomenal score of 299 x 300! This is a new national record *for both men and women*, beating the previous record by one point.

2 But that was only the beginning. Later that same day, shooting in the .22 calibre National Match Course, Miss Jacobs banged out a 292 for a new WOMEN'S NATIONAL RECORD, two points higher than the former mark! She used Peters ammunition in establishing both of these new records.

3 In the recently announced N.R.A. rankings of pistol and revolver shooters in the U.S.A. for 1939, Gloria won *top ranking* among all women shooters, with an average of 93.00. Individual pistol and revolver scores that went to make up this high rating are well worth noting. The October, 1939 Timed Fire score of 199 x 200 is a civilians' and women's RECORD. The 291 x 300 is a Police Match Course RECORD for women. Miss Jacobs used Peters ammunition in running up these two winning scores.

Target is Reg. U. S. Pat. Off.
Police Match and Dewar Match are trade-marks of Peters Cartridge Division

4 EXTRA! WM. P. SCHWEITZER, Hillside, New Jersey, who made small bore history at Camp Perry in 1939 with an unfinished run of 220 bull's-eyes in the iron sights Swiss Match at 200 yards, again establishes a new Unofficial Record. Recently, at the Lakewood, N. J. shoot, Bill beat all indoor records for 50 yards, scoring 400 with 40 X's with a 'scope, shooting Peters Dewar Match.

5 PETERS "POLICE MATCH" and "TARGET" are precision-made ammunition used by expert shots everywhere to run up high scores. They are built to the most rigorous laboratory standards, insuring superfine accuracy for serious target competition. Get a supply at your dealer's today. Discover for yourself that they're star performers in practice and in competition.

LOOK AT THESE SCORES BY GLORIA JACOBS!

Date	Place	Course	CAL.	Score
June, 1939	Fort Funston	Timed F.	.38	195—200
July, 1939	San Diego	Police	.38	291—300
Oct., 1939	Fort Funston	Rapid F.	.38	184—200
Oct., 1939	Fort Funston	Rapid F.	.22	197—200
Oct., 1939	Fort Funston	Timed F.	.22	199—200

PETERS DUPONT

PETERS CARTRIDGE DIVISION, Remington Arms Co., Inc., Bridgeport, Conn.
MEMBER AMERICAN WILDLIFE INSTITUTE, "FOR A MORE ABUNDANT GAME SUPPLY"

National Hardware Open House—April 25-May 4—WE ARE COOPERATING

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