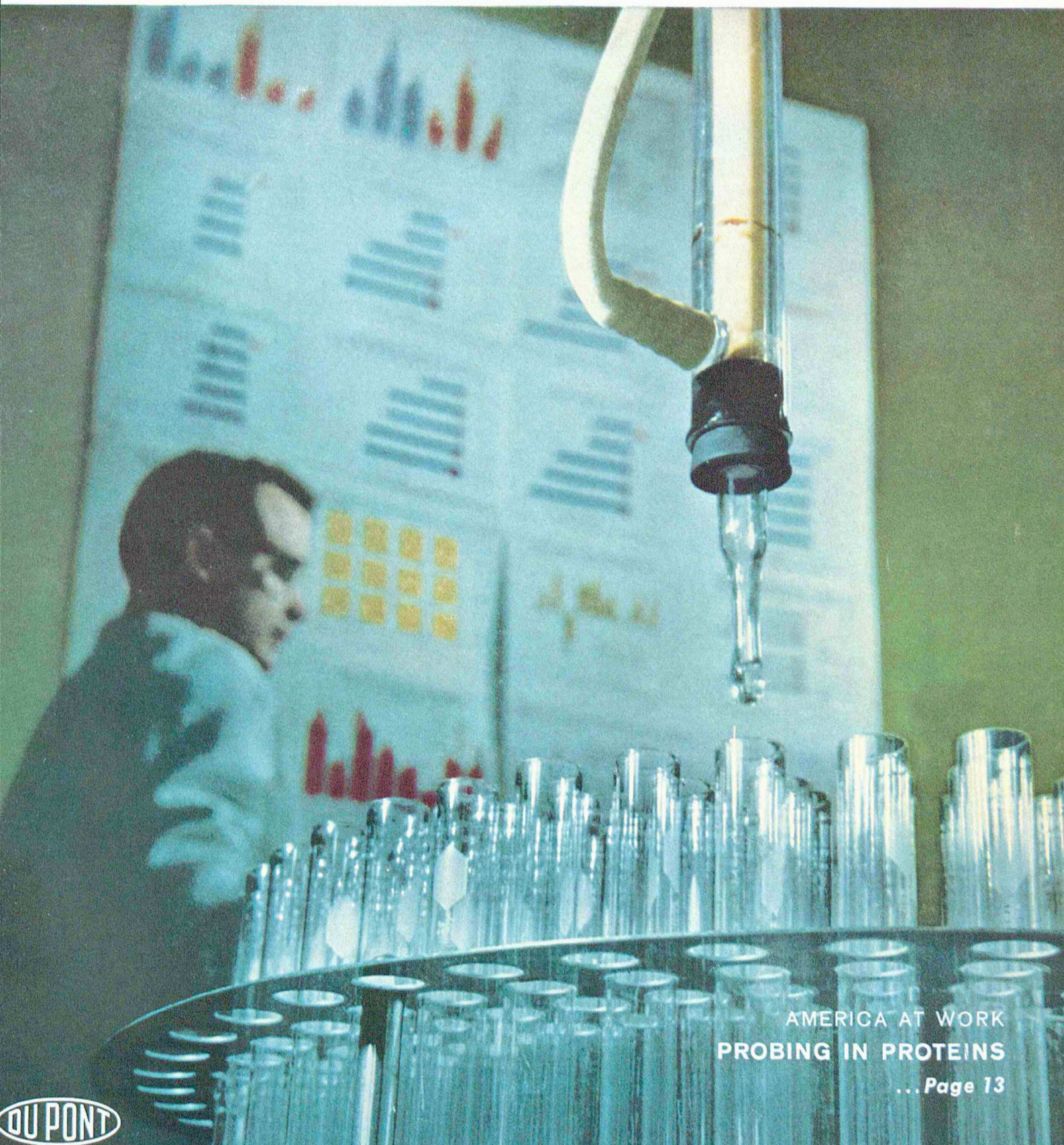
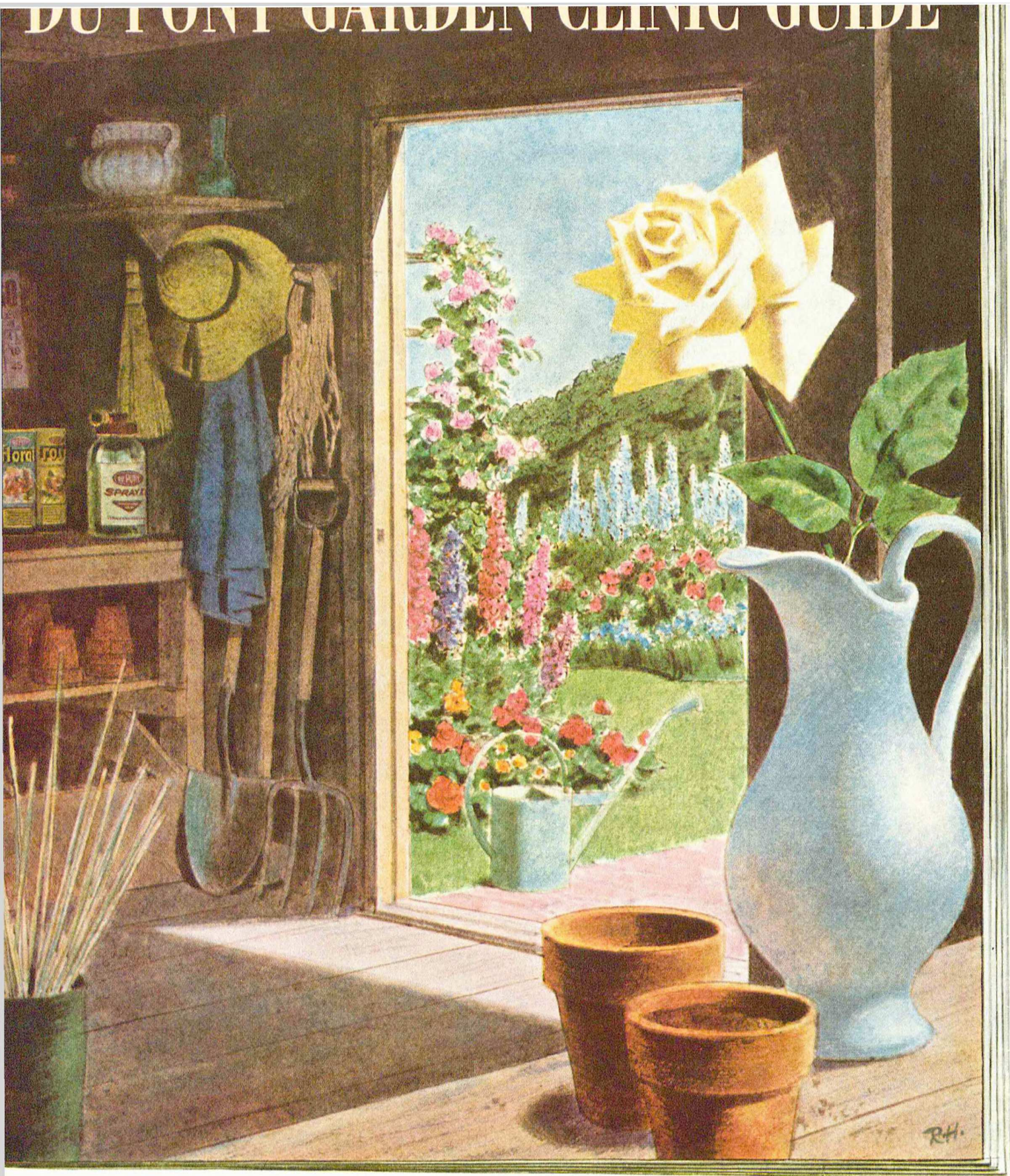




AMERICA AT WORK
PROBING IN PROTEINS

...Page 13

DU PONT GARDEN CLINIC GUIDE



Better Things for Better Living . . . through Chemistry

This new Guide to better gardening identifies over 75 garden insects, weeds and diseases in full color. And it's a ready reference of the best ways to control them. It also contains other helpful information for easier gardening this year. Get a free copy today from your dealer for Du Pont Garden Chemicals.

DUPONT

magazine

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THE COVER

Proteins, a noted British biophysicist recently observed, may justifiably be regarded as the characteristic typical substances of life. They make up a large part of living tissues and no organism has been found that lacks them. Their importance, combined with rapid advances in biochemical knowledge and techniques, has sparked mounting research efforts by nutrition



scientists—a daily, unremitting probe both of proteins and of their building blocks, amino acids. Among Du Pont scientists working in this field is Dr. Jack Longenecker, who is separating amino acids from blood plasma and compiling data that he hopes will provide a quick diagnostic test to measure protein depletion in humans—an "in vivo" test, Jack says, based on analysis of amino acid changes in the blood stream following ingestion of a dietary protein. Probing other aspects of a diverse subject is a versatile team of Du Pont research talents, some of whose findings and developments are recorded in the story, "More Body-Building Protein from Wheat," found on pages 12-15.

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CHANGE OF ADDRESS

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NEW IDEAS, NEW PRODUCTS, NEW JOBS

Next month, in keeping with the season, a tide of 2.2 million graduates—1.8 million from high school and 400,000 from college—will surge from the nation's educational institutions. And businessmen, in accordance with 20th Century tradition, will participate in the flood of graduation oratory that overwhelms the campus during the first week or two of June.

Already the invitations are out; the acceptances have been returned. And the assumption is that the graduation speaker is prepping hard, digging down for the eternal challenges and the ringing phrases with which he can reward his semi-attentive listeners.

The realist in this situation can do far worse than talk very simply and plainly about a subject that must be on every graduate's mind: namely, *Jobs*. For in spite of the fact that jobs this year may be relatively easy to locate (and many graduating may have theirs all lined up), what can be more practical than to strike home with a few honest facts about how jobs grow?

At commencement, a businessman has an opportunity—plus the responsibility—to lay the facts out for all to see and understand. Facts like these:

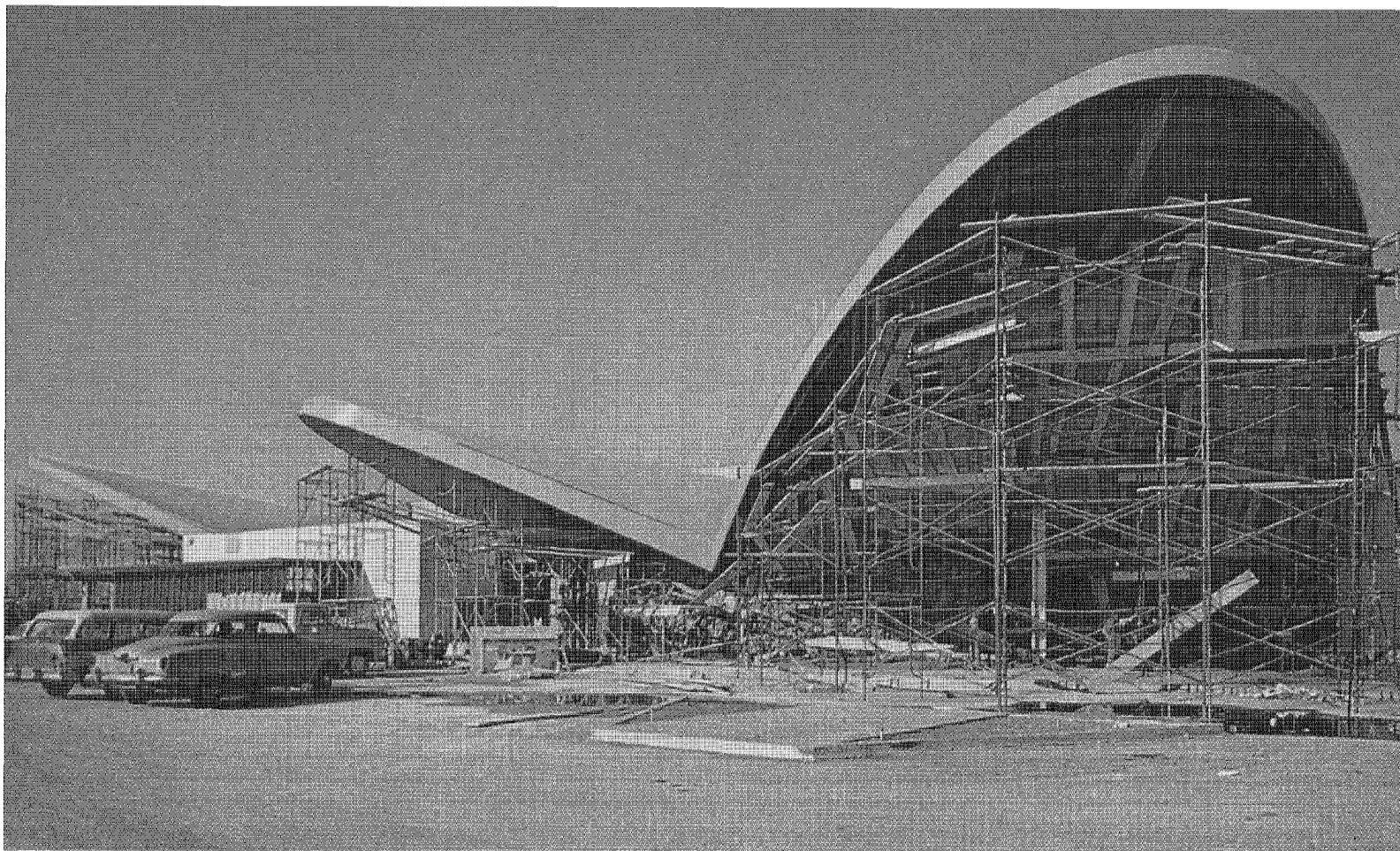
- It takes ideas—good ideas—to build jobs. These ideas may come from an employer; they must also come from an employee. Only a steady and unremitting succession of ideas indeed has expanded the number of jobs in America from 40 million in 1940 to nearly 70 million today.
- Every business grows and develops through the application of ideas, and these ideas are the inventive thoughts of job holders . . . or job applicants.
- Job opportunities are constantly being created in the business world by people with ideas for better products or better services. For, jobs are tied to things people want and need.

What are the Trends?

The Du Pont Company and the 80,000 firms that use its products have more than a passing acquaintance with job trends stimulated by new products and new ideas. Over the years Du Pont has introduced a stream of new products and product applications—scores of these have appeared in the past five years, for example. And most of them have helped generate new jobs, not only at Du Pont, but also with other firms.

Add up the figures and you find that in the past two decades scores of thousands of new jobs have derived from the application of new ideas by firms buying and using new Du Pont products. This is a substantial accomplishment. Yet when you compare it with the projected number of June graduates expected annually from high school alone, just five years from now (2.5 million), you get a fair idea about the bursting need for new ideas, new products and new services that face and will face U.S. businessmen over the next decade.

To create new jobs tomorrow, we need new ideas and new products today. Place facts like these before June graduates and you can impart a small measure of the opportunity facing young men and women as they search out and start their first jobs in business and industry.



PIONEERING WITH NEW

Imaginative users of Du Pont products expand markets

Behind every business, an economist once noted, is "an idea, prosecuted vigorously." Modern entrepreneurs like those whose ventures are reported on these pages are apt to agree—and looking across the panorama of postwar economic development in the U.S., an observer can only marvel at the vigorous brainchildren such men have fathered. For in 15 years, the number of American businesses has increased by a whopping 1½ million—up 50 per cent since V-J Day. In the past five years alone, the net gain has been 300,000 firms, or an average of 60,000 per year.

One of the authors of this business drama is a comparative newcomer: large-scale industrial research for new products, ideas and processes. In prewar America, only a few firms maintained substantial research and development programs. Today, nurturing science is becoming standard operating procedure; in five years, industrial research expenditures have more than doubled; even the chemical industry, traditionally associated with the laboratory, has raised research outlays from \$360 million in 1953 to nearly \$700 million today.

The result has been a steady outpouring of new ideas and products. For large and small firms alike, these created not only more business opportunities but also ventures unlike most that had gone before. In Du Pont's case, about

half its sales are in products unknown 25 years ago. Obviously, such progress is not made in a vacuum. The force and vigor of smaller firms that buy and use Du Pont products is an essential factor in product success. Sometimes a new product provides the foundation on which is built a brand-new small business of converting, fabricating, distributing or selling; at other times, perhaps most, a Du Pont product is a springboard by which a venturesome smaller firm expands or diversifies. At all times, pioneering with new ideas means entering or creating new markets—hard, slow development work by large and small firms in concert.

This relationship of mutual dependence is easily overlooked, but it is a fact as plain as the nose on the gargantuan face of the American economy. So-called small companies comprise the bulk of the business population; less than 1 per cent of all firms have 100 or more employees; 19 out of 20 U.S. firms have fewer than 20 people—and three-fourths of all businesses employ less than 4.

How buyers of Du Pont chemical products use them to expand present or open potential markets is a theme with variations as infinite as the ideas that occur to individual businessmen. To suggest their range, the following pages sample a few personal histories of Du Pont products and of users' ingenuity in adapting and exploiting them.

Modern architecture of the Country Club Bowl recreation center, Sacramento, Calif., is topped by a steep and curvaceous roof of neoprene and "Hypalon" synthetic rubbers. This roof is a new venture by Caram.

Applied in paint-like consistency over exterior grade plywood, Caram's roof coating consists of two coats of neoprene, two of "Hypalon". Latter makes possible full range of brilliant colors.



Elastomeric Roofs

When the striking modern building shown in the two pictures, left, opens this spring, one of the proudest beholders will be F. C. "Cam" Johnston, president of the Caram Manufacturing Company, Monrovia, Calif. For the structure marks Caram's first venture into the high potential field of elastomeric roofing systems; Mr. Johnston's firm is responsible for the weather-tight coating on the building's curved and soaring roof—a fluid-applied system composed of Du Pont neoprene and "Hypalon" synthetic rubbers. Already an established maker of adhesives products, Caram decided to enter the roofing field because the Du Pont materials offer solutions to engineering problems that have long hampered design of modern, unusually shaped roofs. "Now," Mr. Johnston says, "properly compounded coatings based on neoprene and 'Hypalon' can be applied to roofs of any pitch or contour, and over all commonly used substrates when they are properly prepared. Also, 'Hypalon' makes bright colors possible. Add the facts that these elastomers will not support fire and will resist weather, abrasion, chemicals, ozone, ultraviolet rays of sun—and we feel that our firm is expanding into a field where we can make an important contribution to builders on the West Coast area we serve."

BUSINESS IDEAS

by a steady pursuit of the new and the different

Patterns for Printed Circuits

The needs of the space age have created opportunities for new firms with special abilities and know-how. A dramatic case in point is Precision Circuits, Inc., of Mount Vernon, N.Y., whose president, Charles Sabel, is running better than a \$1,000,000-a-year business in a field that barely existed a decade ago. Making printed circuits required for complex electronic instruments, the company is only three years old, yet is one of the field's leaders.

A factor in the young firm's rapid success, states Paul Kramer, supervisor of photography, was the introduction of Du Pont "Cronar" Ortho A Litho film, tailored to the graphic arts industry. "The exacting specifications of intricate electronic patterns must be transferred from blueprint to finished circuit at deadline pace," Kramer explains. "Film is our critical medium; a good percentage of our assignments require tolerances of .002 and .003 of an inch. Without the dimensional stability and holding qualities of 'Cronar' Ortho A, production of printed circuits would be almost impossible."

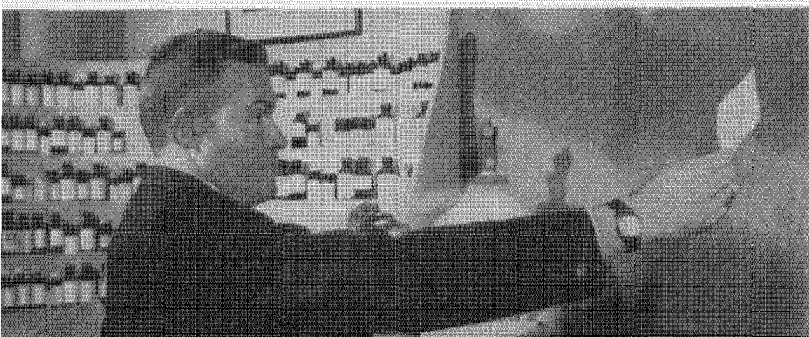
Making printed electronic circuit, master drawing is first photographed on "Cronar" Ortho A Litho film; then negative, right, is exposed on sensitive copper plate for final processing.

Continued



AromaRama on Broadway won show business headlines by introducing scents characterizing places and events audience watched.

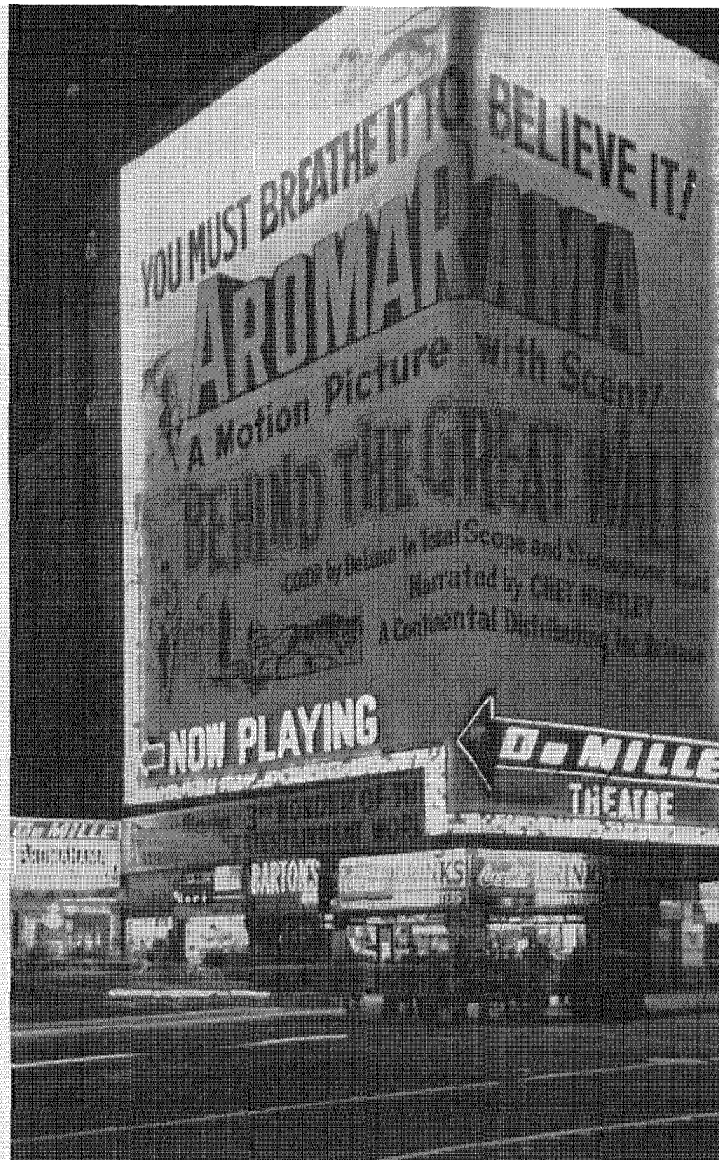
Perfumer chemist tests one of 23 scents Rhodia, Inc., developed for AromaRama and propelled through the theatre by "Freon."



Scents in Motion Pictures

On December 8, 1959, some 1,000 New York noses sniffed a new and promising idea in movie entertainment: AromaRama, in which the filmed sights and sounds of modern China were intensified by appropriate fragrances and aromas ranging from the scent of oranges and incense to tiger smell, floods and fireworks.

Two years earlier, the problem of devising and distributing scents timed to reach every nose in the theatre as the screen image appeared was tackled by Rhodia, Inc., a leading maker of all types of aromatic products. After creating 23 required scents, Rhodia's experiments found that the ideal carrier and disperser for high concentrations of aromatic material was "Freon" propellant. The end result: a ring of aerosol containers mounted on a turntable, and successively triggered into the air conditioning system on a split second schedule. Kudos for what movie and AromaRama producers recognized as a promising, easily installed technical advance were general; AromaRama has subsequently opened in theatres on the West Coast and in Canada.



Homes Under Tents

One of construction's toughest problems—the delays and wrecked schedules caused by winter's wind, snow and freezing temperatures—has been licked by a young Cleveland, Ohio, builder named Robert Brown. His solution: build the entire house under an air-inflated shelter of Du Pont nylon. Designed and built by Domestic Film Products Co., Millersburg, Ohio, builder Brown's blimp-shaped "igloo" weighs only 1,200 pounds, yet it completely covers the home being built underneath, shielding job and workers from bad weather. The coated nylon "skin" is first laid over the site and assembled materials; then two blowers inflate the shelter which stands until the home reaches the weathertight stage—usually four days. Warm and dry, Brown's men work around the clock in three shifts, completing one of his \$23,000 to \$35,000 homes every 21 days. The air-supported structure has withstood two feet of snow; and Brown's idea to use it in residential construction, he reports, provides superior workmanship plus savings of nearly \$1,000 per house in increased efficiency of the workmen.



Electronics in Languages

In education, an important new teaching technique is the "language laboratory" at both college and high school levels. Using magnetic tape and an electronic system such as the "Lingua-trainer" (see picture), students can practice a language, hear experts speak it, and compare their own diction with that of expert linguists. In a few weeks, students have picked up enough Russian, for example, to travel in Russia.

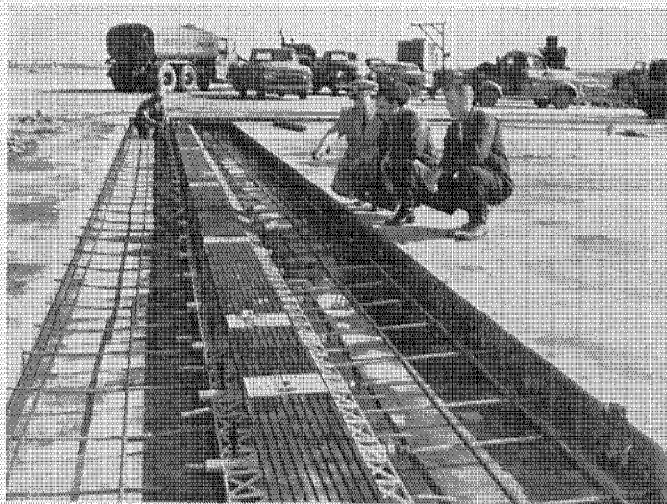
The "Lingua-trainer" is a development of General Electronic Laboratories, Inc. of Cambridge, Mass., which has designed its classroom unit around tapes of "Mylar" polyester film in cartridges. This tape is durable and can be used over and over again for repeated training sessions. The first "Lingua-trainer" appeared less than two years ago, yet more than two dozen units are already in use. To handle the increasing demand for this and other product lines, General Electronic Laboratories is expanding production capacity and marketing the "Lingua-trainer" through its subsidiary, Science Electronics Inc.



Tape in plastic cartridge is new teaching tool for high school language instructor, who uses electronic console of the "Lingua-trainer" (foreground) to teach 30-student class in sound booths.

A Sandwich of Neoprene

In California's San Joaquin Valley the temperature ranges from 30 degrees F. in winter to 112 degrees F. in summer. But a new prestressed concrete taxiway under construction at a Navy jet base in the valley is expected to handle these temperature extremes with a minimum of repair and maintenance. The reason: 24 neoprene synthetic rubber joints or "sandwiches" that contract and expand like the bellows of an accordion. In one area these joints will extend 75 feet across each end of a 500-foot-long concrete taxiway, where they can absorb up to three inches of movement when the concrete is affected by temperature changes. The joints are installed in six and six-and-a-half foot lengths to span concrete sections that are 25 feet wide. These joints are a development of B. F. Goodrich Industrial Products Company, a division of The B. F. Goodrich Company; and this installation made at a new Navy base by the Griffith Co. of Los Angeles is the first for aircraft. Successful test installations have been made on highways, such as the Baltimore-Harrisburg Expressway. Neoprene was chosen as the elastomer for the joint because it will remain flexible and maintain a tight seal for many years, despite sunlight, weather, abrasion, oil and chemicals.



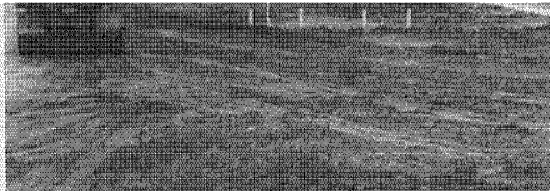
Neoprene expansion joints at Lemoore Naval Air Station provide new way to keep taxiway free from weather damage and reduce repair and maintenance costs. Joints absorb contraction and expansion, yet stay level with concrete surface on jet airstrip.



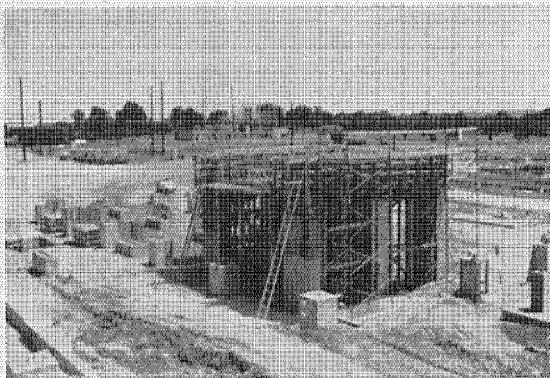
On the way up, nylon air shelter developed by homebuilder Robert Brown covers house site and building materials.



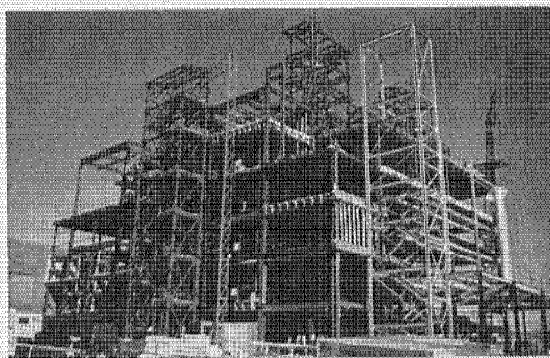
Protected from weather, masons work at night laying foundation, keeping fantastic winter schedule of 21 days per house.



EARTH MOVING



FOUNDATION GOING IN

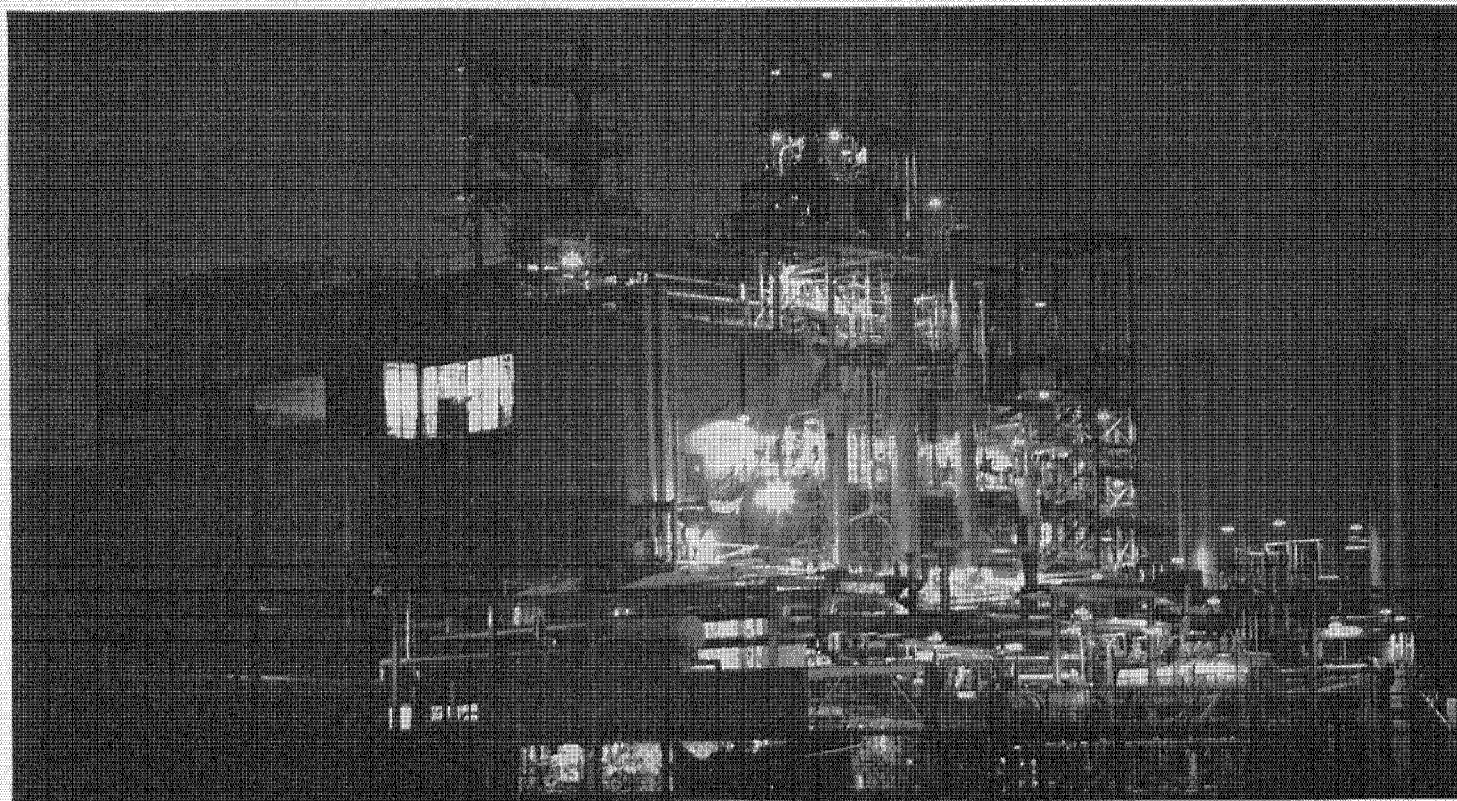


STEELWORK RISING

A plant goes up

Debut of "Dacron" at Old Hickory

*New products fathered by technical
breakthroughs call for a second
plant to make "Dacron" polyester fiber*



Plant on stream—Night view shows portion of Du Pont's new plant for "Dacron" polyester fiber in operation at Old Hickory, Tenn.

The long-awaited ceremony in the famous textile village of Old Hickory, Tenn., was so informal it was not really a ceremony at all. After months of building, Frank Redmile, a Du Pont field project manager, shook Murray Acker's hand and grinned. "Okay, Murray. You can let 'er roll."

Thus last month, veteran Textile Fibers manager Acker and his Old Hickory staff started up the first unit of a complex process that put on stream Du Pont's second plant to manufacture "Dacron" polyester fiber. Teaming up with the seven-year-old Kinston, N. C., plant, the new multi-million dollar facility will roughly double the output of "Dacron". More than that, it will help the textile industry introduce a broad spectrum of new fabrics, and translate major technical advances into fashions with new talents and properties.

The result for you? Whether you're shopping for a rainbow-hued high-fashion party gown or a cold-weather suit for office wear, you'll find your retailer offering new candidates for your year-round wardrobe. One yardstick: In 1960, one large New York department store will be carrying 12 articles of "Dacron" for each two it made available last year. The same trend will be evident across the nation.

In its infant days, "Dacron" captured the public fancy with two distinctive traits textile scientists labeled "moisture insensitivity" and "rapid recovery from stress." In 1953, these sparked a sizable revolution in outer apparel; textile mills were able to introduce fabrics of unusual wrinkle resistance, and to pioneer the now-familiar concept of wash-and-wear.

Easy maintenance signaled the end of ancient upkeep problems of hot-weather wardrobes. Now summer garments—men's suits and shirts, women's blouses—could be dropped into a washer and later dripped dry with minimum ironing or pressing. The result was that "Dacron" polyester fiber found a ready market in suitings; in light-weight fabrics such as broadcloths or batistes for shirts, blouses or summer dresses; in poplins for rain- and sports-wear—even in marquisette curtains and other window coverings.

A Parade of New Fabrics

In its apparel uses, however, "Dacron" was still largely a spring-summer fiber, and research went on to find ways to make the fiber useful in a wider range of products. Now, seven years of Du Pont experimentation coupled with trial runs by textile firms are paying off in a parade of fabrics with radically different aesthetics.

For example, in 1960, you will see a new kind of "Dacron" Du Pont calls Type 64 in the heavier-weight fall and winter hard-finished and flannel suits for men. Readily dyeable and pill-resistant, this fiber provides the bulk and surface cover of traditional fabrics while retaining the easy care traditional with "Dacron".

Similarly, another important advance, improved dyeability, will multiply uses of "Dacron" in women's fashions for all seasons. Notable example: "Dacron" Type 62, in which filament yarn has been modified structurally and chemically to produce brilliantly colored high-fashion fabrics with the texture and "hand" of silk.

In other fashion fields, blends with cotton in sateens, velveteens and Oxfords, piqués and broadcloths are among the fabrics that will capitalize on the dyeability and varied textures available as "Dacron" bows at Old Hickory.



Vibrant inner color, majestic rustle of silk are aesthetic qualities added to this high-fashion evening gown by the new Type 62 "Dacron" polyester fiber. Brilliant colors and varied fabric textures team with ease of care to multiply fiber's fashion uses.

Fall and winter weight fabrics of new "Dacron" Type 64 bring fiber's advantages to year-round male apparel. Luxurious, full-bodied, with deep colors and a worsted hand, suiting fabrics below extend wearing season, helped spark Old Hickory expansion.





Ball gown's elongated lines and fitted torso make 5 foot, 1 inch Miss Allyson look taller. The fabric is Du Pont nylon lace re-embroidered with roses.

High fashion for the "girl next door"

Costume look, a fashion favorite of Hollywood designer Don Loper, is achieved here by combining a dancing dress of nylon and silk chiffon with a brocade evening coat of "Acele" acetate.



As an All-American girl in dozens of movies, actress June Allyson usually appeared in plain-Jane clothes. But currently, as hostess and frequent star of the Monday night "Du Pont Show With June Allyson" (10:30 p.m., E.D.T. on CBS-TV), she's a sophisticated and elegantly turned-out young woman.

Responsible for her new high-fashion look is Hollywood designer Don Loper. Using fabrics made with Du Pont fibers, he creates a fashion showcase for the textile industry with the glamorous costumes that Miss Allyson wears and the room settings in which she appears.

"We had two reasons for choosing this approach," Loper says. "We wanted to present June as the stylish woman she really is and we wanted to show the versatility of the Du Pont fibers." Among the fabrics used: nylon velvet, chiffon and lace; satin of "Acele" acetate; taffeta of "Dacron" polyester and silk; and flannel, tweed and jersey of "Orlon" acrylic and wool. "Such a range means I can get the exact effect I want—one of extravagant simplicity, of softness and maximum femininity," Loper explains.



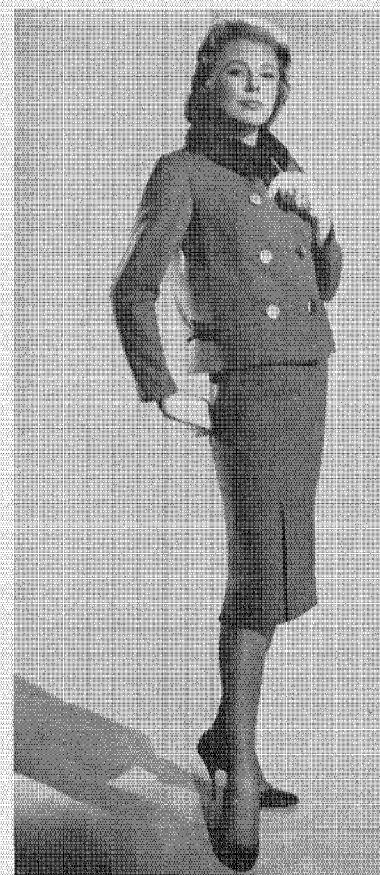
Very full skirts, here, or pencil slim ones are used to flatter Miss Allyson's slender figure and create the illusion of height. Fabric is sheer check of "Dacron" polyester.



Elegant naturalness is effect for which Loper tries. White taffeta dancing dress is of "Dacron" polyester and silk, with a bodice of nylon lace over silver lame.



"Sophisticated but not sirenish" is how Loper characterizes Miss Allyson's taste. The white and gold ball gown she wears is of Du Pont nylon and "Acele" acetate in a giant moiré pattern.



Contrasting textures—a flannel or "Orlon" acrylic and wool paired with fur in this suit—help show versatility of Du Pont fibers, Loper feels.



Browsing sportsmen explore the wonderful world of plastics at Du Pont's sports exhibit in Chicago.

What Sportsmen Learned About Plastics at the Sporting Goods Show

Each year upwards of 10,000 sporting goods jobbers and dealers from all over the country (as well as abroad) descend on Chicago to learn what's new in sports equipment. In five busy days these sportsmen are virtually enveloped in a spectacular show sponsored by the National Sporting Goods Association.

This year the show itself was remarkably symbolic of the tremendous growth now going on in the industry. Billed as the "greatest accumulation of sporting goods assembled anywhere in the world," it was commonly regarded by the experts as the kick-off for a record \$2 billion sports year.

The endless variety of sporting goods packed into one display after another (over 75 lines altogether) included new products making their debut, and marked improvements in familiar products. Showgoers learned about exciting new developments in sporting goods—from water-walking shoes of urethane to a skin diver's underwater boatmobile. And they learned, too, of the increasing and exciting uses of plastics in the sporting goods field including those for "Zytel" nylon resin, "Delrin" acetal resin, "Lucite" acrylic resin, and "Stren" monofilament spinning line.

Fanning out from a Du Pont booth where more than 200 separate items of plastic were on display, a photographer-reporter team chatted with dozens of sportsmen and came up with this word and picture report of what sporting goods dealers and others prominent in sports were learning about plastics at the 31st annual show.

"Delrin" resists CORROSION

Carl Guenther, Brookside Sporting Goods, Maple Heights, Ohio

"One thing I never thought I'd see, was the day when they made a completely salt-water-proof fishing reel. I've seen how this new 'Fabulous Zebco Model 88' with its salt-water-proof parts of 'Delrin' will put an end to the problem of corrosion that's plagued fishermen everywhere for as long as I can remember."

Professional Sportsmen at the Show



Tremendous acceptance for the new Remington Nylon 66 rifle was the report of Paul Cardinal (left), an official of the National Rifle Association, to Bob Mattair of Du Pont.



Rugged innovation on a new Brunswick "Dura-King" bowling pin is examined by baseball star Stan Musial. Also the owner of a bowling center, Musial was interested to find the base of new pin was made of "Zytel" nylon resin for extra durability with pin-setting machines now so widely used.

"Zytel" needs LITTLE LUBRICATION



James Nelson, Nelson Sporting Goods, Duluth, Minn.

•••The outboard motor people are coming out with a new propeller that has an adjustable blade. It's interesting to find that the adjusting ring on this prop—the device that changes the pitch of the blade—is made of "Zytel." It's a tough material and needs very little lubrication. That's why engineers chose it for this use."

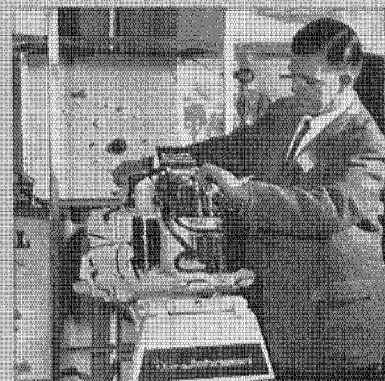
"Stren" is STRONG



Mr. & Mrs. Bernath N. Greene, Whittings Inc., Milwaukee, Wis.

•••My husband and I are truthfully amazed at just how strong "Stren" monofilament spinning line is. It's smaller in diameter and lighter than standard monofilaments, yet it's incredibly strong. All I can say is don't ever try to break "Stren" with your hands. For you're really in for a big surprise if you do!"

"Zytel" resists HEAT



H. B. Helstrom, Foster's Sporting Goods Store, Portland, Oregon

•••Being a dealer of marine equipment and boat motors, I was particularly interested to learn that the new Johnson outboards have more than 100 vital components engineered and made of "Zytel." An engineering material like "Zytel" was chosen, I found, because it withstands high temperatures generated by the motor."

"Zytel" resists IMPACT



Connie Smith, Lipscomb Industries, Tyler, Texas

•••When you're playing football and hit something solid, it's good to know that a durable plastic like "Zytel" will resist the impact without breaking or cracking. I'm glad to see how tough these football helmet nose guards really are. I can certainly see why they'll take a lot of punishment in any league."

"Lucite" meets OPTICAL NEEDS



J. R. Ernsberger, De Foot representative, Indianapolis

•••Running lights with lenses of "Lucite" have aroused a lot of interest among sports dealers here. The superior optical qualities of "Lucite" provide increased visibility for boat lights just as they do for tail lights on cars. This also means safer boating, plus durability, factors that have been noticed by many sportsmen."

"Delrin" stimulates SPORTS INTEREST



P. M. Sears, Pfleuger Co., Akron, Ohio

•••We use "Delrin" for some of the vital parts in our new fishing reels—our designers want it that way—and so do many of our customers. I've found tremendous interest and enthusiasm from dealers who have seen these reels of "Delrin." They agree this new development will stimulate consumer interest in our reels."



Charts studied by Jack Longenecker depict biochemist's research on rate at which amino acids of various proteins are utilized by body.

More Body-Building Protein from Wheat

*A story about one Du Pont exploration
into the exciting field of human nutrition
—one that promises exceptional benefits
for Americans and all of mankind*

In a quiet Du Pont laboratory, a 29-year-old Texas-trained biochemist named Jack Longenecker records data that he hopes will provide a faster and more accurate way to measure the quality of protein in human diets.

Fifteen miles away, amid banks of complex instruments, microbiologist Louis Di Maio ponders analyses for amino acids, the building blocks of protein, charted by an electronic mechanism.

Just down the corridor, physical chemist Sharon Ehle devises new formulas for bread which will be baked in her gleaming experimental kitchen—then fed to laboratory animals to determine their value in promoting growth and health.

These Electrochemicals Department scientists are part of a Du Pont nutritional team in its 15th year of war with one of mankind's most pressing problems: protein deficiency, the number one nutritional problem in the world today.

The protein content of our food is important because from it the body builds the proteins that make up our living tissues—vital organs, muscle, skin, nails, hair, and red blood cells. Protein malnutrition—called “kwashiorkor”

in its acute form—is the result of inadequate quantity or *quality* of protein in the diet. All too visible in the technically underdeveloped nations of the earth, protein malnutrition produces stark symptoms and consequences—retarded growth, high child mortality, inferior adult size and strength, and low resistance to infections. In less severe forms, it is observed in every country in the world.

Improvement of protein supplies from the standpoint of quantity and quality is therefore a major objective of most national governments, as well as of the Food and Agriculture Organization of the United Nations. Strong efforts are being made, by introduction of modern agricultural practices to technically underdeveloped nations, to increase the production of high-quality protein sources such as meat, milk, eggs, and cheese, as well as some of the more concentrated vegetable proteins found in legumes and oil seeds.

Such efforts are necessarily long range in nature and are only a partial answer, for suitable pasture and crop land are limited. Accordingly, Du Pont scientists turned to another approach—the improvement of cereal grain foods to provide high-quality protein. This is a fitting role for

these essential foods, which have been the mainstay of human life throughout recorded history. Today as in the past, most humans depend on wheat, corn, rice and other grains as the largest part of their diet. Agricultural experts and food technologists tell us that, as the world's population continues to grow, we will be relying more and more on the versatile grain foods to supply much of the calories and protein we need.

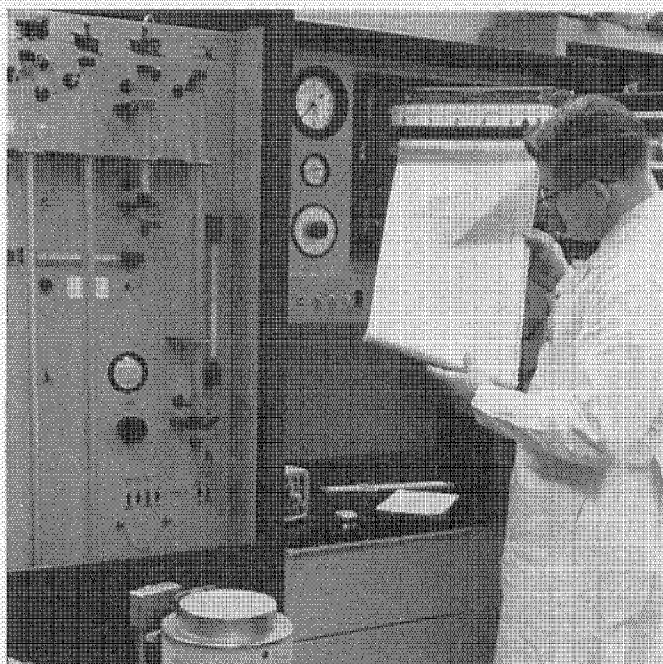
The pattern has already been set; as civilization has progressed, the cereal grain industries have developed endless variations and improvements in cereal foods by milling, baking, cooking, and toasting procedures. The variety of breads and breakfast cereals consumed by Americans today is an excellent example. Improvements in these products extend beyond taste and appearance to nutritional value, for by and large the cereal foods available to the American consumer today are more nutritious than those available a generation ago. One of the outstanding improvements—a major accomplishment in the never-ending efforts of nutritionists to improve man's diet—was the development in the 1940's of the enrichment of wheat flour and bread with vitamins, iron, and calcium.

With fresh evidence continually piling up on the critical importance of high-quality protein in the diet, the baking and cereal industries have been seeking ways to improve the contribution of their products to our protein nutrition. For foods made from wheat, which is the most important cereal grain in large areas of the world including the United States, this means increasing the amount of the essential amino acid L-lysine.

Sources of Proteins

Just as proteins build our body cells, amino acids build proteins. Some 20 of these amino acids are found in our body tissues and in food proteins. So important are these substances that the body actually manufactures many of them if they're short in the food consumed. Unfortunately, eight amino acids, designated "essential," cannot be produced by the body; they must be present in the diet. If only one of these essential amino acids is significantly short in a meal, many of the rest are converted to fat or burned as calorie-sources, rather than used for body building.

In 1945, during study of the reactions of a corn cob

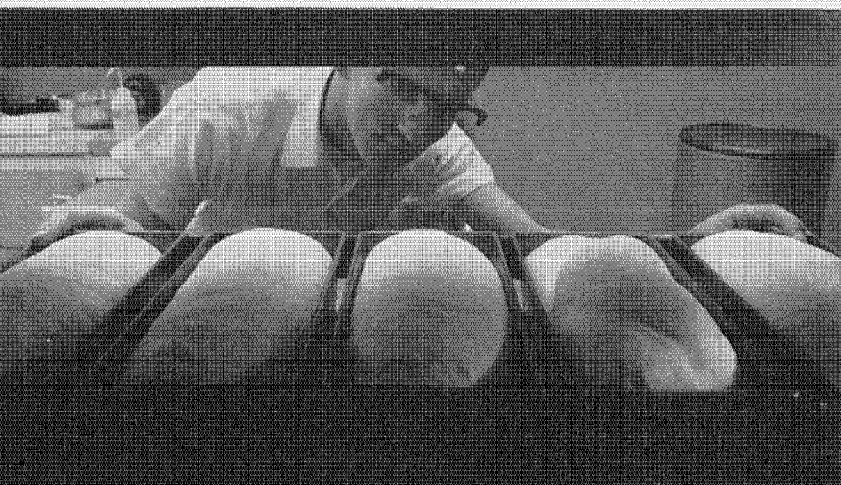


Modern research equipment, Amino Acid Analyzer, separates, measures mixtures of amino acids making up varied proteins.

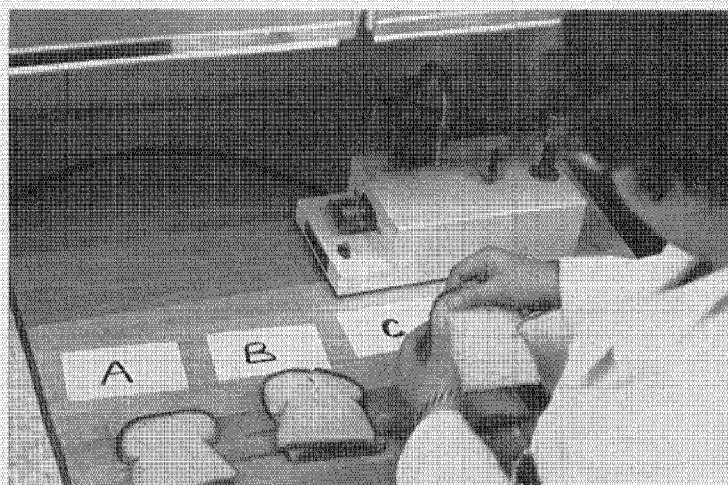
chemical by-product, furfural, Du Pont scientists made a breakthrough in this area: They successfully synthesized L-lysine, the essential amino acid in which wheat protein is deficient. So as the 1950's opened, Du Pont's Electrochemicals Department launched a full-scale scientific attack.

The process came early, and improvements over the years have seen L-lysine's cost halved and halved again. Just as important, Elchem men have added greatly to the store of nutrition knowledge. This has been accomplished by a major research effort not only within the Company, but also in substantial amino acid projects supported in outside institutions. As Dr. N. W. Flodin, development manager, summarizes, "Explorations have covered the fundamental aspects of amino acid metabolism, ranged over L-lysine's pharmacological properties, and determined what nutritional improvements can be engineered into specific wheat-based foods, such as bread."

Continued



New formulas for bread, designed to upgrade its protein quality, are tested by baking fortified loaves in Du Pont's experimental kitchen.



Testing aesthetics of three breads of different formulas, technologist checks such qualities as aroma, texture, grain.

Participating institutions have included such universities as Cornell, Pennsylvania, Rutgers, Tulane, U.C.L.A., Vanderbilt, and Cape Town (South Africa); as well as the Institute of Nutrition of Central America and Panama, Shuman Chemical Laboratories, Hazleton Laboratories and the Baking Research Foundation.

As the result of data turned up by such diverse research activities, most authorities agree it now is feasible to supplement much of the world's supply of cereal foods with L-lysine, converting these products to sources of high-quality protein. This step, together with increased use of legumes and seed proteins, says Dr. Henry Borsook, professor of biochemistry at California Institute of Technology, would "provide adequate nutrition for most of the world's people at a cost within their means."

Thus, by adding only one-quarter pound of Du Pont L-lysine to a hundred pounds of flour, wheat protein is converted to quality protein like that of meat, milk, or cheese. Such supplementation, Dr. Fredrick J. Stare of the Harvard School of Public Health declared recently, is "a realistic and practical approach to nutritional problems because it does not change the good taste, appearance, or characteristics of basic foods . . ."

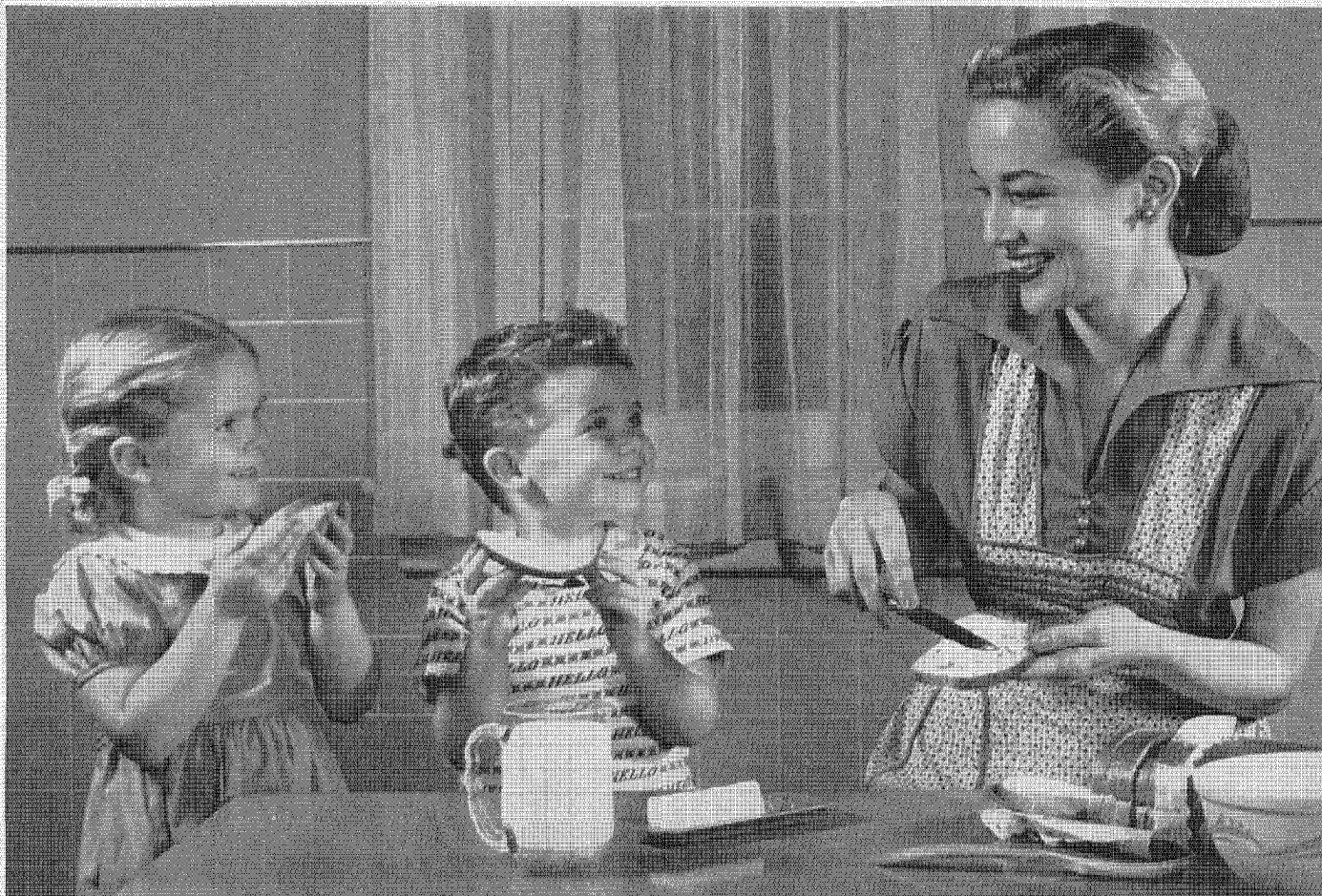
Protein Needed in U.S.

The nutritional importance of L-lysine supplementation is by no means limited to the technically underdeveloped areas of the globe. Even in the U. S., where there's plenty of high-quality animal proteins, dietary survey

data indicate that large numbers of Americans are getting less high-quality protein than they need for optimum well-being. Most children, for example, are best nourished during the first year or so of life, when they are fed almost by prescription. Thereafter, a decline in the child's growth rate profoundly affects his appetite. He develops strong likes and dislikes, and the mother's natural reaction is to give him almost anything he will eat. Because many animal protein foods are not sweet and must be chewed, the child often rejects them. Under these circumstances, he may fail to get enough high-quality protein to support good growth and muscle development, according to studies carried out at the State University of Iowa.

Similar dietary shortages are found in older children and adolescents. In a study of Iowa school children reported by Dr. James H. Hilton of Iowa State College, 40 per cent of the girls, and 31 per cent of the boys, had improper diets. And Dr. Adelia M. Beeuwkes of the University of Michigan has pointed out that fear of growing fat helps to make teen-age girls one of the worst-fed segments of the population. Studies of college coeds' diets have revealed similar findings of inadequate intake of high-quality protein.

Another key person the nutritionist worries about is the expectant mother. She must not only supply the protein to form the developing infant, but also needs more protein for the normal increase in her blood volume during pregnancy. Yet one study, conducted by Dr. Saul C. Werch, at Miami's Jackson Memorial Hospital, found in



Bread and cereal foods, important factors in dietary patterns of Americans of all ages, can now be converted to high-quality

protein like meat, milk or cheese by supplementation with Du Pont L-lysine, essential amino acid in which cereal grains are deficient.

a low-income group that not one patient was receiving the amount of protein (80 to 85 grams daily) recommended for pregnant women by the National Research Council. By the same token, a review of medical reports on nutritional therapy shows that ill or convalescent people frequently suffer from serious loss of tissue protein, thereby delaying recovery. At the precise moment when the body needs high-protein intake to repair damage to itself, the patient's illness often leads him to reject such foods as eggs, meat, and fish. Among the results are weight loss and slow healing of wounds, fractures, and infections. Bread and other cereal foods are generally well accepted by such patients, and when supplemented with L-lysine, can help to meet their urgent need for high-quality protein.

Other studies show that many elderly people eat little meat, milk, and eggs. Elderly persons who live alone may simply "not bother to cook much." The result is heavy dependence upon bread or easily prepared cereal foods.

Hazardous Custom—The Skipped Breakfast

Actually many nutritionists, surveying the nation's dietary habits, fear the protein nutrition problem is even broader. One hazardous national custom, they say, is skipping breakfast or eating only lightly at the start of the day, with subsequent dependence on a mid-morning snack. Breakfast should provide one-fourth to one-third of our daily protein requirements. Yet it's a meal at which many Americans omit the L-lysine-rich animal protein foods. Bread and cereal foods supplemented with L-lysine would go a long way toward improving this situation.

A second trend wrinkling nutritionists' brows is that toward low-calorie diets. With work becoming easier, obesity looms as a problem and diet fads multiply. Emphasis is placed upon cutting calories, but this often means low intakes of vital nutrients, including high-quality protein. "Man's need for protein, vitamins, and minerals does not decline significantly, if at all, when he consumes fewer calories," says Du Pont's Dr. Flodin. "Consequently, for good nutrition, it is important that a smaller food intake should be proportionately richer in these essential nutrients."

Where wheat is concerned, this nation of bread-eaters may consider the protein problem close to solution. Bread, as well as cereals, macaroni, and other wheat-based foods, can, through proper supplementation with L-lysine, offer all a new, economical source of nutritious body-building protein. The potential importance of this contribution is highlighted by the fact that these foods provide 20-50 per cent of the total protein in American diets, and in many individual meals, almost all the protein.

L-Lysine is now being used commercially in many specialty breads, baby foods, and pharmaceutical preparations. In addition, a petition is currently before the Food and Drug Administration to secure approval of this amino acid as an optional ingredient in standard white bread. Present cost to the baker is estimated as low as a penny a loaf, for which the protein of the bread will be raised to a nutritional quality comparable to that of milk, cheese, and meat.

These signs of success, after more than a decade's work, are highly gratifying to Du Pont nutrition scientists, one of whom confides: "The benefits are obvious if our efforts are successful. And what can push a man harder than knowing his work might lead to a healthier human race?"

**Important
groups where
many need
more
high-quality
protein**



CHILDREN, ages 1-10 years: 35 million



TEEN-AGE GROUP, 10-19 years: 29 million



THE ELDERLY (65 years and over): 15 million



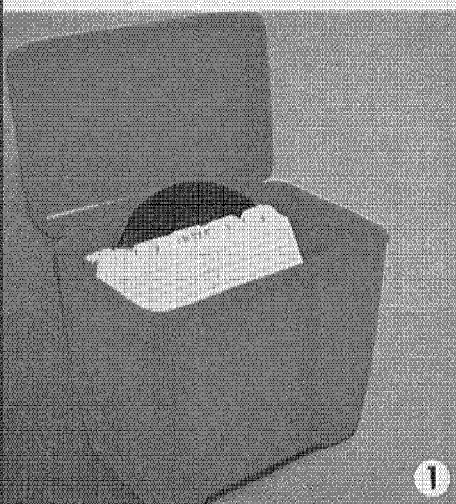
EXPECTANT MOTHERS: 4.5 million annually



CONVALESCENTS: 500,000 at a given moment

THE REDS YOU'RE

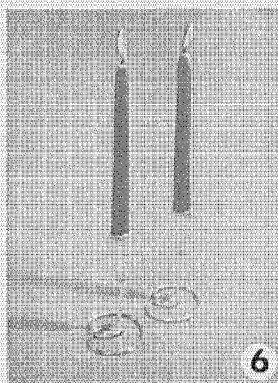
...in paints, plastics, printing



1

PREFERRED FOR PLEA
Quality...lasting Pro
You have fewer Road c
means money in your
fully equipped with

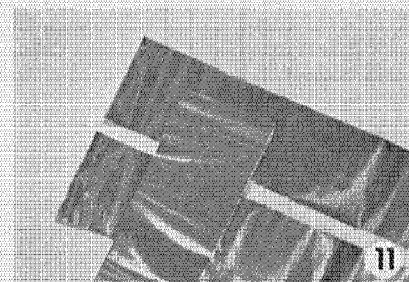
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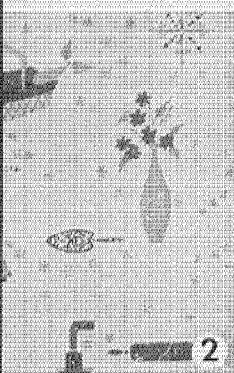
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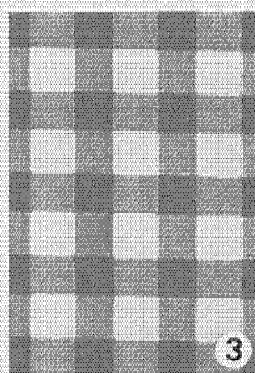
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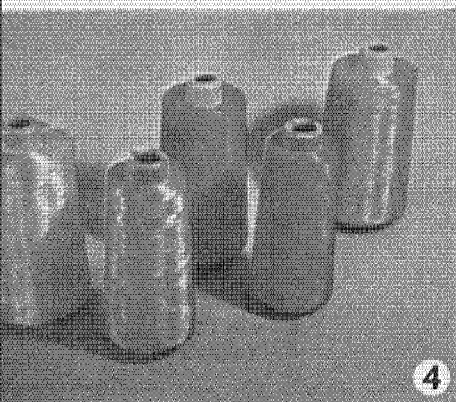
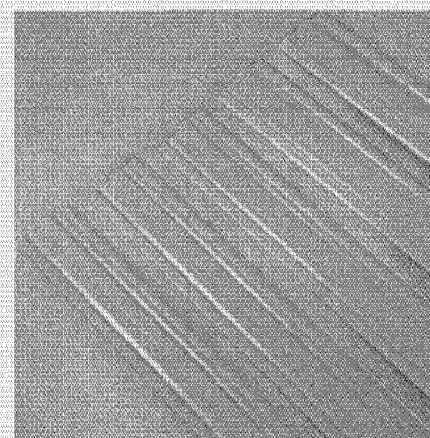
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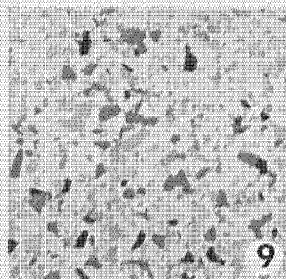
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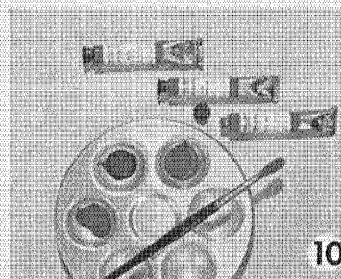
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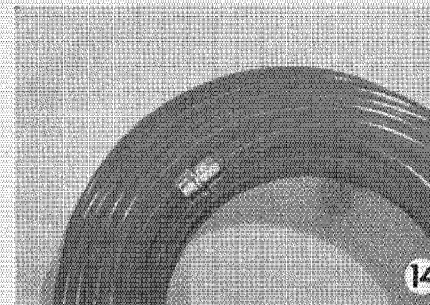
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9



10



14

- 1 Phonograph record case, Columbus Plastic Products Corp.
- 2 Fabric wall covering, Columbus Coated Fabrics Corp.
- 3 Vinyl-coated tablecloth, Columbus Coated Fabrics Corp.
- 4 Pigmented acetate fibers
- 5 Printed sign
- 6 Candles, Chatham Candle Co., Summit, N. J.

- 7 Plastic sign, Western-Pacific Supply Co., Houston
- 8 Oldsmobile, General Motors, Detroit
- 9 Linoleum, Armstrong Cork Co., Lancaster, Pa.
- 10 Artists' water colors, Permanent Pigments, Inc., Cincinnati
- 11 Printed metal foil
- 12 License plate, Louisiana

SEEING

d textiles...they have taken a new lease on life thanks to Du Pont "Monastral" pigments



- 13 Awning slats, Navaco Inc., Dallas
- 14 Vinyl garden hose, Swan Rubber Co., Bucyrus, Ohio
- 15 Valiant, Chrysler Corp., Detroit
- 16 Ford, Ford Motor Co., Detroit
- 17 Reinforced plastic boat, Reinell Boat Works, Marysville, Wash.

The products pictured here are eye catchers simply because they are red. But the notable thing about their colors isn't what meets the eye. It's the fact that these reds, unlike others, will keep their brilliant colors in the face of sun, storm, chemicals and heat.

Responsible are Du Pont "Monastral" red and violet pigments, which combine color fastness and intensity in a way red pigments never have before. A cross-section of products currently being colored with them is shown here. Since even a little of these pigments goes a long way toward producing durable colors, "Monastral" reds and violet are at their best in pastel shades—precisely the ones where fading has been a particular problem. They also can be blended with other pigments to improve color quality.

Automotive finishes currently take the biggest share of the "Monastral" reds. Among the 1960 cars they help color: Chrysler's Imperial (Dusk Mauve) and Valiant (Red); Ford's Falcon, Ford and Thunderbird (Monte Carlo Red); and General Motors' Buick (Titian Red metallic), Cadillac (Pompeian Red metallic), Oldsmobile (Garnet Mist metallic) and Pontiac (Coronado Red metallic).

Home uses include wall fabrics and floor coverings, with colors capable of withstanding repeated washings. Before too long, drapery and upholstery fabrics of pigmented fibers should be available.

Makers of plastic boats have been calling for durable pink and flame colors, reports Howard E. McCurdy, technical director of Rudd Paint & Varnish Company, Seattle, which supplies polyester resins to this booming industry. "Until Du Pont developed the 'Monastral' reds, there was no red pigment that could qualify as lightfast in tints, resistant to alkali, heat and salt water, and unaffected by promoters and catalysts used in polyester systems," he says.

Louisiana automobile license plates are painted purple and gold this year, the colors of Louisiana State University, which is celebrating its centennial. Mobile Paint Manufacturing Co. used "Monastral" violet as the principal color pigment in a formulation that combined good performance with moderate cost.

Outdoor signs of many types—painted, molded plastic and printed—are logical spots for the new reds. Inks formulated with them will overcome the unsatisfactory performance of conventional inks on billboards, Pigments Dept. research men say. Du Pont technical men also are working with inkmakers in formulating new and better printing inks. Especially promising are those for printed metal foils, which are fast gaining favor as packaging materials.

M. Grumbacher, Inc., New York City, and Permanent Pigments, Inc., Cincinnati, have adopted the new pigments for their artists' colors. "To live up to our name, we must be extremely careful to have only the most reliable lightfast colors," Henry W. Levison, president of Permanent Pigments, says. "We chose the 'Monastral' pigments after tests at 100 to 1 dilution gave phenomenally good results."

Oddly enough, a white refrigerator might legitimately be included in this pictured line-up of products. "Monastral" violet is proving to be excellent at "toning"—making white paints look even whiter than they are. It is considerably more economical to use than conventional mineral violet.

In addition to learning more about the working properties of these pigments since announcing them two years ago, Pigments Dept. research men have broadened the line. It now includes water-dispersed colors and extended lakes, the latter aimed primarily at the floor-covering industry. As color-conscious manufacturers translate technical data into their own product language, it can be expected that consumers will be seeing red—and purple—in still more royal measure.



Informal research discussion in front of photo mural finds technical men at Petroleum Laboratory discussing engine characteristics of a gasoline under development for cars of tomorrow. Laboratory and road tests in engines yield essential research data.

PEOPLE your gasoline should know

Assembled in a conference room of a New Jersey research laboratory once or twice a month are a dozen or more engineers and chemists. On their minds are the quality and performance of one of the 20th Century's most familiar products: gasoline. Gasoline for the engines of some 70 million cars and trucks, and gasoline to suit the driving habits and needs of perhaps 85 million U.S. motorists.

These men neither make nor sell a gallon of gasoline. Yet their experience and judgment, based on past and present laboratory research, contribute in a real way to the driving satisfaction you will have this year, next year and the years ahead. For these men are experts in the extraordinarily complex problems involved in engine-fuel relationships. And the results of their studies and experience can be and are being applied by the oil industry to practical problems in designing a fuel to meet the needs of motorists—even as far away as 1965.

First step in thinking about a 1965 gasoline is to forecast the major characteristics of the auto engine for that year. What design changes will occur? How many engines in 1965 will have these changes? What will be the effect on fuel properties?

To find the answers here, extensive (and expensive) test programs are needed. Two or more years of laboratory time and months of road tests may be involved in a single

phase of a problem. With 20 different hydrocarbon streams available in many of today's oil refineries, and at least 50 different additives which can be used in a gasoline, the possible combinations are extraordinarily large.

This is where petroleum experience in depth is so valuable. It focuses research attention on those blends of fuel components likely to be most practical in future refineries and best adapted to meeting requirements of tomorrow's cars. By 1965 new engine designs, new refining processes, customer desires in auxiliary properties, and other unknown factors will be involved. And the gasoline that will be used (175 million gallons of it every day perhaps) will be a different product.

Designing a premium-grade gasoline for the future starts with the assumption that, to meet the needs of most motorists in any given year, a gasoline must have a definite octane number. This number can be predicted (and it is by Du Pont men) within reasonable limits. For today's premium gasolines it averages 99.3; for the same high level of performance in 1965 it is expected that an octane number of about 103.5 will prevent knock in most cars requiring premium gasoline. Technical people at the Petroleum Laboratory make such estimates after studying the trends in compression ratios (the average for 1960 cars is 9.0; in 1965 it is expected to be 10.2) and relating these ratios to

Blackboard sketches trace range of elements in a gasoline research conference

other engine characteristics which affect octane requirements. They also consider expected changes in the way refineries are run.

From this point gasoline designing branches out in half a dozen different directions, all of which comprise special fields of knowledge. Problems of surface ignition of fuels, of volatility and stability, of antistall characteristics, of carburetor cleanliness, antirust qualities—all these and more enter the picture. Additives made by Petroleum Chemicals Division help overcome these problems. Always at hand is the question of how many miles per gallon a gasoline will yield the average motorist in his car.

Rich Experience, Wide Knowledge

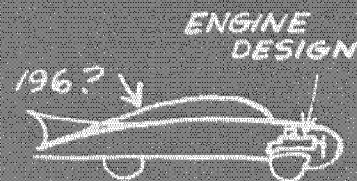
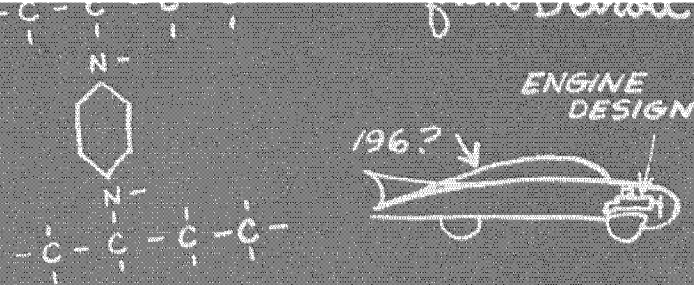
The people who face these problems in the laboratory of the Petroleum Chemicals Division (and have been handling similar ones for years) bring to their task a rich experience and wide knowledge of oil refining and gasoline blending, as well as a first-hand development background on chemical additives used in gasoline. Of the technical men who work in Du Pont's Petroleum Laboratory, about half are engineers and the other half are chemists, many of whom hold advanced degrees. The engineers have chemical, mechanical, electronic or other specialties. The chemists, similarly, have a diverse background in formal education and training. Altogether, graduates of more than 40 colleges and universities are represented on the staff.

The typical Du Pont engineer or chemist in this field has six to twenty years of direct study in this laboratory, piled on top of his formal education and any prior experience in the oil industry. For practical experience in the oil industry represents another important factor in the background of the technical people at this Du Pont laboratory. In almost any group of five or six technical men there will be years of outside experience in the production, development or use of gasolines, fuel oils and lubricants.

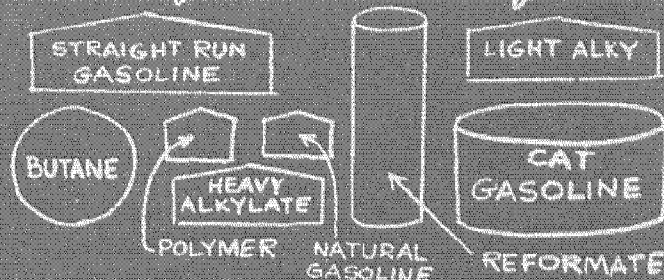
While gasoline now being pumped into your car may look or smell the same as it did last year or five years ago, people who have been carrying on fuel research know how different it really is. New additives contribute new properties: spark plug antifouling, antistall, antirust, anti-rumble and others. The people in this laboratory must foresee problems and seek solutions before they affect millions of motorists. And so their fuel additive studies and the line of Du Pont petroleum additives that have evolved from these studies comprise another valuable component in building a gasoline for 1960—and for 1965, as well. This is particularly true since this Petroleum Laboratory handles a unique spectrum of technical work: research, product development, product evaluation and technical service.

So it is that the people your gasoline should know are a group of highly trained scientists and research men in Du Pont who work to improve the quality and performance of petroleum products. They know gasolines and cars. Their work and their findings are flowing to oil men everywhere—men in refineries, research men in laboratories, management men in oil company main offices. Your car and your gasoline, bought at the neighborhood service station, will know them, too.

Continued



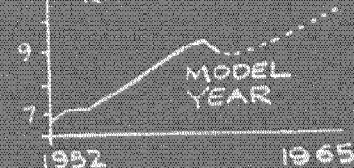
Gasoline Blending



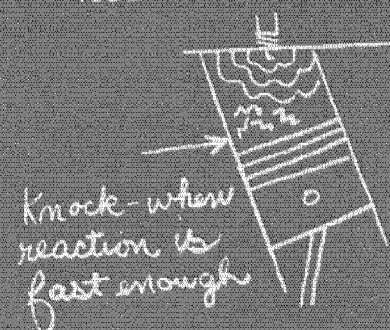
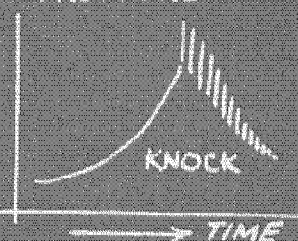
$$\frac{T_2}{T_1} = \left(\frac{P_2}{P_1} \right)^{\frac{n-1}{n}}$$



Forecast

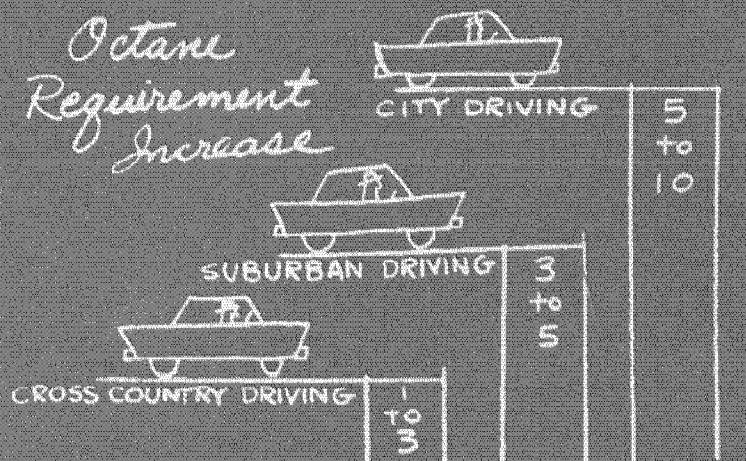


CYLINDER PRESSURE



$$\text{ROAD OCTANE} = A(\text{Research}) + B(\text{Motor}) + C$$

Octane Requirement Increase



DRIVING CONDITIONS AFFECT OCTANE DEMAND

Engine Noises Studied by Petroleum Men

Engine Knock—This is the sharp, rattling noise you hear when you push the accelerator down to get away from a traffic light or to pass on the open road. If this happens when the throttle is pushed to the floor the noise is called full-throttle knock; if it is heard when the throttle is only part way down it is called part-throttle knock. Although the distinction doesn't mean much to a motorist, it does to the fuel expert because fuels of different composition behave differently under the two conditions. Knock occurs most commonly when the engine is poorly adjusted, but also occurs when the fuel

is not properly matched to the automobile engine.

Surface Ignition—All engines are designed for controlled ignition of the flame by a spark plug at a predetermined point in the engine cycle. Whenever the flame is started at some other time by ignition from hot surfaces, the combustion is no longer controlled within design limits and various noises can result. This type of ignition is called surface ignition.

Wild Ping is one of the noises associated with early surface ignition. Since only one or two separate noises are usu-

Petroleum Technical Men Have Blend of Knowledge and Experience



WILLIAM T. ROBINSON

William T. Robinson, who took his bachelor's degree in chemistry at St. Vincent College, started working in the petroleum field with the Texas Company in 1943. Following service with the U.S. Navy, he joined Universal Oil Products and spent seven years as a technical service man on gasoline additives, working with refineries in the U.S., Central and South America and Canada. With Du Pont since 1952, Robinson has handled a variety of technical and sales assignments, including the application of antioxidants to gasoline sweetening and the utilization of additives in fuel oils. He is active in petroleum, engineering and chemical groups. Recently he visited seven European countries to assist Du Pont representatives and to become more familiar with current European trends and problems in oil refining. This spring, after extensive experience in the Petroleum Laboratory, he was appointed technical assistant on new product development working in Wilmington with the technical manager of the Petroleum Chemicals Division.



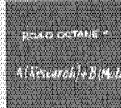
DANIEL L. PASTELL

Daniel L. Pastell, who holds a bachelor's and master's degree in chemical engineering and a bachelor's in electrical engineering, came to Du Pont direct from the University of Washington in 1947. His first two-year project in Du Pont's newly formed Petroleum Laboratory wound up with an unusual technical paper, "Precombustion Reactions in a Motored Engine." For this work he received the 1950 Horning Memorial Award from the Society of Automotive Engineers, the first of three such awards to be made to Du Pont men at the Petroleum Laboratory. The paper was a landmark in combustion research and indicated what could be done via basic studies to develop new knowledge about the utilization of oil industry products. Like many associates, Pastell spends a fair amount of time away from the Laboratory. He travels 20,000 miles a year, participating in industry meetings and on industry committees. Now in charge of the engineering division of the Laboratory, Pastell helps make basic recommendations to refiners for the best fuel for your car.



WILLIAM E. MORRIS

William E. Morris, a chemical engineer from the University of Missouri, came to Du Pont in 1950, following seven years with the Standard Oil Development Co. Much of his time has been spent on a wide range of studies of gasoline performance in engines. Examples of his projects are: aviation gasoline, vapor lock characteristics and gasoline preignition tendency. Since 1950 Morris has coordinated Du Pont's periodic road octane surveys which involve octane number tests in the latest model cars sold in 15 marketing areas from coast to coast. He supervises a 20-car fleet and is constantly considering factors that indicate the need for changes in gasoline composition. For the oil industry he served as member of a group that estimated yearly octane requirements for new American cars through the detailed study of individual cars. Currently he is carrying out evaluation studies for possible new fuel additives. Among his recent technical papers is "Combustion Qualities of Future Gasolines," written with colleague Kent H.



heard, it is usually assumed that the hot surface responsible is a loose flake of deposit which goes out of the combustion chamber with the exhaust gases.

Rumble is another surface ignition noise. It sounds like a loose bearing and usually occurs at speeds above 50 mph during an acceleration. It is believed to be due to surface ignition occurring simultaneously at several or many different points in the combustion chamber. When this happens combustion is very rapid, and creates pressure above design levels. Under

this condition engine parts, usually the crankshaft, vibrate, causing the noise.

Run-on is another surface ignition phenomenon in which the car continues to run after the key is turned off. Usually only a few cylinders are firing, the engine runs very roughly and sometimes with sharp noises. Hot surfaces are igniting the fuel mixture, even though spark ignition has been shut off, and since these ignitions are untimed the resulting operation is very irregular.

With Fuels



DONALD R. DIGGS

Donald R. Diggs, who holds three degrees in mechanical engineering from Northwestern (B.S., M.S., Ph.D.), spent two years in research with the National Advisory Committee for Aeronautics, taught thermodynamics, heat engines and other engineering courses at Northwestern, and started at the Petroleum Laboratory with Du Pont in 1950. Assigned as a junior engineer to the combustion research group, Diggs studied problems such as flame speeds, chemistry of knock and others for three years, became a group supervisor and later spent 18 months on automotive liaison work with Detroit. Now in charge of the Laboratory's combustion division, he is principally concerned with the way fuels burn in the reciprocating engine. His experience covers studies on the burning rates of fuels, combustion chamber deposit modifiers, alternate anti-knocks, and surface ignition. Looking ahead, he says, "No one can predict exactly what the power plant of a 1975 car will be like. While we can't expect sudden change, it's our job to help refineries meet new needs."



HAROLD J. SCHEULE

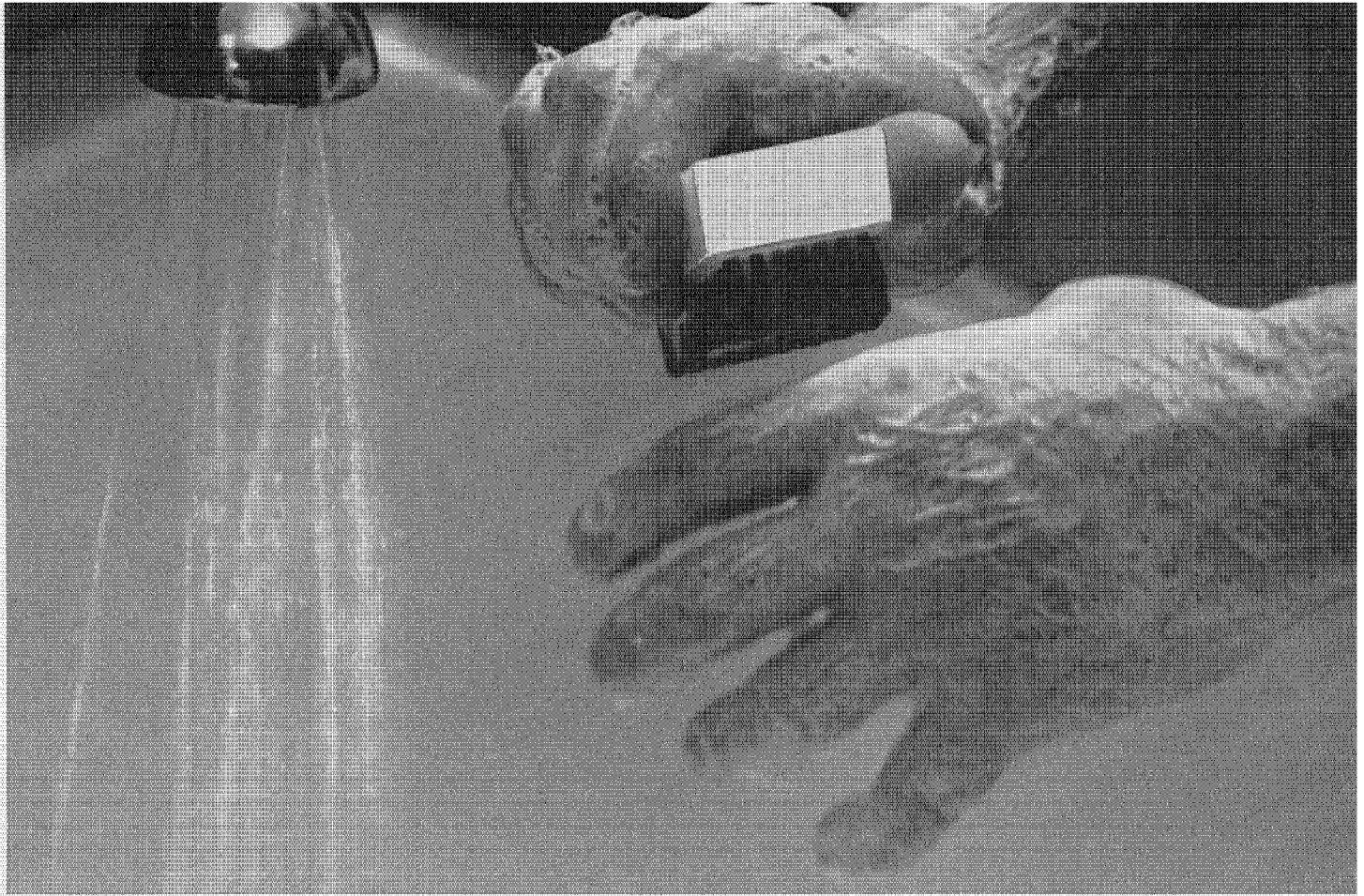
Harold J. Scheule, a chemical engineer from Bucknell, joined Du Pont in 1946 after three years in process design and fuel research with the Phillips Petroleum Co. Working in research at the Petroleum Laboratory since its early years, he has been engaged in studies on gasoline stability and carburetor icing. An unstable gasoline forms varnish that interferes with carburetor and valve operation; ice forms in carburetors from condensed moisture on cold, wet mornings. Scheule's studies have been aimed at helping the oil industry overcome these problems with alternate blends of refinery components, plus gasoline additives such as antioxidants, metal deactivators and anti-icing compounds. Additives like these are used in minute quantities (a few cups per tank truck). Accordingly, a high degree of technical competence and experience from years in the petroleum industry are critical, so a man like Scheule can make proper recommendations. Today, as a consultant, he backs up service of regional technical managers through frequent refinery visits.



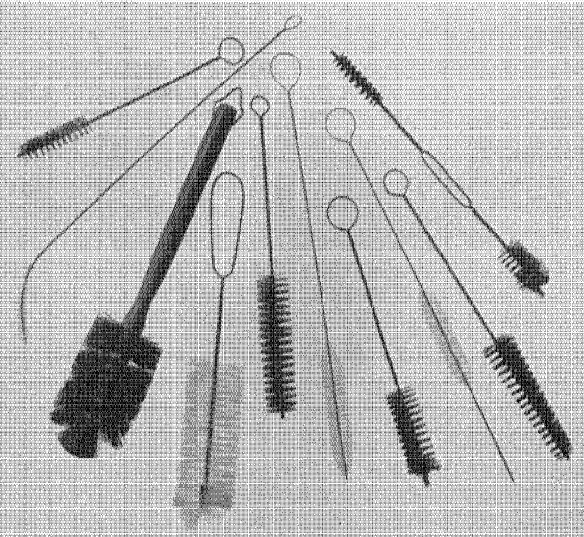
PAUL H. RICHARD

Paul H. Richard, a mechanical engineer from Penn State, spent five years in research on fuels and lubricants for the National Advisory Committee for Aeronautics. Later with Lima-Hamilton he handled studies on railroad diesel engines and free piston machinery, then he joined Du Pont in 1949 as an automotive technologist. In 1955 he became the Petroleum Chemicals Division's Detroit representative, handling liaison with the automotive industry. On this assignment he has been concerned with engines and cars on the drawing boards for tomorrow, so coming trends and new knowledge important to the Laboratory will be available to the petroleum industry. Richard is one of Du Pont's best-known mechanical engineers among professional groups. He has spoken to as many as 25 of these groups annually on what Detroit is considering in the years ahead, from an engineering viewpoint. He has recently returned to the Petroleum Laboratory and will continue these activities as head of the automotive division, working on mechanical problems related to fuels.





Surgical scrub occurs 60 times a day in average hospital. Special brushes for oxygen masks and other equipment are also used in surgery. Typical surgical scrub brush with "Tynex" yields months of service under severe conditions.



Laboratory brushes, in wide variety, are needed for cleaning of lab glassware.

Brushes with "Tynex" Scrub

When the surgeon and his assistants scrub for an operation on TV or in the movies, it's high drama; but in real life it's part of the everyday routine.

In a 100-bed hospital there is an average of 12 operations a day, and about five people must scrub for up to 20 minutes apiece to prepare for each of these operations. And so this hospital needs an inventory of about 200 surgical scrub brushes to handle just one area of its daily routine. While some brushes are being sterilized in the autoclave, others are on hand for immediate use.

Hospitals expect each scrub brush to stand autoclaving at least 300 times without softening or loss of filaments. With these requirements it's no surprise that brushes filled with "Tynex" nylon filament are

turning up in more and more hospitals these days. For brushes with "Tynex" can be sterilized repeatedly, and still stay stiff and lively.

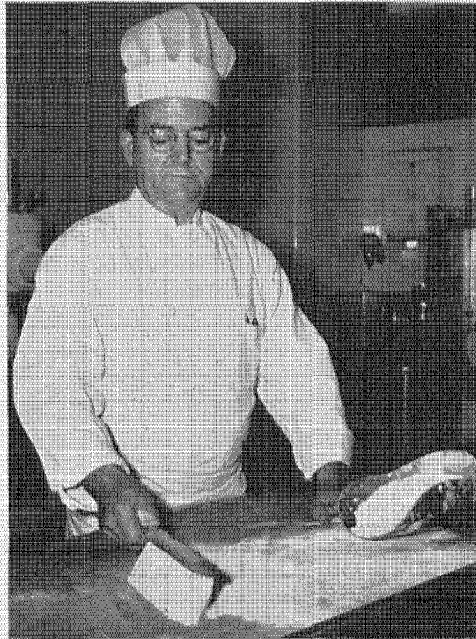
In surgical areas, labs, kitchens, rooms and hallways—in fact all over the nation's hospitals—brushes with "Tynex" are helping maintain high standards of cleanliness. These brushes dry quickly, and therefore don't encourage bacteria growth. They resist most chemicals. They have excellent abrasion-resistance, and last longer than most other brushes. Collectively the 12,000 hospitals and sanitariums in the United States, employing one of every 44 working people, probably use a larger variety of brushes than most other industries. All told, there are well over 5 million brushes in service in U. S. hospitals.

Housekeeping and maintenance needs of hospital include use of rotary brushes, sweeps, paintbrushes, and toilet brushes. A rotary floor brush with "Tynex" will last up to twelve times as long as one with another filling material.

Patients keep tidy with both tooth- and hair-brushes. Most hospitals stock these for patients who didn't have time to pack their own.



Kitchen uses special brushes for food preparation and clean up. "Tynex" is easily cleaned and it will stay springy even in hot water.



Hospitals Clean

The housekeeping and engineering departments of hospitals rely on brushes with "Tynex"—rotary floor brushes, sweeps, paintbrushes, toilet brushes. An executive housekeeper of an East Coast hospital says: "We have two rotary floor brushes—one bought two years ago the other three years ago—and each is as good as the day we bought it. One of them we've used six days a week cleaning the operating room floors, and water has never softened it. Any other kind of brush would get so soggy that we'd have to change to another half way through the day's cleaning in the operating rooms. We notice, too, that a rotary brush with 'Tynex' is much faster in removing floor wax."

Hospital laboratories rely on a variety of brushes with "Tynex" for cleaning lab glassware from test tubes

to beakers. Hospital kitchens use brushes filled with "Tynex" in preparing food and cleaning up afterwards. In their rooms, patients depend on tooth- and hairbrushes of Du Pont nylon for personal tidiness.

Brushes with "Tynex" nylon filament are used in cleaning bedside water pitchers to help prevent the spread of infection from patient to patient.

And in other areas, bed pans and urinals are scrubbed, too, with special brushes with "Tynex".

Says a nurse in charge of service facilities at one hospital: "The brush with 'Tynex' that we use to clean water pitchers is so springy! The brushes we once used would flatten, and then we'd have bent bristles on one side and just wire on the other. But these brushes with 'Tynex' have bounce."



Nursing service is responsible for clean water pitchers. Scrubbing prevents spread of infection among patients. Brushes with "Tynex" dry fast, avert bacteria build-up.

The Ancient Metal with the Modern Look

Du Pont explosives help

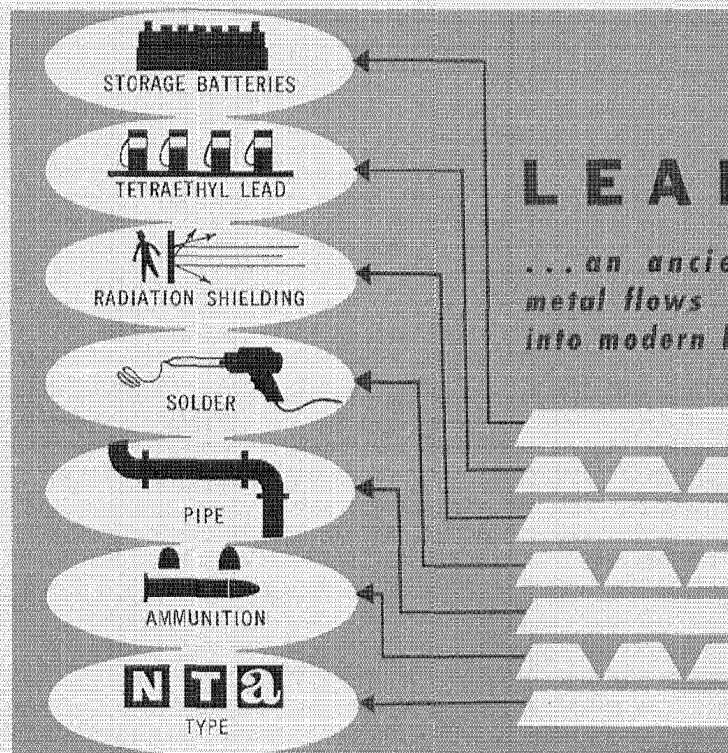
The Bunker Hill Company bring up lead to fill some atom-age jobs

by R. H. LARSON, *Technical Representative*,
with William J. Brooks

Two thousand years ago the Romans drank water that came to them through lead pipe, the Chinese spent lead money, and Indian women prettied up by putting red lead on their faces. Now the ancient metal fills man's modern needs in fields from atomic energy through air transportation. Start your car, turn on TV, or read a newspaper—and tip your hat to the lead miner.

Last year American miners brought a quarter million tons of lead above ground. Imported lead and secondary (reclaimed) lead found its way to American markets; and so a total of some 1 million tons was consumed. A third of that went into storage batteries, principally to supply portable electric power for automobiles and submarines, trucks and diesel engines, buses and airplanes, outboards and luxury liners. Some 150,000 tons went into the production of tetraethyl lead to help insure the knock-free performance of countless car engines. The remainder filled scores of other modern needs: solder for the connections on complex electronic circuits, shielding to protect medical and atomic technicians from hazardous radiation, ammunition for the sportsman's rifle or shotgun, type metal to make possible the wide dissemination of ideas in print.

Twenty-four of the United States are lead producers. Three states—Missouri, Idaho and Utah—account for 63 per cent of the nation's output. Sixteen per cent comes from a single mine, the Bunker Hill mine, located in the



Ore is on its way to modern uses when the ore train breaks into daylight

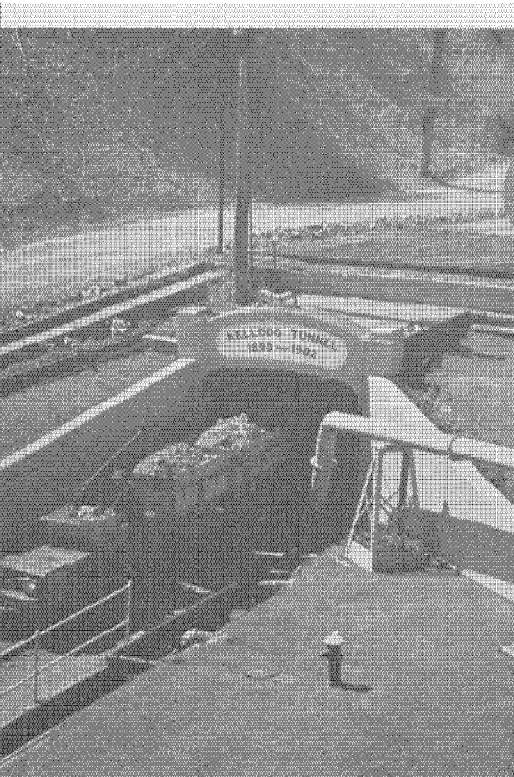
rich Coeur d'Alene Mining District near Kellogg, Idaho.

In the past 75 years the Bunker Hill mine has yielded some 25 million tons of high-grade lead-silver-zinc ores, worth an estimated three-quarters of a billion dollars at today's prices. This treasure, so legend has it, was discovered by a burro. As the story goes, Noah S. Kellogg, a gold prospector, was searching the hills of the Coeur d'Alene area when his animal bolted at night and wandered across a creek and up a hill. Kellogg is quoted as saying he found the burro "standing upon a great outcropping of mineralized vein matter and looking in apparent amazement at the marvelous ore shoot across the canyon."

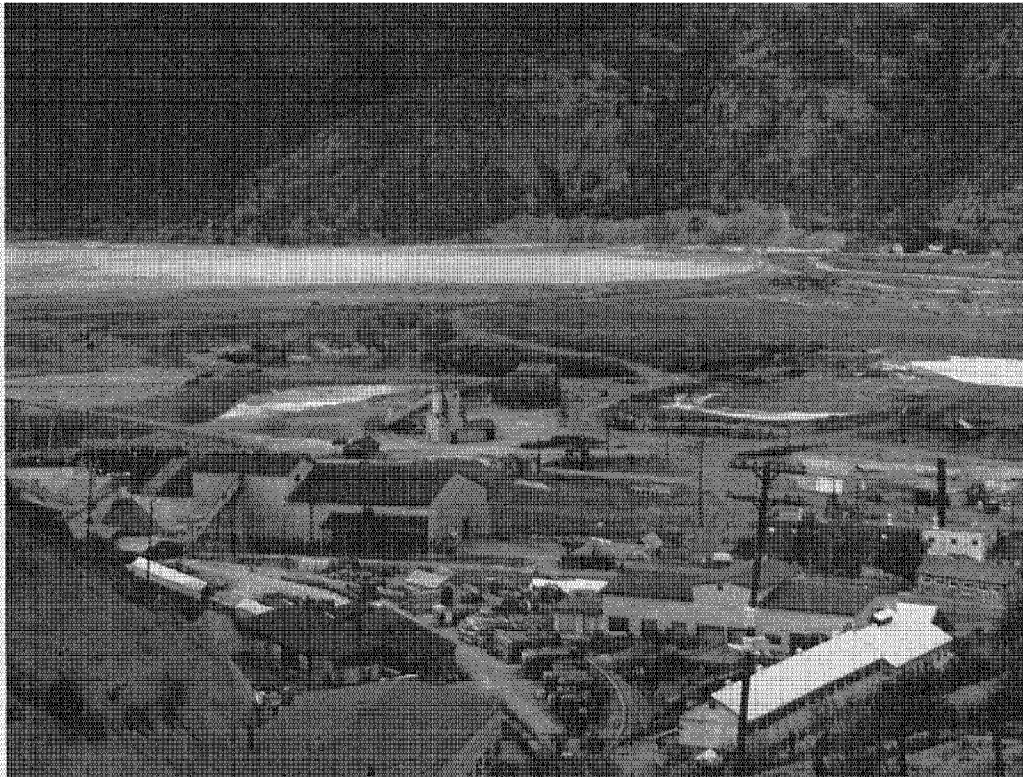
Today the Bunker Hill mine is a maze of more than



Every mining town has its legend. In Kellogg they say this 1890 photograph shows the burro that discovered the Bunker Hill mine.



mouth of the Bunker Hill mine's Kellogg Tunnel.



Bunker Hill mine sits in the heart of Idaho's mountainous Coeur d'Alene Mining District.

100 miles of tunnels, crosscuts, and drifts. Because the mine is located in a mountainous area, the miners find themselves working underground at anywhere from 3,600 feet above to 1,350 feet below sea level. When the Bunker Hill mine was discovered in 1885, only muscle and black powder were on hand to get at the ore body; dynamite was a new product just coming into use. Today when Bunker Hill men drive a tunnel or sink a shaft they may have at hand either Du Pont "Gelex" 2 or Du Pont Special Gelatin 60%. From the shafts, the miners cut drifts to the ore veins that extend through the rocky heart of the mountain.

Progress 7½ Feet at a Time

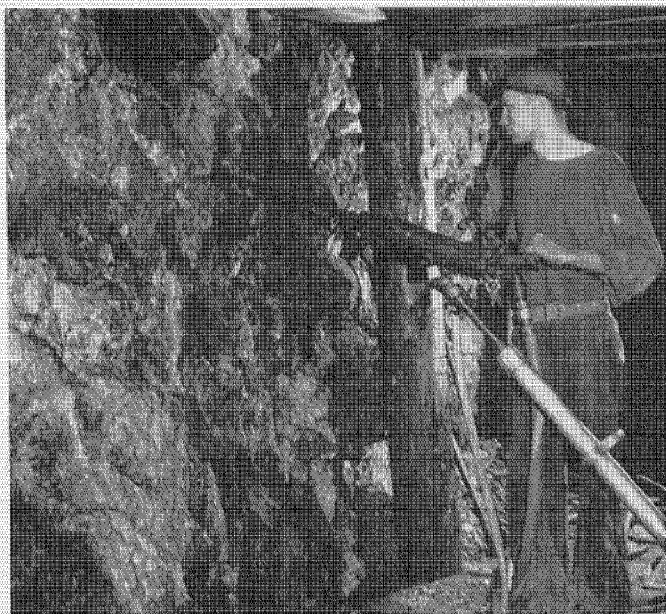
It takes 30 to 40 drill holes, loaded with "Gelex" 2 in 1½ by 8 inch cartridges, to break rock for an advance of 7½ feet along a drift of 9½ feet by 8½ feet cross section. The individual charges are detonated with caps and fuse or electric blasting caps, depending on conditions. Stopes leading from the drifts are cut and the ore in them is taken out by the cut-and-fill method.

In working a stope, crews drill holes in the ore body above them; load and tamp charges; and then set off the charges at shift end. The broken ore falls to the floor of the stope. Later, men using powered drags and scrapers muck (move) the broken ore and drop it into a storage chute. The space excavated is then timbered. But as the roof of the stope goes higher and higher—as more of the ore body is cut away—not even sturdy timber can hold back the crushing weight above. So, as the stope progresses, waste rock is hauled in as fill. The crew stands on this waste rock as they bite further into the ore body.

Timbers are buried as the stope is filled. In a single year more than 7,500,000 board-feet of timber goes into

the mine never to come out again; that's enough lumber to build 1,200 four-room frame houses. To keep the timber coming, The Bunker Hill Company has had to set up its own sawmill.

The timber is left behind, but it has helped loosen nature's hold on one of her treasures. When the ore train breaks into daylight, it brings an ancient metal vital to modern needs.



To prepare for advance of just 7½ feet, charges are tamped into 30 to 40 bore holes made with help of a compressed-air drill.

How to Put a New Face on Your Home Town

*Here's how East Orange, N. J., has done it.
The city's Clean Up—Paint Up—Fix Up
campaign has earned it national recognition*

You're in East Orange, N. J., and drop a piece of paper on the sidewalk. A voice behind you says: "Oh, oh—would you mind going back and picking that up." Then comes the shock: you turn around and discover a waste basket has been talking to you.

You see, you've hit town in the middle of the kick-off of the Clean Up—Paint Up—Fix Up Campaign held annually in East Orange and 6,000 other communities coast to coast. Look around and you'll discover the waste basket's voice comes from a hidden microphone a few feet away. The voice behind the mike is probably that of Bill Reimer, East Orange's City Engineer, or Tom Cervasio, supervisor of refuse collection.

On high enthusiasm and a low budget, Reimer and Cervasio, with the full support of Mayor James W. Kelly, Jr., have sparked a program for a brighter and healthier city that last year won East Orange first prize in its population category in the National Cleanest Town Contest. The contest is sponsored by the non-profit National Clean Up—Paint Up—Fix Up Bureau, Washington, D. C.

Widespread Participation

A solid portion of East Orange's 87,000 people participate in the annual program. In 1959 more than

12,000 reports of Clean Up—Paint Up—Fix Up activities around homes, stores, schools, and industrial plants were turned in during the city's special week. Exteriors of 2,207 homes were painted; so were 4,003 rooms inside them. People cleaned out their yards, basements, attics, closets. They fixed up their fences, porches, steps, roofs.

To encourage this kind of activity, the City of East Orange differentiates clearly between maintenance and improvements when it comes to tax assessments. Says Mayor Kelly: "People in the past were afraid to fix their houses for fear of an increase in property tax assessment. But now we're making it clear to the people that when you put on a new roof it is considered as 'maintaining value,' not 'improving'."

For the success of its Clean Up—Paint Up—Fix Up Campaign East Orange leans heavily on the support of its service clubs, churches, schools, merchants, Chamber of Commerce and local newspapers. Promotion material, obtained from the Clean Up—Paint Up—Fix Up Bureau, is placed in store windows and public buildings. The newspapers, especially the East Orange Record, give the campaign continuous coverage. And any time a group can be gathered, the city

arranges a showing of a slide film that provides a step-by-step study of home deterioration—from front curb to rooftop.

Kids Set the Pace

Throughout the campaign, kids set the tempo. Paint stores compete with soda parlors for juvenile trade as youngsters set out to gain recognition for Clean Up—Paint Up—Fix Up projects they complete at home.

Scouts canvass their neighborhoods asking people to take part in the city's program. At school the kids make every effort to keep their schools and school neighborhoods clean throughout the year. Mayor Kelly awards trophies to the schools with the best clean-up programs. Special classroom projects find youths turning out prose and poetry on the merits of cleanliness. This sample from a poem about the pre-clean-up troubles of a dog named Rusty (by a heavy-thinking seventh grader):

*Now in this labyrinth of trash
Rusty spent his days;
With perked-up ears and quivering nose
He traversed through this maze.*

Several stanzas later, the Mayor proclaims the Clean Up—Paint Up—Fix Up Campaign. And so there's a happy ending to the story for Rusty and for East Orange, New Jersey.



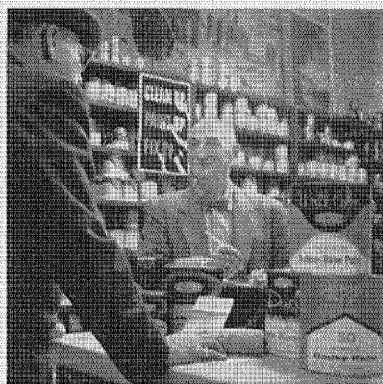
Planning program, Tom Geisler, of East Orange High, and mittee members show cartoons to Mayor. Geisler wrote Charles Schulz, creator of "Peanuts" comic strip; got posters, including one of the popular "Pig-Pen," who always plays in a pig



Before clean-up spurred by East Orange's city-wide campaign, even "Pig-Pen" of Schulz's "Peanuts" cartoon might not have played here.



After clean-up, the backyard is a garden spot—a good place for anybody's kids to play. (Friend "Pig-Pen," though, might avoid it.)



Merchants help by posting promotion material for the campaign. Du Pont paint dealer, S. M. Kleinman, helps customer get ready for a paint-up project.

Catching litterbugs: The town's bound to step on litterbugs after boys paint at each intersection.



Promoting the program: These two girl scouts canvassed their street to drum up enthusiasm for Clean Up—Paint Up—Fix Up. They got results, and they posed for picture to prove it.



WHAT'S

New Product Line...

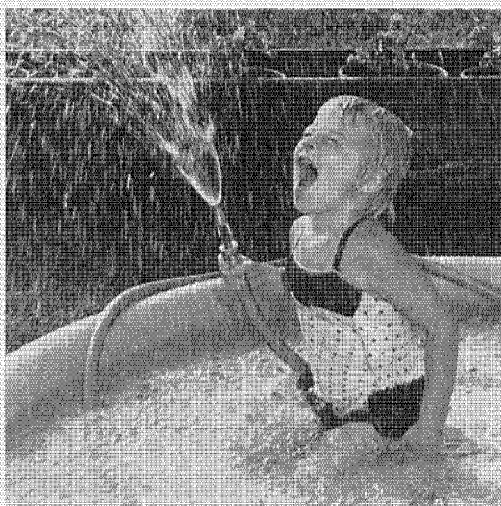
The "7" Seas line, a new line of Du Pont marine products, is being introduced to yachtsmen in boat yards, marinas and marine stores this spring. Hundreds of thousands of boating enthusiasts will see this new line on display in the next few months. It includes products that will improve performance of engines (outboards and inboards) and products to make it easier to keep boats looking ship-shape. Chemical products in the "7" Seas line and new marine sponges are seen at left. Initial introduction of these marine products in 17 states on the Eastern Seaboard and on the West Coast is taking place this spring; nationwide distribution will follow.



New Product Applications...

A new lightweight flannel for baseball uniforms has been adopted by four major league clubs: the Giants, Yankees, Red Sox and Senators. The new fabric, made of "Orlon" acrylic fiber and wool, is more durable than the conventional all-woolen flannel; also it is more practical from cleaning viewpoint. The Dodge Davis Co. of Hartford, Vt., worked on development of this new flannel for two years prior to its recent introduction.

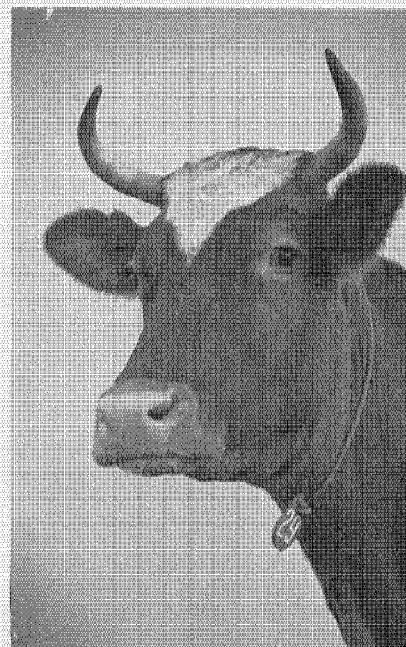
Beach and pool pad introduced by Dayton Rubber Co., Dayton, Ohio, can be used afloat or ashore. Made of $\frac{3}{4}$ " resilient urethane foam, the pad is covered with candy-striped waterproof fabric. It weighs only 2½ pounds, yet measures 72" by 25". Du Pont "Hylene" organic isocyanates are used in making the urethane foam. The pad can be found at sporting goods dealers and department stores.

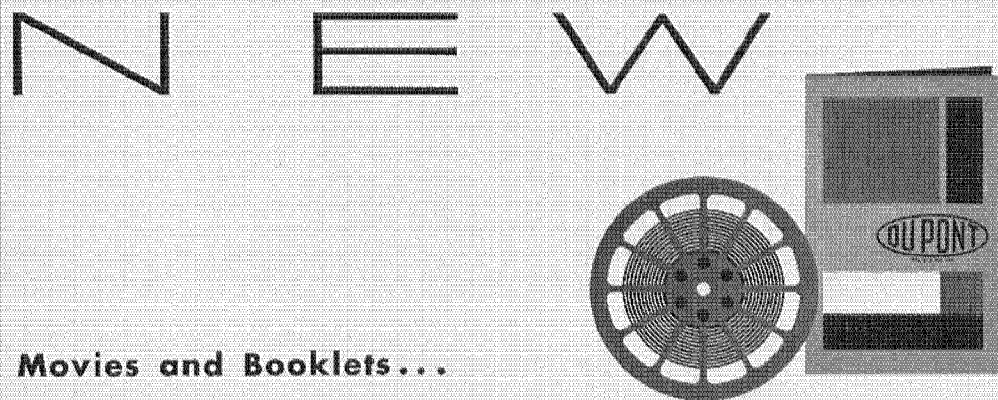


A bright green garden hose that provides decades of service is now being introduced to quality-conscious gardeners. Outstanding durability and weather resistance of the result from use of "Hypalon" synthetic rubber for the rugged outer covering. "Hypalon" is an exceptionally tough elastomer that has long since proved itself in industry. The hose, called "Heirloom," is made by the Rubber Company; it will withstand deterioration from garden chemicals, fertilizers, oils and greases. Exposure to the hottest light won't soften this hose. The quickest freeze won't cause it to become brittle. These qualities assure long-range economy. Price: approximately \$14 per 50-foot length.



A new I.D. tag—identified as "what the well-dressed cow should wear"—is being produced of "Zytel" nylon by the C. H. Dana Co., Inc., of Hyde Park, Vt. The identification tag makes it easy to identify the ages of cattle or to distinguish different feeding or breeding groups. The tag is hung on a braided cord of Du Pont nylon; and Du Pont dyes for the cord carry out the color schemes of the distinctive numbered tags.



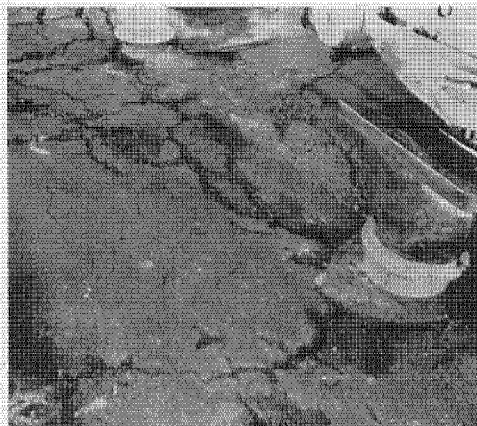


Movies and Booklets...

18 motion pictures are currently available from Du Pont for showings to schools and to social, civic, service clubs and churches. Pictures include historical, professional, and product subjects. Information on these motion pictures, including data on running time, and highlights about the pictures are available in a new 28-page booklet. The booklet can be obtained from Motion Picture Section, Advertising Department, Du Pont Co., Wilmington, Del.

New booklets recently published by Du Pont include "The Use of 'Quilon' Chrome Complex for Treatment of Paper Products"; "A Review of Catalytic and Synthetic Applications for DMF Dimethylformamide and DMAC Dimethylacetamide"; and "A Booklet on Processing of 'Zytel' Nylon Resins." You can obtain a copy of any of these booklets by addressing a letter to the Editor, Du Pont Magazine, Du Pont Company, Wilmington, Del.

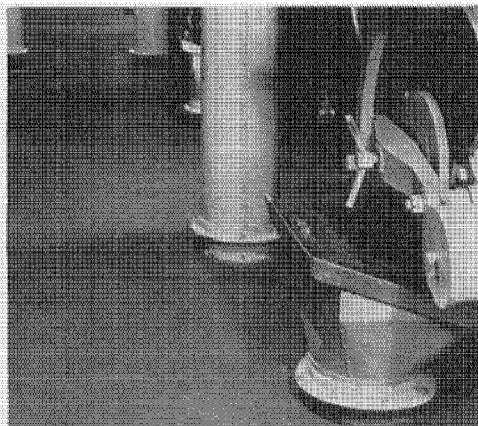
An automatic floor mat featuring brushes filled with "Tynex" nylon filament that clean the dirt off shoes quickly is now being manufactured by the Progressive Engineering Company of Holland, Mich. The "Miracle Mat," as it's called, is a heavy aluminum grill, rubber mounted within a steel frame and built into the floor. Brushes filled with "Tynex", running the width of the grill, are set in motion by a motor that is activated the instant the mat is stepped on. The brushes sweep up through the grill at hundreds of strokes per minute and clean the shoe soles.



PROBLEM

Neoprene cement, developed by Crossfield Products Corp. of Roselle Park, N.J., for outside decks of ocean liners, has solved a major flooring problem for a midwest food processor. For years the concrete floors in this processor's plant had been eroded and cracked (left above) by enzymes and sugar solutions occurring in the conversion of cornstarch to sugar. Sanitation was difficult, maintenance costs were up, and safety

"Pyralux" fluorescent enamel, the super intense paint used on military aircraft to prevent air collisions, is now being introduced to the automotive world by Du Pont's Finishes Division. High visibility identification and safety markings of "Pyralux" on trucks and buses will make the vehicles more prominent at night as well as during the day, and hopefully will help reduce highway accidents.



SOLUTION

hazards were present. But the special flooring of neoprene cement, known as "Dex-O-Tex", has solved the problem. The new floor, only 1/4" thick, is easily hosed for cleaning, is flexible enough to eliminate cracking—even where cracks exist in the sub-surface. Sugar-laden solutions cannot penetrate it. The food processor made a test installation in 1955, followed it with 100,000 square feet in 1957-59 and is now extending the use.

Science Milestone...

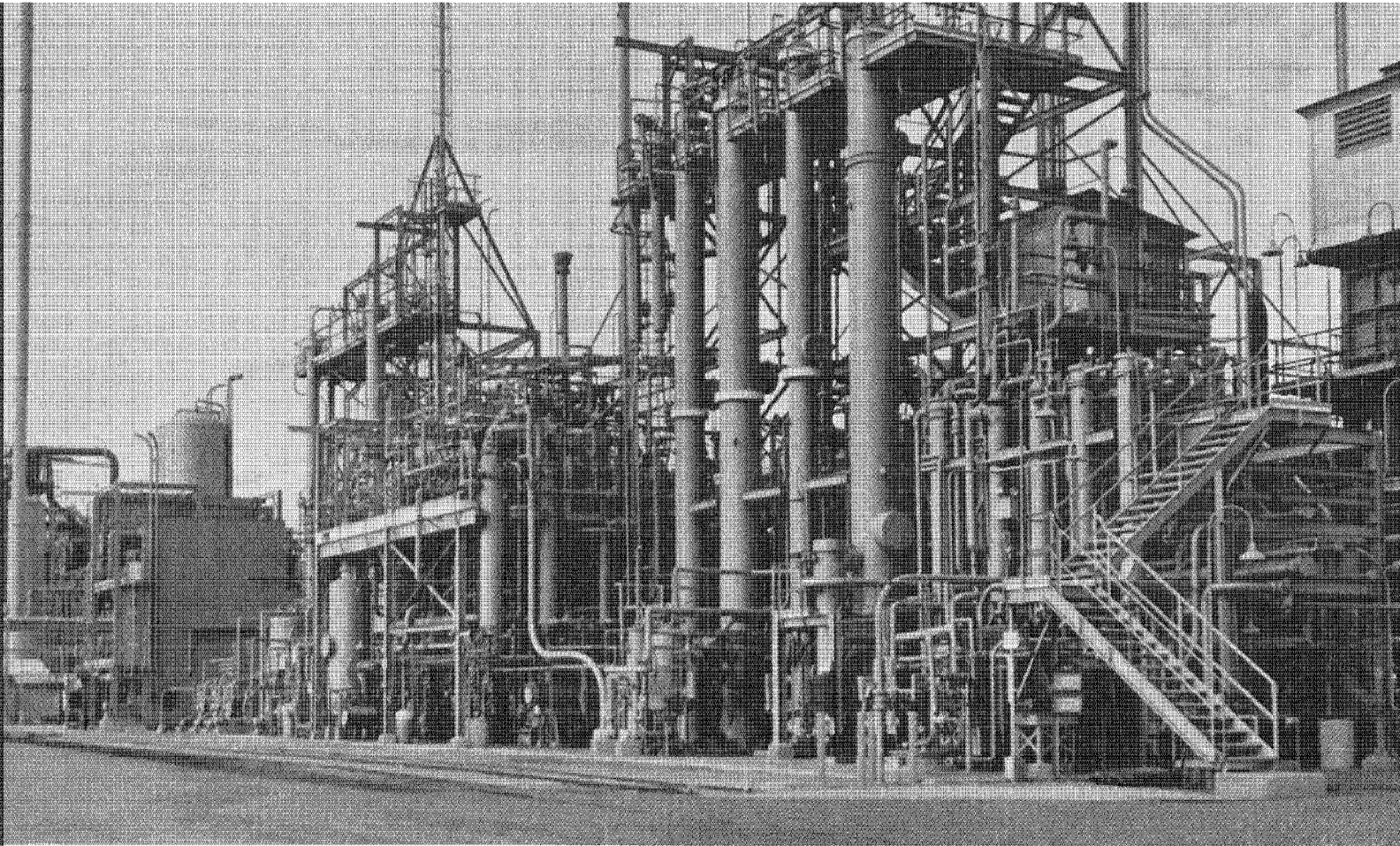
A scientific breakthrough that opens the door to understanding a major life process has been achieved in the Du Pont Company's fundamental research work. For the first time researchers have duplicated in a test tube the reaction nature uses within a living cell to create the nitrogen compounds without which no life can exist. They have discovered a technique, long sought by scientists around the world, by which chemicals that convert nitrogen can be separated from bacteria and stimulated to perform their function outside the bacterial cell. Lacking such a technique, scientists have been frustrated in research on this vital natural process.

Research on the mechanism of nitrogen conversion in microorganisms has been carried out for several years at the Du Pont Experimental Station by Drs. James E. Carnahan, Leonard E. Mortenson, Howard F. Mower, and John E. Castle, all of whom are in the Central Research Dept. The subject is being studied as one phase of Du Pont's efforts to learn more about the chemistry and physics of biological processes. This work is part of Du Pont's program of fundamental research—the search for basic knowledge without specific commercial objective.

Added Notes...

A new plant to produce "Dycril" photopolymer printing plates is to be built by Du Pont at Parlin, N. J., with a completion date set for mid-1961. These new light-sensitive plastic plates promise to introduce new techniques to segments of the printing industry.

The trademark "Antron" has been adopted by Du Pont for a new type of nylon fiber having a trilobal cross section. This is the first nylon textile fiber the company has distinguished with a trademark since it introduced nylon in 1939. Evaluation work undertaken by leading textile mills has confirmed that characteristics of "Antron" nylon fiber will result in advantages in dress fabrics, foundation garments, uniform fabrics, shell and fleece fabrics for jackets, and upholstery fabrics.



New coating incorporating "Hylene" organic isocyanates gives outdoor plant bright, dressed-up look that lasts. This is first big field application following three years of panel tests.

A New Look for Outdoor Plants

Du Pont unit trades her somber tone for pastels

The somber, block-long plant unit at the east end of Du Pont's Chambers Works in Deepwater, New Jersey, went quietly about her business of turning out tank loads of "Hylene" organic isocyanates; and nobody except her operating and maintenance men paid her much heed. She was well protected from corrosion with a heavy black asphalt mastic but was drab in appearance and here and there the black was discolored by product spills. Then last year, thanks partly to the product she produces, she traded her somber tone for a new look in pastels. Decked in light green with touches of yellows and reds, she now glistens by daylight or floodlight; and she attracts attention as one of the first full-scale production units to be coated with a promising new material.

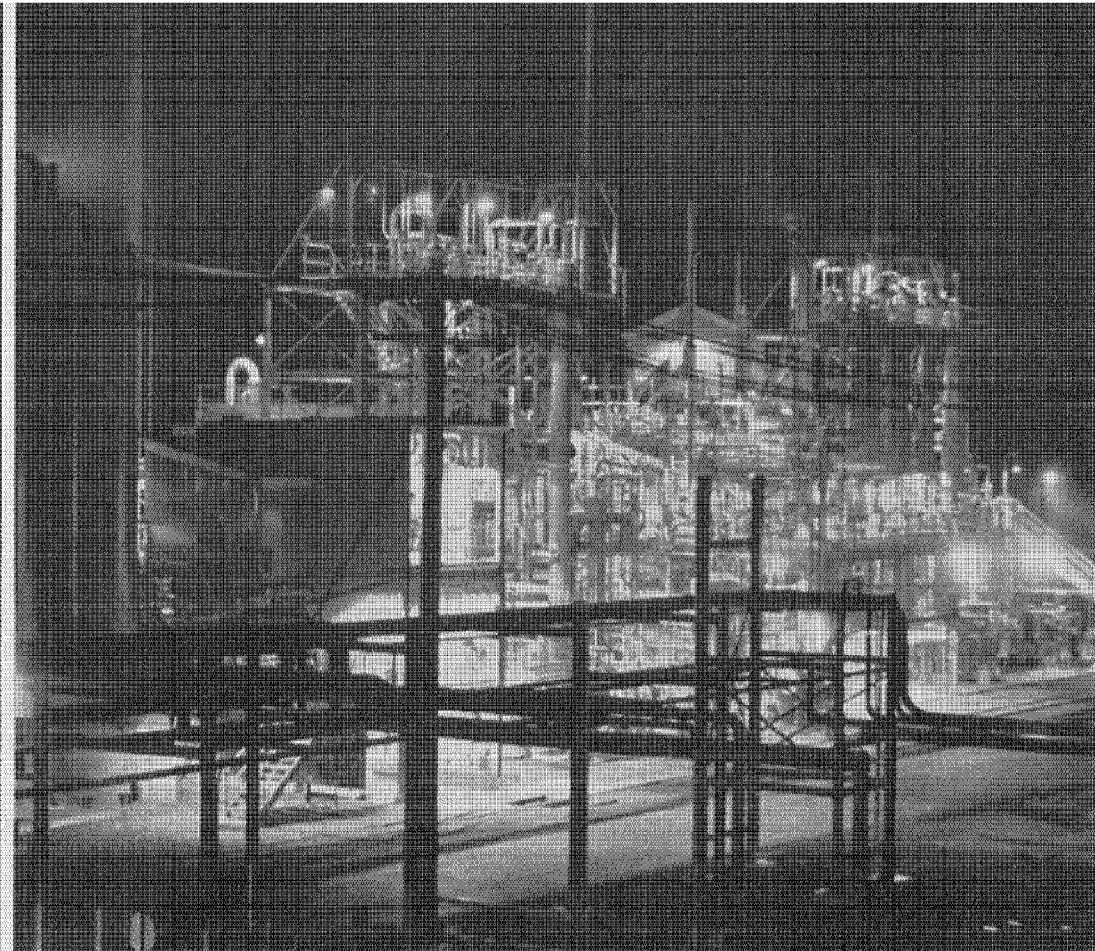
But the story is not to be found only in a pretty picture. For the plant's new urethane coating, based on "Hylene", adheres to the mastic without bleed-through. And the system does not seem to be harmed by chemical spills. The urethane coating is a cousin to a product now going into fine seat cushions—highly resilient polyurethane foam made with "Hylene".

Maintenance men chose a light green to hide streaks that were bound to show up on parts of the unit. It seems one of the chemicals used in the process finds a way to seep through even the tightest joint, and this slight green staining had continually shown up here and there. But when you can't "lick them, join them" so they painted her green.

Contrasting colors were used too. In normal operation heat had turned several joints a light color, so the maintenance men simply picked an ivory-colored urethane finish to coat these parts. And they touched up platform edges and stair edges with the same color.

When it came to special color needs, they found the Newark, New Jersey, company supplying the urethane coating for the job could match the colors desired. Control valves were coated with international orange. And all of Du Pont's normal safety-code colors were used: red for fire boxes, dark green for safety showers, yellow for potential hazards.

At present, the per gallon cost of urethane maintenance coating is above that of many other finishes. The urethane maintenance coating used is a two-package system: Part A contains a resin with pigment ground in; Part B contains the isocyanate in a solvent. The two parts



Particularly at night, high gloss of the urethane coating makes plant unit a brighter, better place to work. Coating's gloss is durable.

must be mixed in proper proportions and applied the same day. If durability lives up to expectations, it should help to compensate for the higher initial cost and the extra time for mixing.

The urethane coating has been on the plant unit nine months, and is holding up well. A good rainstorm will take off any surface dirt and leave the place sparkling.

Operating Men Like It, Too

The pastel color has been a bonus for plant operating personnel, too. Unanimously, they agree the plant's a better place to work, particularly at night when the coating

adds brightness that was impossible when the plant was shrouded in black.

Du Pont is showing a bright face on another industrial front with urethane coatings. Several of Du Pont's yellow and green tank cars have been finished with a urethane paint and are now riding the nation's railroads, carrying tetraethyl lead compound to gasoline refiners. Again urethane finishes have combined good looks with practicality.

Accidental spills of tetraethyl lead can be cleaned off the tank cars completely to reduce residual toxicity. For tank cars, the urethane finish is compounded so that it will



First tank cars with tough urethane coating are now riding the nation's railroads. Easy-to-clean coat has been used on tank trucks.



Flexible urethane coating is being used as wire enamel. And the wire can be soldered without stripping away the insulation.



Patent leather shoes are now being given a urethane finish. Left: a urethane coated shoe. Right: an uncoated one after same wear.



Urethane floor finish is hard and clear. Textile mill tests show it wears two to three times as long as any conventional varnish.

A New Look, continued

... other new uses for clear urethane coatings

be hard. And this harder finish gives even greater chemical resistance and makes for easier cleaning.

But pigmented urethane coatings are only part of the story. Several manufacturers are making one-package clear urethane finishes—in a range from flexible to hard—for a variety of industrial applications. Each finish has slightly different properties tailor-made for the specific application. The one-package system, in which the coating is cured by atmospheric moisture, was originally developed in Du Pont's Elastomer Chemicals Department laboratories.

Hard, clear urethane floor finish has proved itself in extensive field tests made by Du Pont's Finishes Division in textile mills and other industrial plants. It wears two to three times as long as a conventional floor varnish, is easy to clean, retains a high gloss, and is extraordinarily resistant to discoloration and softening by lubricating oils and greases.

A urethane coating made from drying oils modified with "Hylene" is being used for finishing farm machinery. It is also possible to make clear floor finishes from these modified oils. Technology worked out in Du Pont's Elastomer Department laboratories is contributing to the development of these products.

A flexible urethane coating is being used as a wire enamel. It is an excellent insulator; and wire with urethane enamel can be soldered without stripping away the insulation. And a manufacturer is using a urethane finish as an inside coating for pleasure boats because of its abrasion resistance.

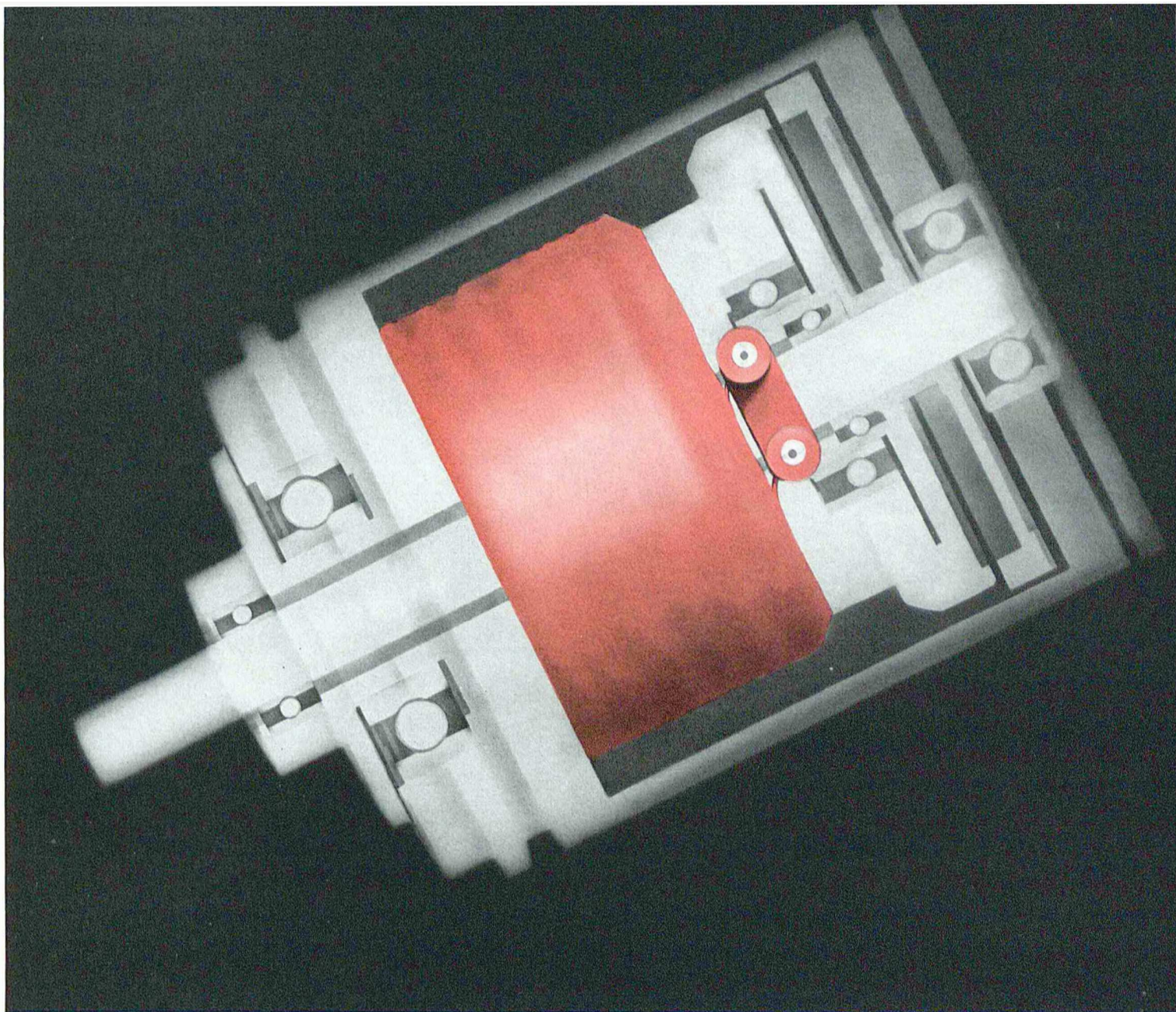
Automobile manufacturers have turned to a urethane finish, too—for rubber window seals. The urethane coat protects the rubber from ozone exposure and prevents cracking. And a plus for the car owner: winding up a window takes less effort because the urethane finish reduces the seal's coefficient of friction.

Toughens Toys for Tots' Torture

Rubber toys are being coated with a clear urethane finish based on "Hylene". The toys resist cracking, and their glossy coat doesn't soil easily.

A manufacturer in Boston supplies New England leather houses with a urethane finish based on "Hylene". The finish goes on patent leather; makes it tougher, longer lasting. Many in the leather industry say this new finish is so far superior to other patent leather finishes that it may spark new consumer interest in this once very popular material.

The technology of urethane coatings, much of it developed by Du Pont, has already made a considerable impression on industry. The search continues for new uses for this unique material that combines hardness, toughness, abrasion resistance—and bright good looks.



X-ray photograph (here enlarged 3 times and shown in color) of magnetic clutch manufactured by Dynamic Instrument Co., Westbury, L. I., N. Y.

INSIDE STORY: magnetic-clutch terminals that hold tight

The feed-through terminals on magnetic clutches and clutch brakes don't have an easy time of it. With very little space for attachment, conventional terminals are prone to pop out and rotate under torque. Terminals must withstand 500 volts potential between the case and terminal, and operate continuously at 400°F. The answer? New, melt-processible TEFLON FEP-fluorocarbon resin. The two terminals are molded together of FEP resin and inserted from the inside of the case. This new member of the family of TEFLON fluorocarbon resins provides all the necessary insulating, thermal, mechanical and fabrication properties. Inside the potted case, where temperatures run higher, wires are insulated with TEFLON TFE resins for

utmost reliability.

In addition to the properties demonstrated in this application, TEFLON resins — both FEP and TFE — offer remarkably low friction and almost universal chemical inertness.

If you would like to find out more about how TEFLON fluorocarbon resins make possible improved mechanical and electrical designs, send for your copy of a booklet describing in detail the unique engineering properties of these resins. Write to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room DM56, Du Pont Building, Wilmington 98, Del. In Canada: Du Pont of Canada Limited, Box 660, Montreal, Quebec.



TEFLON[®]
FLUOROCARBON RESINS

TEFLON is Du Pont's registered trademark for its family of fluorocarbon resins, including TFE (tetrafluoroethylene) resins and FEP (fluorinated ethylene) resin.

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

You can cast farther... cover more water
...when you fill your reel with **Stren**®



Because **STREN** is as much as 20% stronger than standard monofilaments, it has a thinner diameter per pound test. The thinner the diameter, the longer the cast.

Now, you can cast farther without sacrificing line strength! And because **STREN** has a smaller diameter than standard monos, it's limper—guarding against kinking, looping and “sets” on the spool. You’ll be pleased, too, that the stretch in **STREN** has been reduced by one-third over standard monofilaments, with just enough left in to absorb the shock of a heavy strike. And the gunmetal grey color of **STREN** is permanently built into the line.

STREN offers advantages for all kinds of fishing. For *fresh-water spinning*, its smaller diameter and extra limpness can give you longer casts and better coverage. In the heavier pound tests needed for *surf spinning*, **STREN** lets you cast out where the big ones are and still have all the necessary line strength. In *trotting* or *bottom fishing*, its extra-thin di-

ameter offers less resistance to the water and allows the use of lighter sinkers. And, of course, this smaller diameter lets you put more **STREN** on a spool. When you tie into big fish, you can have a feeling of greater security on long runs.

STREN spinning line is available in 100-yard spools, single, two or six spools connected, from 2- to 30-lb. test. Better pick up a couple of spools from your tackle dealer or any other retail outlet where spinning line is sold.

VALUABLE BOOKLET: Informative 56-page booklet gives the latest on spin fishing, casting, lures, lines and knots... plus tips and answers to many questions that will help you improve your fishing. Send your name, address and 10¢ (no stamps, please) to cover cost of handling to: E. I. du Pont de Nemours & Co. (Inc.), Dept DM-1, Room 2507S, 3rd and Greenhill, Wilmington 98, Del.

Top fishermen everywhere are sold on **STREN**®

“In one short word, I think **STREN** is ‘terrific.’ It casts like a dream and was made for the bone-fish flats.”

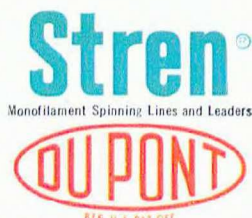
Jim Martenhoff, President
Florida Outdoor Writers Assn.
Homestead, Florida

“**STREN** casts beautifully, slips through guides nicely and is a pleasure to cast. I get distance without effort.”

Enos Bradner, Outdoor Editor
The Seattle Times, Seattle, Wash.

“Thirty-five minutes of fighting a record 8-lb. 4-oz. brown trout couldn’t break 6-lb. test **STREN**.”

John Molinski, 359 Hoover Ave.,
Bloomfield, N. J.



BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

The greatest advance in spinning line since spin fishing began!

New **STREN** level leader packs are available in pound tests from 2 to 30, and in lengths from 8 to 20 yards. New **STREN** knotless tapered leaders come in a range of sizes, 7½-ft. trout sizes, 6x to 0x tippets. 9-ft. trout and salmon, 6x to 6/5 tippets.

