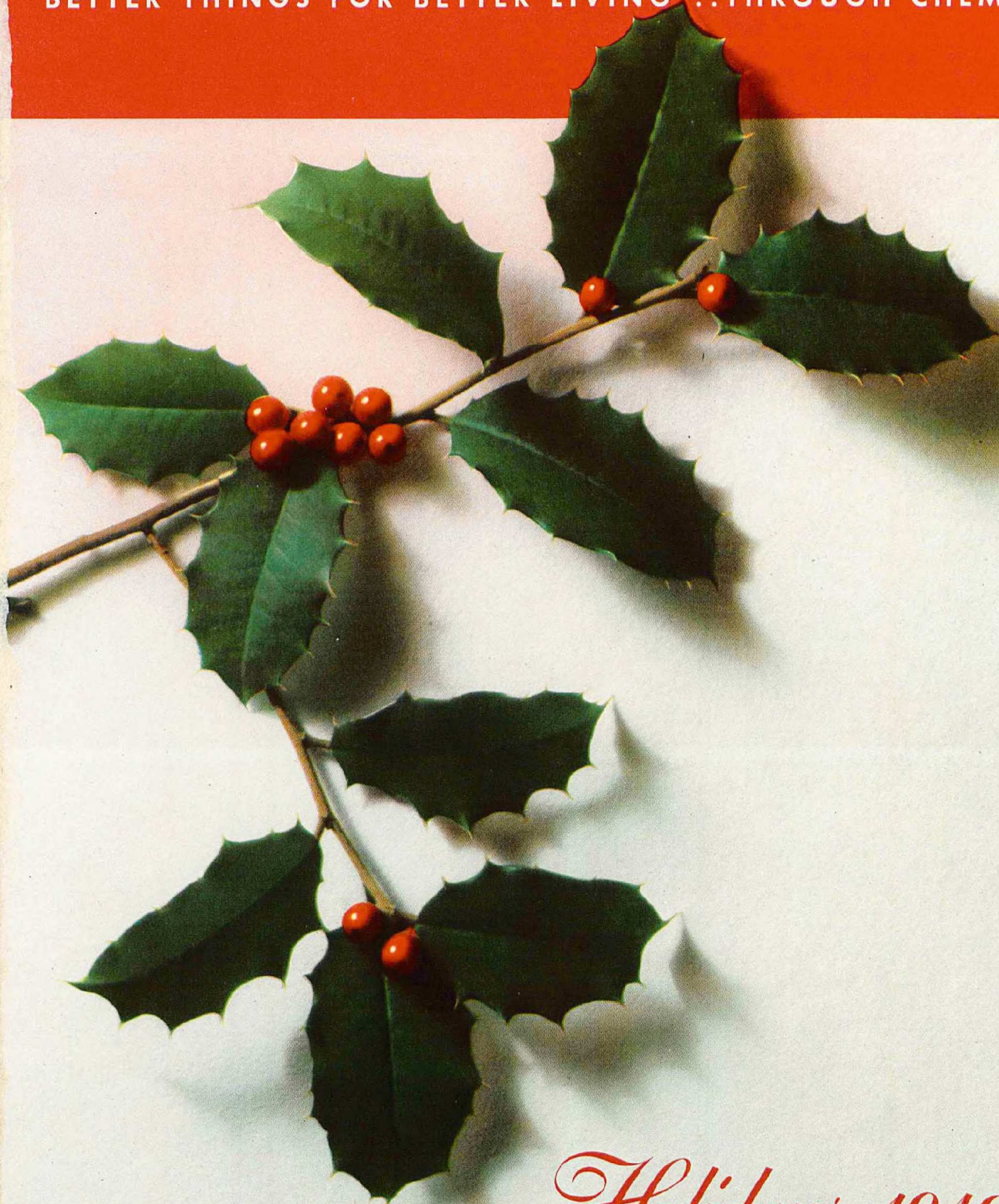


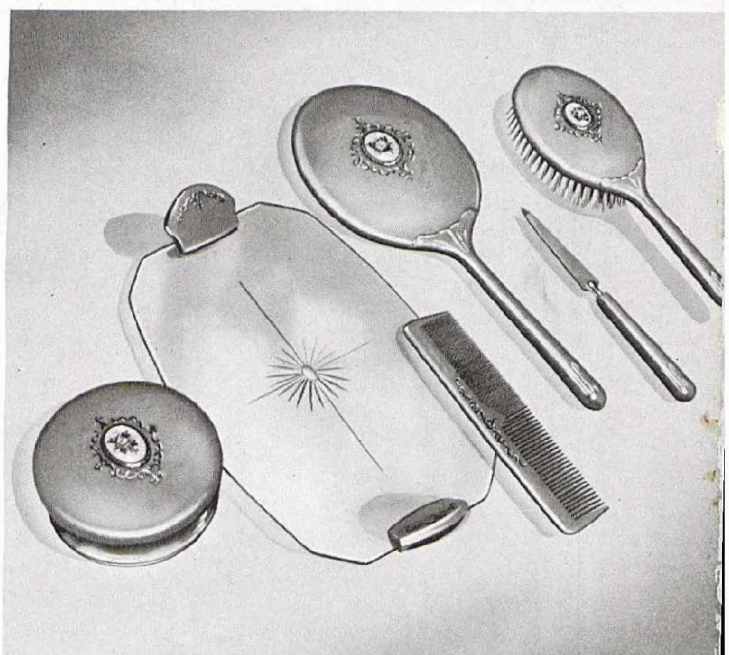
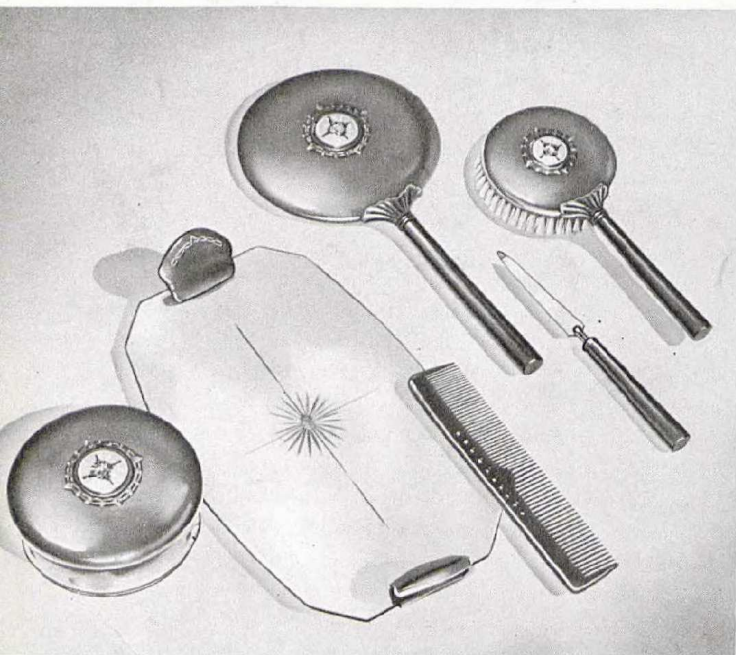
THE DU PONT MAGAZINE

BETTER THINGS FOR BETTER LIVING ..THROUGH CHEMISTRY

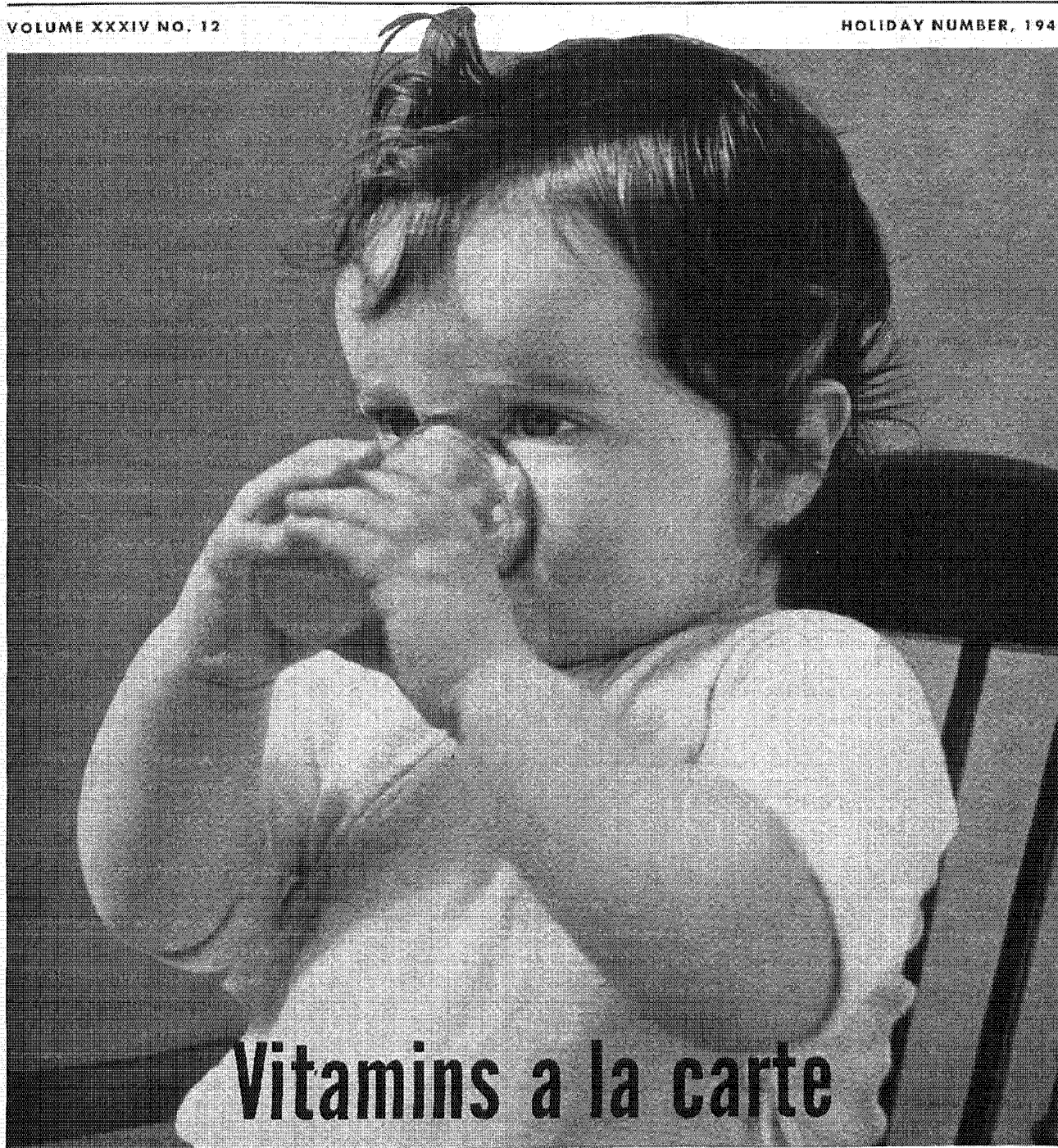


Holidays, 1940

BRILLIANT GIFTS THAT SPEAK YOUR THOUGHTS TO HER



Brilliant with the gem-like, sparkling beauty of "Lucite" methyl methacrylate resin and other new Du Pont plastics are these new boudoir accessories made by the Plastics Department of the Du Pont Company. The hair brushes, bristled with nylon, add good cheer and long wear to these everlasting Christmas gifts, which are available at all leading retail outlets.



Vitamins a la carte

H. Armstrong Roberts

By C. M. A. STINE

I AM told that the present generation of American youth is taller and broader of shoulder than the youth of 25 years ago; that young women are wearing stockings which average a size larger than those worn by their mothers at the same age. Tailors report the masculine waistline is growing slimmer. Food experts are discussing the possibility that fat men may become as rare as wing collars, that short men may in time become extinct except in a few backward places.

More greens on the American dining table—and more vitamins—are given as a major reason for these and other astonishing changes that have taken place since the first World War.

Imports of cod-liver oil, noted for its high contents of Vitamins A and D, increased 1,200 per cent between 1920 and 1939. In the latter year, Americans and their animals and poultry consumed more than 6,000,000 gallons of the oil, together with a mounting quantity

of other fish oils at which we once wrinkled our noses disdainfully.

In two decades, the consumption of vitamin-rich leafy vegetables has trebled. Fruits and fruit juices have become standard items on our bill of fare. Sun-bathing, the great free source of Vitamin D, has attained the dignity of a national cult that has changed fashions, influenced city planning and architecture, helped raise golf to a leading sport, and routed beach censors from Barnegat to Catalina.

Upheavals without precedent have taken place in agriculture and in our systems of shipping, storing and handling foodstuffs all the way from the farm to the cook-pot. The vitamins are being added to bread and breakfast foods, candy and cosmetics, even to beer. They are being sold in department stores.

Estimates are that the vitamin industry, and it can be called no less, represents a sales volume in excess of \$50,000,000 annually. When one considers that vitamin molecules are too small to be seen by the naked eye and that knowledge of them is still meager, the figure is astounding.

The question arises, are we riding another food-fad rocket or is the public interest in vitamins resting upon a foundation of scientific truth?

Authorities are unanimous in their answer that in the vitamins and kindred discoveries we have come upon substances of enormous importance to human welfare. They have enlarged our conception of preventive medicine. They may, conceivably, give us new standards for regulating growth, health and mental development. Some go further. They say it is possible we are on the verge of developing a super race. That race, they say, will be highly resistant to disease. It will live longer. Insanity and other abnormalities will be diminished or, perhaps, become historical curiosities. And food will be man's chief preventive medicine!

It should be emphasized that I speak not as a medical man, but as an organic chemist. However, the vitamins are chemicals. The task of prescribing vitamin concentrates and diets for specific ills and deficiencies

is, of course, a medical function, but the even larger task of making the proper food available in the most beneficial form to everybody is an industrial and agricultural function, with which the industrial chemist is intimately concerned. The Du Pont Company, for example, is one of the largest manufacturers of synthetic Vitamin D, and for eleven years Du Pont laboratories have been engaged in vitamin and related research both of a fundamental and an applied nature.

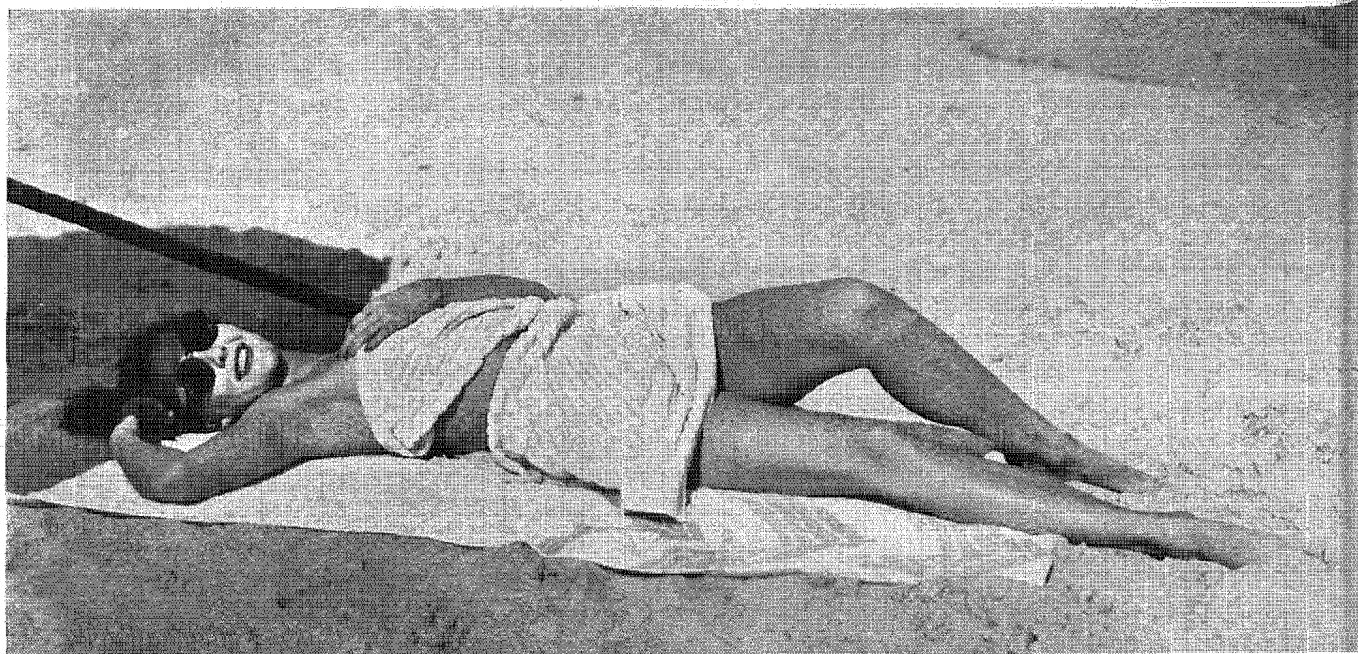
It is to the organic chemist that we owe our accurate knowledge of the nature and structure of these complex organic compounds, and medicine is dependent on chemistry for the synthesis of them. Above all, is the growing recognition that the body is a machine, the operation of which is dependent upon the proper sequence of a large number of chemical reactions. In a much closer alliance of chemistry with medicine, I believe, lies chemistry's most brilliant future as a great alleviator of human ills.

Prior to Pasteur—a chemist—the idea of germs causing disease was laughed at. Similarly, prior to the discovery of the vitamins in food, it was believed that if one ate enough calories of proteins, fats, starches and sugars, and obtained some mineral salts such as iron, calcium and phosphorus, all the body's normal nutritional needs would be met. When ills came, few blamed diet. As late as 1917-18, we felt we were benefiting our soldiers in France by sending them white flour for bread, while at home we ate dark bread as a duty. The trend was toward highly refined foods. Yet, for almost forty years, the evidence had been accumulating in laboratories that calories of energy units alone will not support health and life, and that too much refinement of food leads to physical and mental disturbances, because of the removal or destruction of the vitamins found naturally in food.

The hormones were discovered. These are chemicals of varying structural complexity secreted by the body glands. They share with the vitamins the ability to bring about important chemical reactions in the body. The sex hormones, for example, control the character-

Sun-bathing, the great free source of Vitamin D, has attained the dignity of a national cult. Here's one devotee at a shore resort.

Underwood & Underwood



istics by which men and women differ in physical structure, hair, voice, temperament and personality. They determine whether one is a giant or a dwarf, a "he-man" or a "sissy."

Then, scientists uncovered the enzymes. These mysterious chemicals condition the body's ability to digest fats, carbohydrates and proteins, three of the most important classes of foodstuffs. Lately, a beginning has been made in understanding their chemical structure, and other substances have been synthesized which, to an extent, duplicate some of their properties. The feat opens a new avenue of attack, essentially chemical, upon human infirmities, through the digestive system.

Finally, it was learned that a fourth set of complex chemicals known as the amino acids must also be

Perhaps you, too, have noticed the increasing popularity of these way-side stands in recent years as more people become Vitamin C conscious.

Acme News Pictures, Inc.



present in one's diet to stay well and happy. These acids are the building blocks out of which beefsteak, cheese, eggs and other foods high in proteins are made, and 22 of them have been discovered in proteins. At least ten of these are believed to be "essential to growth."

The uncovering of such highly important substances in food, a field supposedly exhausted of the sensational years ago, has brought some of the ablest explorers of science into food research. Every medical laboratory in the world is today attentive to some phase of it, and all of them are interested in the various vitamins, and their interrelated chemical roles.

It is not my purpose to discuss the remedial value of vitamins, nor to suggest diets. However, speaking as a chemist, it is permissible to outline the broader phases of this subject, in which chemistry is intimately concerned.



The rat colony at the New Brunswick, New Jersey, biological laboratory where Du Pont research workers make their assays of a well-known source of Vitamin D.

The physiological functions of Vitamin A range all the way from keeping the skin healthy to acting with a specific protein in restoring the visual purple of the eye. Failure to see well at night, which often means that the visual purple is depleted, might be a sign of Vitamin A deficiency. Long exposure to sunshine may produce a temporary case of night blindness, unless the intake of A is increased. This suggests that more A in the diet might be one way of reducing the number of automobile accidents at night.

Collectively, the B vitamins promote appetite, aid growth, help in the functioning of the nervous system, and some of them act very much like enzymes in assisting the digestion. They are specifics for preventing beriberi and pellagra.

Once it was believed that beriberi was limited chiefly to the Orient where polished rice is a large part of the diet. Physicians are not so sure of that now. Associated with the disease in the Orient is a condition known as "beriberi heart." A strikingly similar condition has been observed among many sufferers of heart disease in the United States, to which must be added the highly suggestive fact that fully half of our common foods contain no appreciable Vitamin B₁ content. This scarcity has been a challenge to the chemist to provide a synthetic source of Vitamin B₁, identified as thiamin, and fortu-



In many mill towns like this, the sun's ultra-violet rays penetrate only feebly through the dust and smoke that are so injurious to public health.



Black Box Studios, N. Y.

What causes the trouble? Expert diagnosis may disclose that faulty vision springs from a deficiency of Vitamin A in the patient's diet.

nately that challenge has been met. Thiamin is now produced synthetically. Food processors are adding it to their products in growing number. Pharmaceutical companies are selling it in concentrated forms as a supplement to the diet. Here, then, chemistry in co-operation with medicine has made one of its many important contributions to human health.

The mortality under old methods of treating pellagra was 54 sufferers out of every 100. Ordinary brewer's yeast (rich in Vitamin B Complex), careful nursing and medical attention, plus a balanced diet, reduced that mortality to five in 100, but the treatment was cumbersome. Finally, chemists determined the individual factors of Vitamin B Complex, and one of them, nicotinic acid, turned out to be unusually simple.

This chemical, derived from tobacco, and used in conjunction with a rich vitamin diet, recently has been effecting some near-miraculous cures of pellagra sufferers.

Lack of Vitamin C causes scurvy, dental ailments, pyorrhea. Our great grandparents obtained their Vitamin C requirements from "weeds," such as milkweed and dandelion, cooked or eaten raw in salads. However, the phenomenal rise of the citrus fruit industry and the exploitation of Hawaiian pineapples and tomato juice have provided new and unrivaled sources of this vitamin. And it is also obtained chemically from dextrose, an ordinary corn sugar, and sold commercially.

On the one hand, Vitamin D is the most abundant of all vitamins because sunshine produces it in the human body. On the other hand, it is the one vitamin not supplied in a well-balanced modern diet. Fish-liver oils are the only natural products known to be rich in D.

Nature did not anticipate the rise of factory towns and cities wherein people live under a perpetual pall of smoke and dust, through which the sun's ultra-violet rays penetrate only feebly. Some of the consequences may be spindling bone formations in youngsters, stunted growth, and the disease known as rickets. Knock-knees and bow-legs are the most obvious signs of too little sunshine. You rarely see them among country-reared children, and they are becoming rarer among all children, thanks to the research which has made Vitamin D abundantly available.

Among the naturally-occurring sterols, specific ones have been found which are responsible for the formation

of Vitamin D. One of these natural products is ergosterol, obtained from yeast. Another has been found in certain forms of marine life. Through this work it has been found possible to produce Vitamin D as a pure chemical which is fully 400,000 times as anti-rachitic as cod-liver oil. And this chemical is being sold at prices so low that poultry breeders, quick to see its value in increasing egg production, are using huge quantities of it. Drug houses are putting out cod- and other fish-liver oils, which contain Vitamin A as well as Vitamin D, on mass production scale. Breads and cakes are being irradiated by a patented process which adds the sunshine vitamin. So are canned milks, cereals and other foods. This industrial development means sturdier, more disease-resistant children.

There are also Vitamins E and K. The former, known as the anti-sterility vitamin, is widely distributed in nature. K is believed to be vital to the first step in the process resulting in formation of a blood clot, a very beautiful bit of colloid chemistry. This vitamin, too, has been reproduced synthetically. Furthermore, once the structure of K was known, a number of related chemicals were tried and found to possess K activity.

Still other vitamins are reported, but little is known of them as yet. The fact to be emphasized is that all of these vital substances, not forgetting the enzymes and amino acids, have been found in foods or fish-liver

oils, and that each has shown promise of becoming a specific for some human shortcoming or ailment. A few, indeed, have definitely attained that status. To this extent then, food in itself is a medicine. It is being so recognized by all competent physicians.

Let us go a step further. In food, if it is of the proper variety and quality, may be all of the biological and chemical substances man needs for normal development and perfect health straight through from birth to old age, barring excesses, accidents and direct bacterial infection.

Since the vitamins were brought to light, the whole subject of food and its effects on growth and health has been reopened. And the results have continued to be startling. The researchers have found, for example, that there is little exact knowledge of the mineral needs of the body. Iron is required by the human adult in an amount fixed at 0.015 gram per day. Also 0.7 gram of calcium and 1.3 grams of phosphorus are considered daily essentials. But what about the other minerals present in various foods? The question is answered as yet only in part.

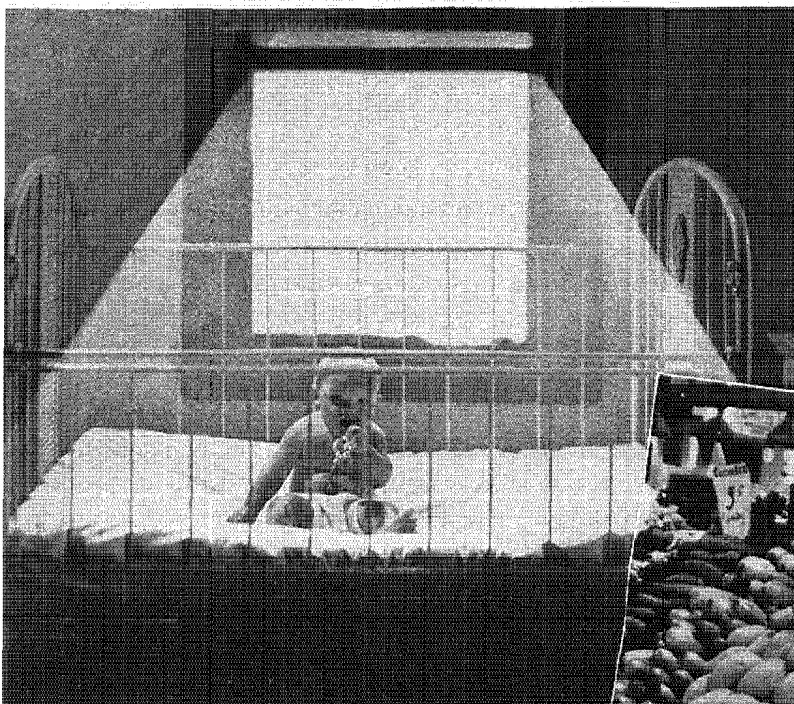
It is now believed good health demands a daily intake into the body of some form of copper, zinc, manganese, magnesium and perhaps some other chemical elements, but why and how much are still problematical. In improper combination or doses, these become poisons.

Some researchers suspect that certain types of mineral deficiency may have much to do with the declining birthrate of large districts, where animal as well as human fecundity has been affected.

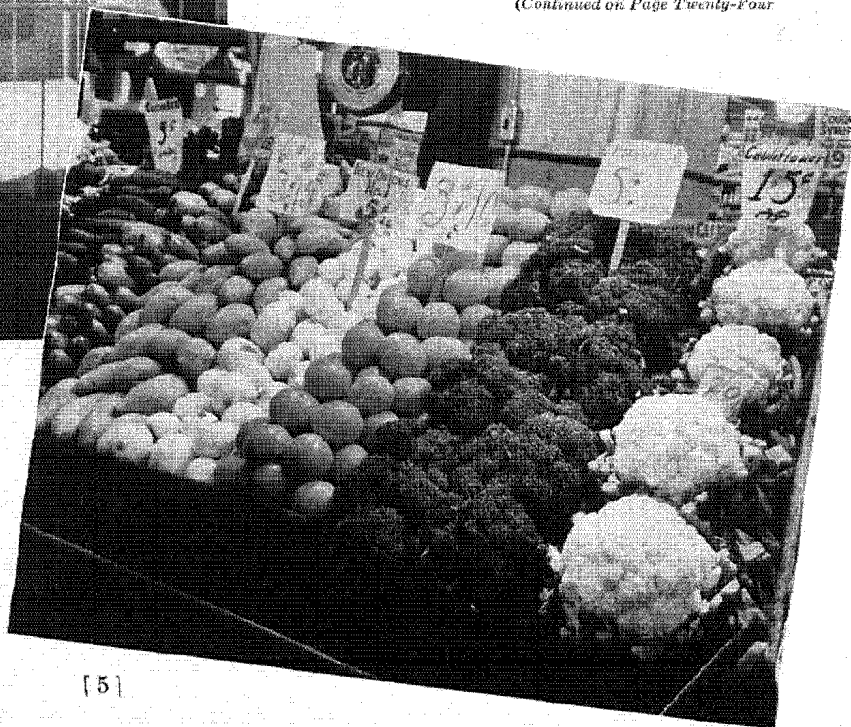
Men are beginning to wonder, and to inquire, why the people who live in some lands are often short of stature; why other lands produce tall people. Is the reason that the soils of some countries contain substances, passed along through food, that the soils of other countries lack? Here is one of the most complex and far-reaching of all the problems posed about foods.

The soils of some areas are known to be deficient in one or more of the mineral salts, or

(Continued on Page Twenty-Four)



Winter sun-bathing in a Boston children's hospital helps to prevent rickets. The solarium windows of "Cel-O-Glass" plastic-coated wire mesh let the ultra-violet rays through.

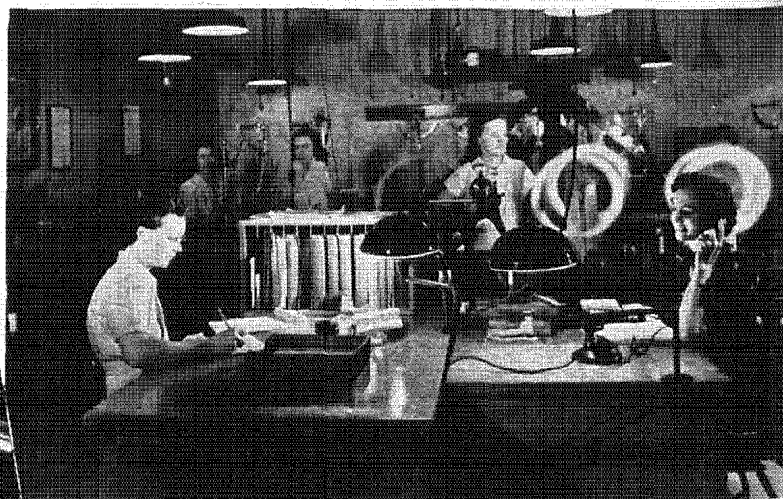


Fresh vegetables rate high as an important source of vitamins, and nowadays they are easily procurable the year 'round.

H. Armstrong Roberts

LEFT: Inspectors at work in the Spruance plant near Richmond, Virginia, as "Cordura" rayon yarn moves from the creels to a beam.

BELOW: Women employees are kept busy working on rayon yarn in the physical testing laboratory. CENTER: Staff members on duty in the Technical Library, Wilmington, Delaware. RIGHT, on facing page: Experimental research at the New Brunswick, New Jersey, laboratory. View shows an assistant at work as the head of the laboratory staff compares perfume odors.



Women Workers of Du Pont

By BETTINA SARGEANT

FIVE mornings a week, 7,500 women report for work with the Du Pont Company. Those on the Pacific Coast start the day about the time their Atlantic Seaboard sisters are thinking of lunch. Almost 1,500 of these workers are concentrated in the two headquarters buildings in Wilmington and at the Experimental Station on the outskirts of the city. Branch sales offices, laboratories and factories scattered through thirty states claim the remaining 6,000. Clerks, secretaries and factory operatives; chemists, nurses, technicians and librarians; youngsters just out of high school; gray-haired women with long service records—all share in carrying on the many operations of the Company.

Women's names comprise almost fifteen per cent



Transparent plastic sheeting undergoes critical inspection at the Du Pont Company's Arlington plant in New Jersey.



Inspecting finished rayon yarn is exacting work for a well-trained staff of women employees at the Spruance plant.

A supervisor and the Suier-machine operator discuss the results of a strength test applied to rayon yarn in the physical testing laboratory.



of the Company's total wage and salary rolls. They number ten per cent of the wage roll and twenty-five per cent of the salary roll. As a group they exceed by 300 the total number of Du Pont employees thirty years ago.

Statistics in large doses are forbidding, but from a numerical potpourri there emerges a figure we can christen "Miss Average Du Pont." Factory or office employee, she is in her twenties, unmarried, and has worked for the Company five to seven years. She is a high-school graduate, lives with her family, and is interested in social and civic activities. She enjoys better than average health and takes care to keep healthy. All Du Pont employees, when hired, must pass a thorough medical examination and have a check-up annually

thereafter. The composite Du Pont woman lives in a moderate-sized city and, like most urban dwellers, prefers to spend her vacations in the mountains or at the seashore. She gets along well with her fellow workers and makes the most of her duties, responsibilities and opportunities.

As to educational background, five and a half per cent of these women employees have attended college, but only three per cent hold degrees. They represent 197 American and eleven foreign colleges.

Among the college women, about 200 are technically trained. Most of these are chemists and laboratory assistants. Many are textile experts in the Rayon Department. A few combine technical and secretarial

training, which is an especially valuable combination.

The Medical Division alone employs more than a hundred registered nurses, technicians and laboratory assistants in connection with its activities.

Twenty-seven libraries in nine states are staffed by fifty-five women. Eleven are trained librarians.

Clerical and secretarial workers total 3,000. Almost half are located in Wilmington, where the Du Pont Company is an important outlet for the city's business schools. A few of the secretarial workers hail from other states, but the majority are local girls.

RECREATIONAL INTERESTS

The headquarters buildings are located in the heart of Wilmington's business district. An area approximately three blocks square daily absorbs from noon until 2 P. M. more than 1,400 Du Pont women. Lunch counters are crowded, and stores of all kinds enjoy a midday boom. Not only here, but in all communities in which they live, Du Pont women employees represent an important customer group.

Du Pont women join and support Wilmington churches, civic associations and service clubs; in addition, about 300 active women members find recreation at the Du Pont Country Club just outside the city. Two eighteen-hole golf courses and a dozen tennis courts provide exceptional facilities for the devotees of these sports. Women members participate in all the golf and tennis tournaments as well as the many social activities in the clubhouse throughout the year. At the moment, interest centers on a new and larger house which will be built to meet the needs of the rapidly-increasing membership. Incidentally, the Board of Governors' roster customarily includes an active woman member.

The winter program of activities for women includes monthly dinner parties, bridge luncheons and evening bridge parties. Average attendance at these functions is about 125. Private parties are organized at no cost except for food, which is notably good.

Also from October through April each year, about 150 Du Pont women are organized in three bowling leagues. At the end of the season, banquets are held at the Du Pont Country Club, where team and individual trophies are awarded.

So much for the work and recreational pursuits of women employees in the Wilmington area. Now what about those in other communities?

Approximately 4,000 women are engaged in manufacturing hundreds of diversified chemical products. In jobs involving manual work only, women operators generally report to women supervisors, or foreladies. If machines are used, however, supervision is exercised by foremen who know what to do when mechanical breakdowns occur. Women are not engaged in handling toxic compounds, nor are they employed on any but day shifts.

The Rayon Department is the largest employer of feminine factory workers. Rayon and nylon yarns, "Cellophane" cellulose film, cellulose sponges and "Cel-O-Seal" caps and bands for bottle closures are all products in the manufacture of which women are concerned.

Twelve hundred women are kept busy in Du Pont

rayon plants in Virginia, New York State, and Tennessee. After the syrupy viscose or acetate solution emerges from the spinnerets and hardens into continuous filaments, the product passes into the hands of women operators. Trained inspectors classify the yarn according to definite grade standards. Appearance and "feel" guide their decisions on the sorting rack. Some women chemists, too, are found working in the plant laboratories.

At Southern rayon plants foreladies and women's group leaders are participants in the Company's foreman-training programs. At discussion meetings both men and women cooperate in solving the problems relating to operation and personnel.

At Buffalo, we find 150 women assorting, inspecting and packing "Cellophane," cellulose sponges and caps and bands. At the Richmond and Old Hickory "Cellophane" plants, almost a hundred more are engaged in similar activities. Initial inspection of cellulose sponges involves the use of the X-ray to detect any foreign particles in the sponge blocks.

Nylon is of special interest to women because of its extensive use in fine hosiery. More than a hundred women are employed at the Seaford, Delaware, plant, spooling, testing and inspecting the yarn; as at Richmond and Old Hickory, they work under the guidance of foreladies who are also active in the foreman-training courses.

ASIDE FROM TEXTILES

It may surprise you to learn that the Explosives Department in one of its plants employs more women operators than are required at any other Du Pont plant manufacturing a single product. At Pompton Lakes, New Jersey, almost 700 women assist in the manufacture of small metal cylinders which, in finished form, become electric blasting caps. Before any high explosive is loaded, they skilfully solder, seal, and test these caps, many millions of them in the course of a year.

At Arlington, New Jersey, the Plastics Department employs more than a hundred girls for a variety of operations. One group, for example, inspects fountain-pen barrels, measuring their diameter and examining them closely for defects at the rate of 750 to 850 an hour. Another group inspects the plastic sheets which are used for safety-glass interlayers to make sure they are of specified thickness and free from any defects.

Let's move on to the Leominster, Massachusetts, plant where tooth brushes and hair brushes are manufactured by the Plastics Department. Here, more than 300 women are sorting, inspecting and "bundling" nylon bristling filament, decorating plastic articles and packing the finished products.

At Bridgeport, Connecticut, Ilion, New York, and Kings Mills, Ohio, more than a thousand women serve the Remington Arms Company as inspectors, packers, polishers and bench workers. Before Remington shot shells are loaded, sharp-eyed girls, aided by mirrors placed at precise angles "fore and aft," are able to see at a glance the outside, inside and bottom of each shell. Similarly, the inspection of delicate gun parts is one more instance of the aptitude of women for work involving sensitive fingers and patience.

Go with me to the Du Pont plant at Newburgh,

New York, where pyroxylin-coated fabrics are manufactured, and watch women cutting and sewing the washable strip material into card-table covers, shelf-linings and table mats. See women operators at Parlin, New Jersey, helping to make motion picture film. At the Technical Laboratory, Deepwater Point, New Jersey, you will find more than a hundred women employees preparing dyed samples for distribution to the dyestuffs and textile trades.

In New York City, a small group of women style writers strives to make American women more familiar with Du Pont products for the household and for the fashion field. They maintain contact with important women's service groups, cover trade conferences, handle annually hundreds of inquiries from publications and women's groups.

More than 1,500 clerical and secretarial workers are scattered among branch sales offices and the offices of plants and laboratories throughout the country. There is no great concentration of these workers in any one location. News garnered from thirty plant publications, however, indicates that Du Pont women everywhere have their own clubs, athletic teams, and social activities. Their economic and social positions in various communities compare with those occupied by Du Pont women employees in Wilmington.

Clubhouse facilities for men and women workers are available at all the large Du Pont Company plants.

EMPLOYMENT NEEDS

The story of Du Pont women employees is repeated, with variations, in virtually all important industries, and for the same reasons. There are millions of women who *must* not only support themselves, but others as well. The Women's Bureau of the U. S. Department of Labor estimates that more than one-tenth of the em-

ployed women in the United States are the sole wage earners in families consisting of two or more persons.

In our American industrial economy, there is a proper niche for everything and everybody. Women are fast finding theirs, thanks to more intelligent vocational guidance, which is reflected in the changing curricula of commercial and graduate academic schools. Today, the emphasis is on training that will prepare young women for work that is suitable and easy to find.

Personnel executives of most large companies give much thought to problems of young women. Every effort is made to provide suitable jobs that girls are qualified to fill—jobs that are compatible with the varied temperaments and personalities of the applicants.

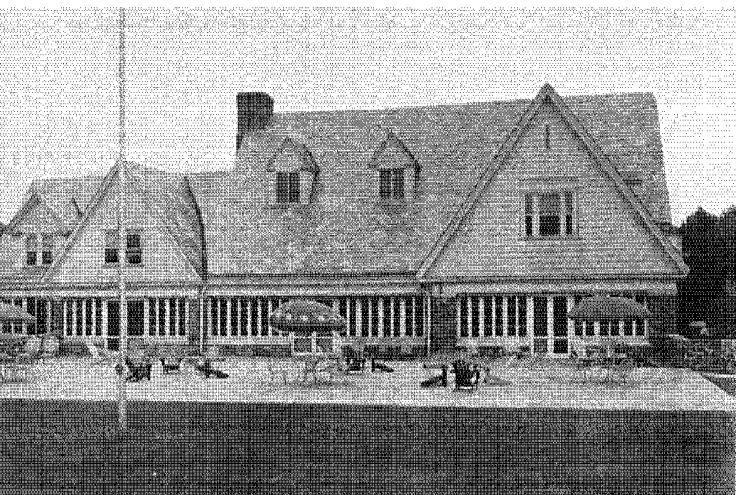
Under the improved working conditions generally existing today, women enter into their work with as much zest and enjoyment as they bestow upon other pleasant elements in their lives. This attitude is a tribute to the enlightened employment policies of business and industry, as well as to the carefully-trained, well-balanced personnel organizations of all progressive companies.

As an employer—and, specifically, as an employer of women—the Du Pont Company's policies with respect to industrial relations and benefit plans are enlightened and progressive.

Women employees share equally with men, in plans which include accident and health insurance; salary allotment insurance, disability wages, special assistance to employees, vacations of two weeks with full pay for wage-roll and salary-roll employees, and pensions for employees.

The group of pensioned women workers in the Du Pont organization is not a large one—less than fifty—which reflects the fact that relatively few women entered the business field until the World War. But this picture is changing. As of this date more than 2,500

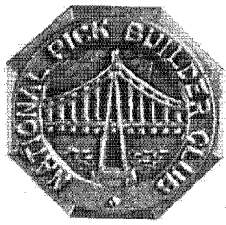
women have worked ten years or more for Du Pont. Undoubtedly, the great majority of them will continue in service with the Company until eventually the time comes for their retirement.



The Du Pont Country Clubhouse where many women employees of the Company in the Wilmington area are active in the sports and social activities throughout the year.

At the noon hour each day many women employees leave the headquarters office buildings after lunch to go shopping in the central city district. This view shows a few of them near the Tenth Street entrance of the Du Pont Building.





Toothpick Engineering

A dentist's childhood dream becomes a popular hobby with the organization of the National Pick Builder Club

By JEWEL B. DE BONILLA

IN THE midst of your every-day tasks, or at home after the long day's grind, does your mind suddenly go off at a tangent and bring you visions of far-away places with yourself in the heroic role of empire builder, flinging web-like trceries of steel across deep chasms or building fanciful towers and palaces of architectural perfection? Do your fingers itch, then, to get to work? It is the creative instinct in you seeking expression.

Well, perhaps you weren't cut out to be an engineer or an architect. Perhaps life has tucked you away into one of the less glorified professions or businesses. What of it? You can still find an outlet for that creative urge, for there's a new hobby abroad in the land . . . toothpick engineering.

How did it start? Twenty-two years ago, a boy of twelve dreamed a brave dream—of becoming a great engineer. The urge to build was so great that he took to constructing things with whatever materials came to hand; thus, when even the simplest of kits was not available, toothpicks and glue became the logical standbys. His first major achievement ended in tragedy, however, for the beautifully executed model of France's famed Eiffel Tower which he had laid away with such tender pride on that hot summer's night was naught but a mass of meaningless sticks when he ran to view his work next morning. The glue had melted in the

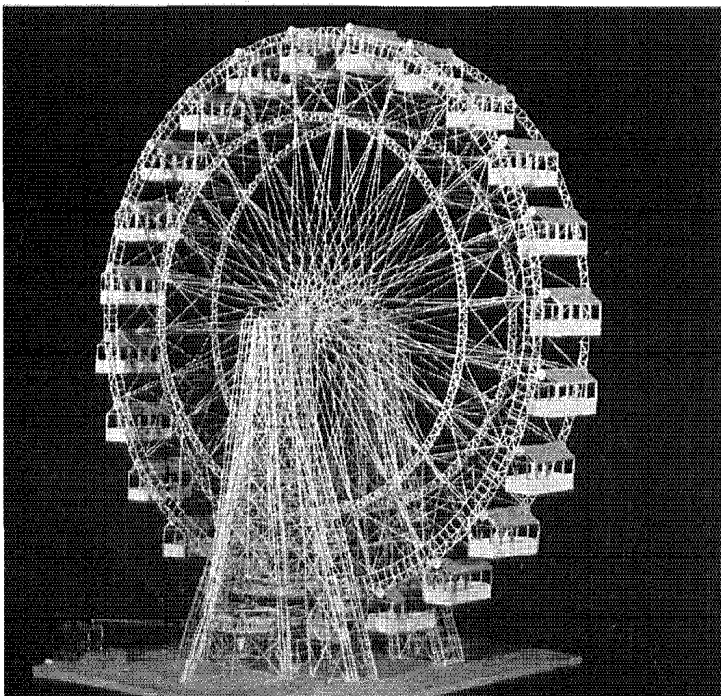


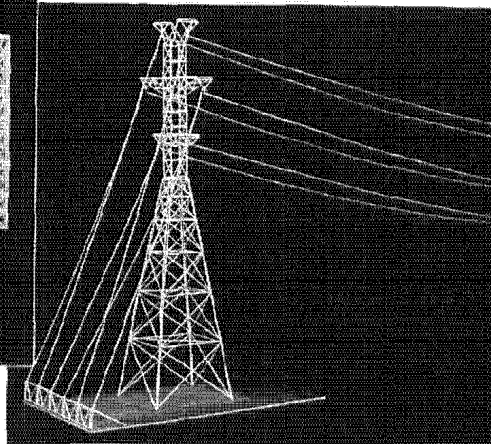
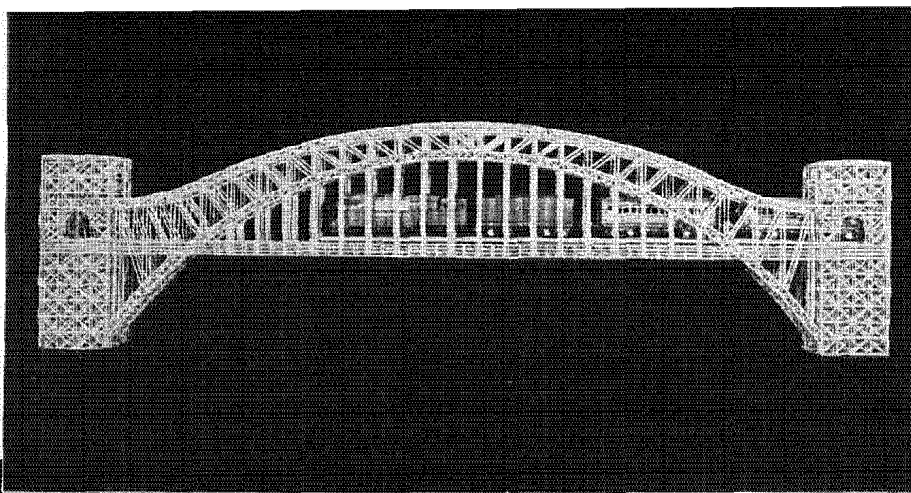
Dr. and Mrs. M. Russell Stein at work constructing a fire-tower from their carefully-drawn plans. Note, above left, the base of the Eiffel Tower model which stands 7½ feet high. Below, left, the Ferris wheel model which required about 25,000 "picks" to make. The builders spent a month and a half's spare time on this project.

excessive heat. But the young lad was not engineering-minded in vain. He studied his problem carefully and experimented with a number of materials until he found a combination that would hold fast even under the pressure of heavy weights—flat toothpicks and household cement.

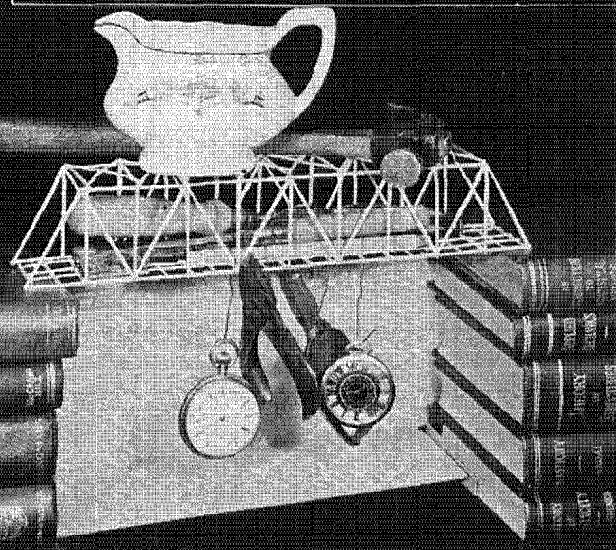
Today, the boy with the ambitious dream is a successful New York City dentist, Dr. M. Russell Stein, who also lectures on anthropology at Columbia University. His youthful knack for construction he has developed into the fascinating hobby of toothpick engineering and some of his recent projects have been so complicated in craftsmanship and intricate in design as to be undreamed of even in the wildest flights of boyhood fancy. Mrs. Catherine Stein, his wife, derives equal pleasure from this constructive hobby and together they have built some architectural and structural masterpieces that are such accurate models and work so well that even practical engineers marvel at their perfection.

Dr. Stein begins his projects with carefully drawn plans. Each section is designed and laid out on paper; the toothpicks are placed along the lines of the drawing and then cemented together. Various sizes of beams and girders are achieved by cementing the picks in lengths of two, three and four. Completed flat planes are tied in place with string and then cemented. The only tool required is a pair of small cutting pliers.





The miniature arch bridge pictured at the left, above, is a well-designed structure consisting of approximately 31,000 individual pieces. It is supporting a toy train that weighs thirty pounds. Shown above is a twenty-inch model of a high-tension tower, with even the cables made of toothpicks cemented together.



Bridges, large and small, towers, swings and Ferris wheels are only a few of the interesting possibilities open to model builders. The ten-inch truss span pictured directly above tips the scales at less than half an ounce, but it is strong enough to support the combined weight of all the articles shown here. It has even carried a six-pound flatiron without buckling—proof of its sturdiness.

Some of the outstanding creations of the Steins are illustrated here. The replica of the Eiffel Tower stands seven and a half feet high and contains about 30,000 picks; it took a month to make. The arch bridge, with two towers and a span of forty-four inches, is fifty-two inches long, has 31,000 pieces and was also built in a month's spare time. It is shown here supporting a toy train of thirty pounds which, according to Dr. Stein, is far less than its actual load capacity. Perhaps most remarkable of all is the Ferris wheel with its twenty-four free-swinging cars. In this working model, turned by a seventy-five cent motor run by batteries, about 25,000 picks were required, each little car containing 250. The gears are toothpicks, the bearings collar buttons and the axle and drive shaft, broomsticks. One month and a half of painstaking and skilled effort was rewarded by this exquisite but amazingly workable miniature.

Not all of these projects require so long a time to complete. On a single afternoon, a twenty-inch replica of a high-tension tower was built and, on another afternoon, a model of a giant swing with

twelve cars rotating in a two-and-a-half-foot circle. Truss bridges are also quick jobs, but competent, for though a ten-inch span weighs but half an ounce it can support several fairly heavy articles, even a six-pound flatiron.

These really remarkable pieces of toothpick engineering have aroused great interest and elicited much praise, admiration and inquiries. Following the suggestion of his friends, therefore, Dr. Stein has organized the National Pick Builder Club, Inc., with headquarters at 119 West 57th Street, New York City. Its purpose is to furnish model builders with carefully prepared plans of various structures to be made with toothpicks and cement, and to conduct an ethical educational program through members, schools, hospitals and public institutions.

Since one of the major materials used in the construction of these models is "Duco" Household Cement, Dr. Stein's creations were put on display during the past summer in the products showrooms of the Du Pont Exhibit at Atlantic City, New Jersey. During the month of July alone, approximately 225,000 persons, who came from all parts of the country, saw the display and most of them stopped to carefully examine the models. The demonstration was held over, by popular request, for another two months and thousands of cards and pieces of literature on the National Pick Builder Club were distributed to interested visitors. All of which is indicative of how the new hobby of toothpick engineering has "caught on."



"Duco" Household Cement, packaged in convenient tubes, is well recommended for joining together firmly the tiny pieces used by the model builders in their work.

Christmas Gifts with Personality



By JAMES SHELLINGER

Americans are naturally generous and love to bestow gifts. Not only on the conventional birthdays, anniversaries and weddings, but on all sorts of occasions, we offer these tokens of affection or esteem. But, of course, the real peak, the grand climax of our gift-giving comes on Christmas day.

During the days preceding this great holiday, the stores are jammed

with shoppers, everyone in a dither trying to find appropriate gifts for Aunt Mabel, Grandfather or the country cousins. Finally, the all-important purchases are made; the Christmas list is checked off. Then comes the most exciting ritual of all—adding the personal touch, giving to each of the gifts an individuality that transforms it from a commercial to a personal thing.



Due to conditions abroad, many of the European novelties for tree decoration are no longer available. Thanks to the ingenuity of American manufacturers, however, there will be no shortage of Christmas decorations this year. "Cellophane" cellulose film Sparkle Balls and Spirals for the tree are new items.

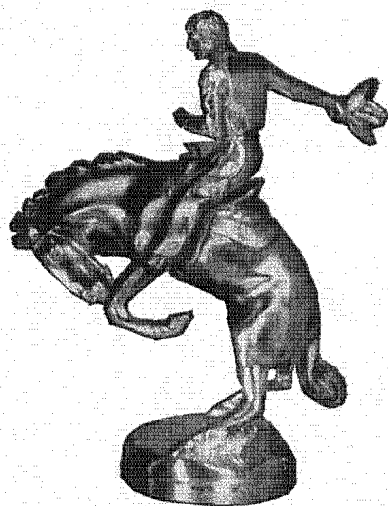
Never before has there been such a variegated assortment of gift-wrapping materials to help in this fascinating task. Sheets of sparkling "Cellophane" cellulose film and cleverly designed ribbons, colorful cords and decorative straws made from the same transparent material are just a few of the accessories which will help to personalize your gifts.

Gift-wrapping, like many other arts, has tricks and short cuts that make the whole thing comparatively easy. It's lots of fun to wrap presents, but even more so if you know how to get unusual effects with a minimum of effort. A booklet entitled "Gift Magic with 'Cellophane'" tells how to use these materials to the best advantage. For your copy, just write to Department 15, Du Pont Company, "Cellophane" Division, Wilmington, Delaware.

Base Metals in Fancy Dress

Modern electroplating processes assure lasting beauty and protection to metal surfaces

By J. J. LANDY



MANY articles, familiar to us through daily use, owe their attractive appearance and serviceability to a durable, protective coating of another metal applied by electroplating. This process has been in use for the past hundred years, yet, despite many refinements, the basic principles have not changed. These involve the deposition of one metal on to the surface of another by means of an electrolyte, a solution in which a solid piece of the surfacing metal is suspended and in which the unplated article is also immersed. Electric current is then made to flow through the solution from the surfacing metal—the anode—to the article—the cathode. In so doing, it picks up metal from the electrolyte and deposits it uniformly and beautifully on the article. During the process, the anode gradually dissolves in the solution, thus keeping up a constant supply of metal for deposition.

Few people realize how many important contributions to every-day living have resulted from technical progress in this industry. Look about you. Wherever you see metal, there is a good possibility that it involves

plating. The silver spoon, unless it is sterling, is not silver throughout. It is made from an inexpensive base metal electroplated with silver, which gives it that brilliant, decorative, durable finish. Modern plating methods thus take attractive silverware out of the luxury class and bring it within reach of everyone. The familiar tin can is iron with inner and outer jackets of tin; thus plating makes safe and sanitary containers for our foods and other products. The shining chromium surfaces on automobile trim, hardware, golf clubs and your electric toaster are typical of the practical, lasting beauty obtainable through electroplating.

Today's achievements in plating are almost beyond one's imagination. Experts have produced gold deposits so thin that the finest tissue looks like a wood plank in comparison. These coatings are measured in millionths of an inch, yet they give a beautiful and fairly lasting finish to jewelry and other articles. But the process is not confined to thin coatings of precious metals for decorative purposes. This is but a small part of the service rendered by modern plating.

It is in the battle between man and nature—the continuous war against corrosion of materials such as iron and steel—to fend off the forces exacting a loss estimated at \$10,000,000 daily, that plating is a vital necessity. Steel is cheap and strong and needed for many useful things, but it must be protected from the weather, moisture and other destructive influences. Plating it with zinc or cadmium affords this protection.

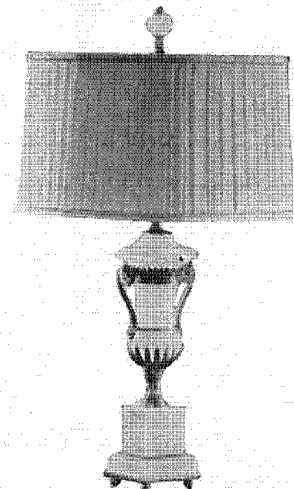
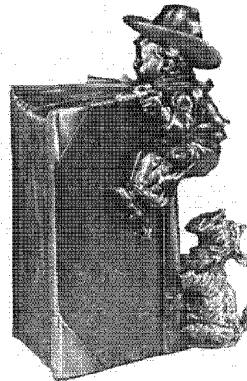
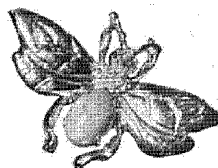
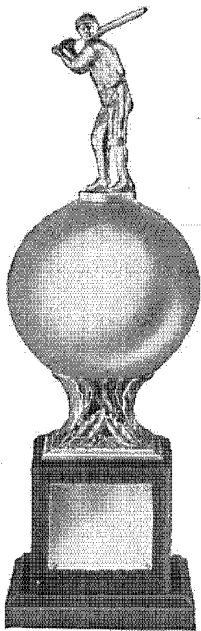
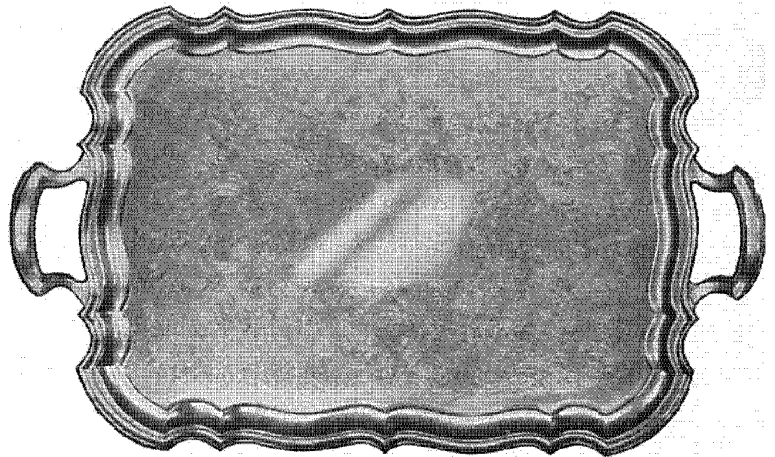
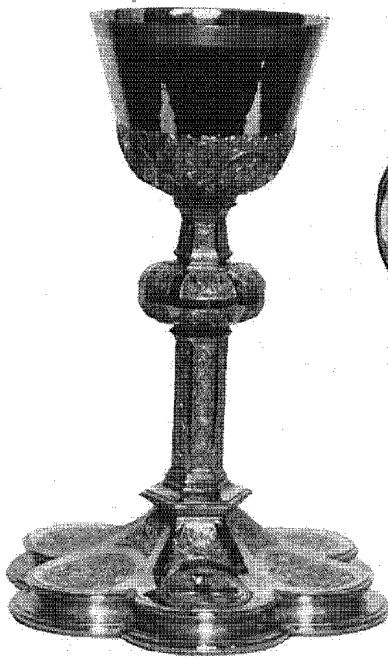
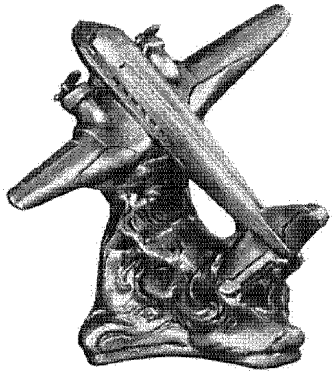
In general, electroplating is widely used for the purpose of beautifying less expensive and more utilitarian metals. Many different processes are required for the various attractive finishes now available. The Electroplating Division of the Du Pont Company offers no less than sixteen major processes, each of which can be modified to produce scores of diverse finishing effects.

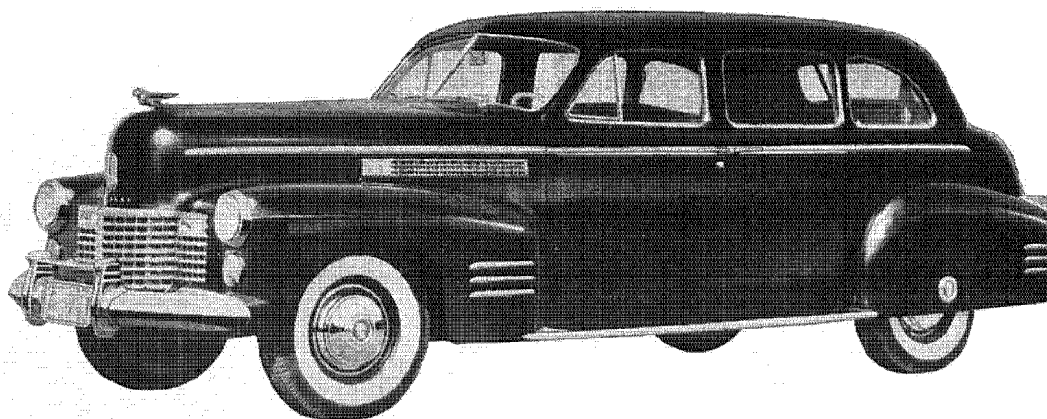
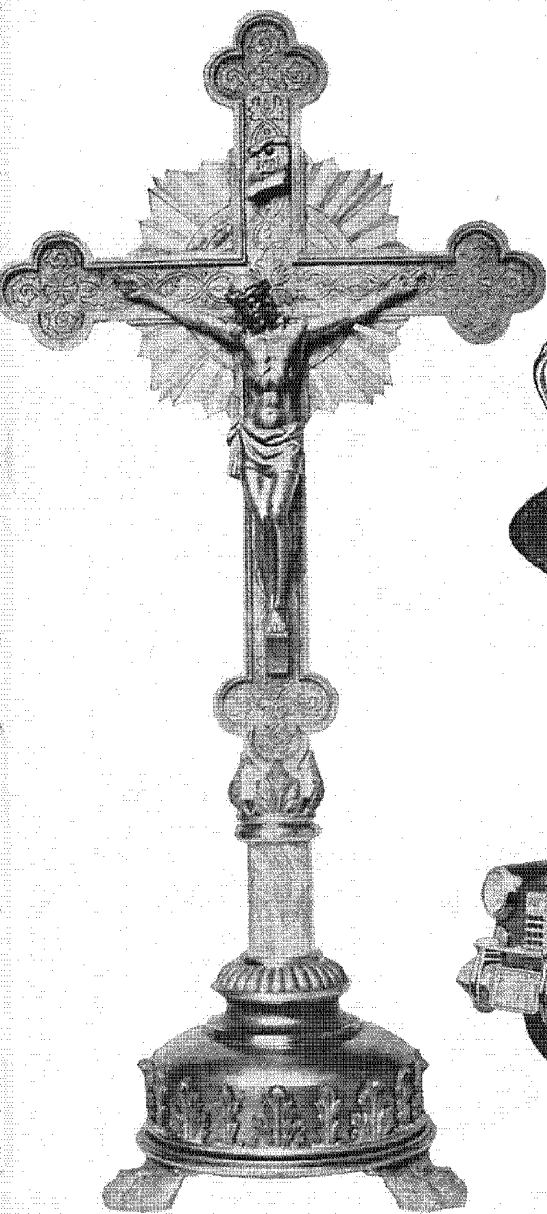
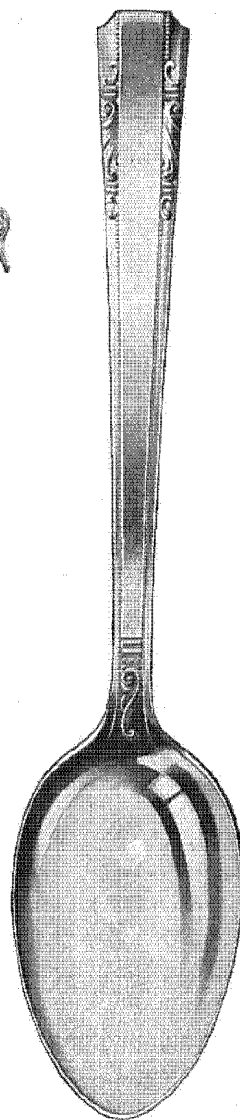
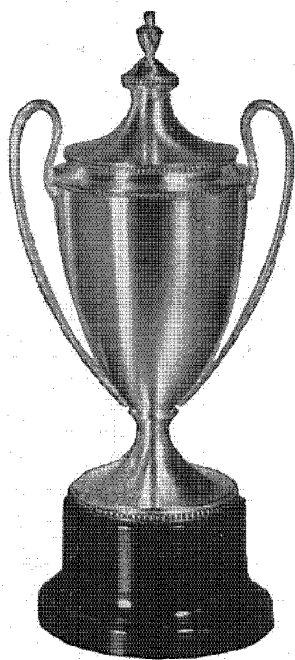
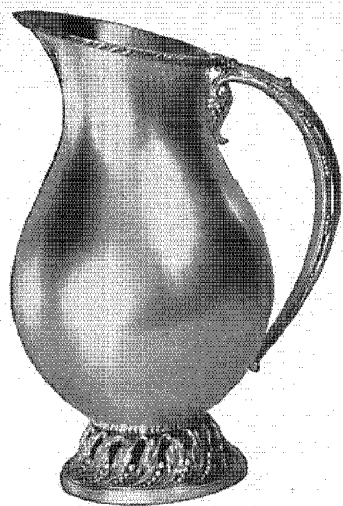
Zinc is not ordinarily considered a bright metal, but one of these processes makes possible extremely bright to brilliant zinc finishes. "Cadalyte" finish, a silvery-white cadmium plate, can be had from gleaming to satiny effects. Also available now are yellow gold and a brush gold novelty finish, a bright and oxidized silver, bronze, nickel, chromium and tin. There is even a lustrous jet black surface, achieved by molybdenum nickel plating. Quite recently two new processes, which make it possible to obtain coatings very quickly, have been introduced for industrial plating. These are High Speed Copper and High Speed Brass, which operate at from two to four times the speed of old processes and produce smooth, bright, uniform coatings much thicker than are obtained by other methods. To industry High Speed Copper means a quicker, surer method of getting bright, protective undercoating for decorative surfaces of nickel and chromium. To the consumer, it means a better and more durable metal finish.

The change from an art to a science in electroplating didn't happen overnight. New chemicals and processes are the results of years of planned research and development. They may seem new to you, but not to electroplating chemists who are constantly striving to improve surfaces for modern living. See a few examples of fine plateware on the next two pages.



Illustrated on these pages are just a few among the many thousands of electroplated things that are distinguished for their beauty. They all have their places in the scheme of American living. Plating art has made them possible.





Chromium plating plays an important part in the appearance of 1941 automobiles. This new Cadillac is a typical example.

THE DU PONT MAGAZINE

PUBLISHED AND COPYRIGHT 1940 BY

E. I. DU PONT DE NEMOURS & CO.
Incorporated

WILMINGTON, DELAWARE, U. S. A.

Subscription \$1.00 the year

E. R. MANCHESTER, EDITOR

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Vol. XXXIV HOLIDAY NUMBER No. 12

Peace on Earth...

CHRISTMAS 1940 finds the world in greater need of a spiritual uplift than ever before in history. Angelic voices are still singing "on earth peace, good will to men," but in many lands the din of war drowns out the chorus. The star of hope still shines to guide people of good will everywhere toward peace and understanding.

May the spirit of the Prince of Peace control our lives in these times and be a living influence not alone on Christmas day but throughout the year to come. To all readers of this publication we offer hearty greetings and good wishes.

Three Anti-Freeze Products

BY THIS time millions of motorists have already protected their cars by the addition of anti-freeze in the cooling systems. And well they know it is a wise precaution; for when the mercury drops to 32° and below—as it has a way of doing at this season—it is annoying to discover a frozen radiator or cracked engine block as the price of neglect.

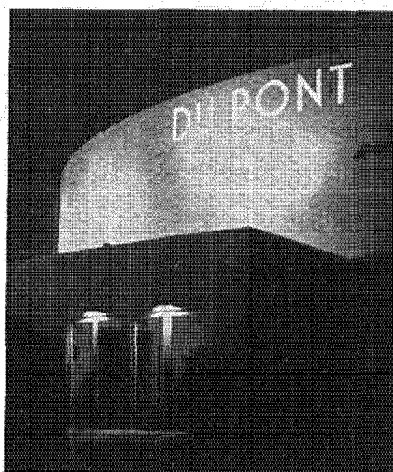
Anti-freeze solutions—and there are many on the market—are designed to keep car-cooling systems in serviceable condition, even at sub-zero temperatures. And this year for the first time motorists have a choice of three well-recommended products of Du Pont manufacture. You have seen them advertised at service stations under the trademarks "Zerone" Anti-Rust Anti-Freeze using methanol as a base;

"Five Star" Anti-Freeze, based on ethanol and containing seven other blended ingredients, and "Zerex" permanent-type ethylene-glycol anti-rust anti-freeze.

Looking Backward

FOR one theater party, 9,734,438 people are a lot of guests! But the Du Pont Company was host to that many at a varied and dynamic continuous show averaging an hour's duration for each guest. The party which began May 30, 1939, and ended October 27, 1940, was the Wonder World of Chemistry exhibit at the World's Fair in New York.

The spectators of a similar show at San Francisco's Treasure Island



in 1939 raised the total to 11,792,637 new or renewed acquaintanceships which Du Pont made among Fairgoers in the two years.

Perhaps it may not matter much to posterity that the 4,371,227 visitors to the 1940 Wonder World of Chemistry in New York saw 8,500 miles of nylon thread being knitted, looped, seamed and pre-boarded into lovely nylon hose; that 27,360 tooth brushes were bristled with monofilaments of nylon; that 10,000 sparkling tumblers were made from "Lucite" methyl methacrylate resin molding powder. Guests saw a crystal-clear "Lucite" rod vigorously thwacked on the counter some 20,000 times without breaking; 40,800 pieces of safety glass made and broken by a steel ball which exerted enough energy over the season to lift the four-million-pound Trylon three inches off the ground;

a "Fabrikoid" pyroxylin-coated chair cushion given punishment equal to 1,183,000 average-sized adults sitting in it and getting up again, with no sign of failure; a "Cavalon" rubberized fabric covering on a bar stool "sat upon" by mechanical proxy 2,376,000 times without breaking down; 2,000,000 household flies slaughtered in the fly-spray testing chamber; 6,120,000 yards of acetate rayon yarn manufactured on one of the world's smallest rayon spinning machines; 3,769,400 Spanish peanuts automatically wrapped in "Cellophane" cellulose film, and the containers given away to visitors. We could go on like this indefinitely.

But it is important that four and a third million visitors in 1940 and seven and a third million in 1939 were given a comprehensive view of the chemical industry at work. Most of them—if we are to judge by voluntary comments, the reports of Du Pont salesmen throughout the country, and independently-conducted public-opinion surveys—came away with a greater appreciation of the way Du Pont makes "Better Things for Better Living... Through Chemistry."

"What a Yarn!"

MARGARET FISHBACK'S verse about nylon, reprinted by permission in the October number of this Magazine, has inspired a reply in kind by Janet Delmonte, of Glendale, California. The original verse expressed what "Dad" considered a bully good idea, and we quote:

"Said Dad to his expensive daughter,
'These stockings made of coal and water,
With just a little air thrown in,
Sound economical as skin.
With summer here, I've coal to burn
Left in the bin, so kindly learn
To knit your own, since we have air
And also H₂O to spare.'"

His suggestion is spurned in the answer by Mrs. Delmonte:

"Said daughter to her stingy Dad,
'Now you look here, you old tightwad,
With water, air, and coal to burn,
There's still so much I have to learn,
'Twould be a crime to waste my time
On things that Du Pont's do so fine,
So I will buy my nylon hose,
And then you watch me catch the
beaus.'"

NOTE:—While this controversy rages, we think it well to mention that Du Pont produces nylon yarn; hosiery manufacturers knit the stockings.

WHAT'S NEW

A GENERAL price adjustment and reduction on all nylon yarns manufactured by the Du Pont Company became effective October 28, according to an announcement by the Nylon Division. Two types are produced at the Seaford, Delaware, plant—a hosiery yarn, which is used largely for ladies' full-fashioned stockings, and a "high-tenacity" yarn for other textile uses such as sewing thread, braided articles, fishing lines and webbing. Both types of yarn are basically the same. The "high-tenacity" yarn, however, has less stretch but ten per cent higher breaking strength.

On the net weight basis, price reductions on low-turn hosiery yarns which are sent to commercial "throwsters" for processing range from seventeen to thirty-two cents per pound, as shown below:

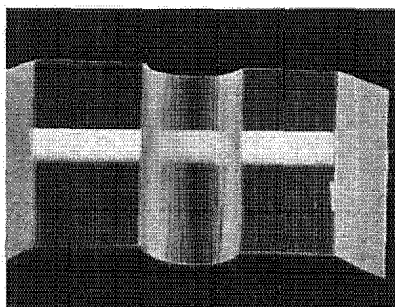
Denier	Filaments	Turns	Price per Pound	Reduction
30	10	2	From \$4.27 to \$3.95	.32
40	13	2	" 3.52 "	3.27 .25
70	23	2	" 3.17 "	3.00 .17

Computed on the net weight basis, price reductions on fully processed hosiery yarns ("thrown" at the Seaford plant) are as follows:

Denier	Filaments	Turns	Price per Pound	Reduction
30	10	30	From \$4.93 to \$4.88	.05
40	13	10	" 3.83 "	3.80 .03
40	13	25	" 4.07 "	4.04 .03
70	23	10	" 3.46 "	3.40 .06

Nylon yarn was introduced to the textile trade commercially early this year. Prices had remained at the same level since the first pound was sold from the nylon research laboratory in October, 1935. Increased volume and operating economies have made possible the present reductions announced only ten months after the first unit of the Seaford plant started operations.

"MYCOBAN" propionate salts to inhibit mold and rope in bread have been reported previously in this Magazine, but a recent announcement by the Company indicates that they have a wider range of practical applications. Tests reported by both dairy producers and dairy bacteriologists of several agricultural colleges show that the use of these salts will prolong the mold-free life of cheese and butter by as much as 200 to 300 per cent. "Mycoban" products are sold by the National Ammonia Division of the Du Pont Company, Frankford P. O., Philadelphia, Pennsylvania.



LOUVERGLAS, made from "Plastacel" cellulose acetate sheeting, is manufactured by the Plastics Department of the Du Pont Company for the Doane Products Corporation of Meriden, Connecticut. According to the angle from which it is viewed, as shown in the accompanying illustration, Louverglas appears either as transparent sheeting, with tiny, vertical hair lines, or midway between transparency and translucency. This material, intended primarily for fluorescent lighting fixtures, is said to combine the efficiency of direct lighting with the comfort of indirect illumination.

FACTS concerning polyvinyl acetates, the thermoplastic resins produced by the Du Pont Company, are contained in a technical bulletin issued by The R. & H. Chemicals Department. Information concerning different grades and specific applications is given. The bulletin also contains a discussion of the uses of polyvinyl acetates in various industries. Copies may be had on application to the Wilmington office.

THE Dyestuffs Division of this Company has added to its line:

"Polyform" Scarlet 2GF (P.A.F.): Produces very yellow shades of scarlet, particularly on viscose rayon.

"Polyform" Blue 2RF (P.A.F.): Highly recommended as a ground shade on viscose process rayon that is subsequently to be discharged.

"Ponsol" Green 2BL Paste: A new anthraquinone-type vat color, with exceptional fastness properties, for use on uniform cloths, work clothing, awning fabrics and the like.

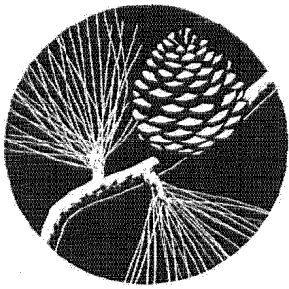
"Diagen" Bordeaux MR (Pat.): A stabilized azoic printing color for cotton, and well suited for use on fabrics that are subjected to occasional laundering.

"Diagen" Red Violet DR: Another printing color producing reddish shades of violet, similar in strength to those of "Diagen" Bordeaux MR, but considerably bluer in shade.

A NEW concentrated detergent, trade-marked "Modinal" D, has been announced by the Gardinol Corporation, Wilmington, Delaware. The greater strength of this product, in comparison with "Modinal" ES, permits of economies which should broaden its use. The new detergent, almost equally efficient in hard and soft water, is a wetting and penetrating agent, dyeing assistant and general all-around surface active agent. It is recommended for all fibers and can be obtained from the Du Pont Company, Wilmington, Delaware, a sales agent.

A NEW Super-Clear Varnish finish designed for use on floors, interior trim and woodwork, and exterior work not completely exposed to the elements, has been announced by the Finishes Division of the Du Pont Company.

This varnish, the latest development in the research laboratories of the Division, possesses good durability, is excellent in its resistance to both hot and cold water, and dries overnight. It is unusually high in gloss and build, but at the same time shows little discoloration over light-colored woods. It is recommended for previously finished as well as new and unfinished woods.



Uncle Bert solves some Gift Problems

By DUNBAR S. REYNOLDS

UNCLE BERT stretched his slippered feet out to the cozy warmth of the hearth fire. The resinous smell of burning logs seemed to bring his beloved woods indoors. Evergreen wreaths in the windows, holly sprigs over the mantelpiece and mellow pine-paneled walls, all proclaimed the return of the holiday season. Aunt Martha and Gladys had gone about their decorating tasks with so much enthusiasm, he reflected, that it was perhaps a veiled hint for him to make some effort to get his own Christmas shopping done.

"Well, maybe they're right, at that . . . only a few days left, now." Picking up the Barnesville "News," he spread it out on his knees, refilled his pipe, and settled down to a leisurely study of the advertising pages. Possibly he might get some idea of gifts for his family. He already had a deposit down on a fur coat for Martha, but Christmas or not he would have purchased that anyway. What else could he get her?

He turned another page and read about a special showing of Christmas gifts at the Hendricks Hardware Store. The advertisement gave him some idea of the offering. One picture of an attractively arranged kitchen featured gleaming cutlery and utensils. Maybe she'll like some of these gadgets. Below it was an appeal to sportsmen: "With a Remington gun you'll be sure to bag your game!" "There, by golly, is the gift for Fred. Guess I'll mosey down to Barney Hendricks' store."

Although reluctant to leave his cozy nook, he put on his shoes, stumped into the hall, wound a shaggy muffler around his neck, put on his overcoat and hat, and strode out into the blustery December night. Already a light mantle of snow lay on the ground and large flakes were still whirling about.

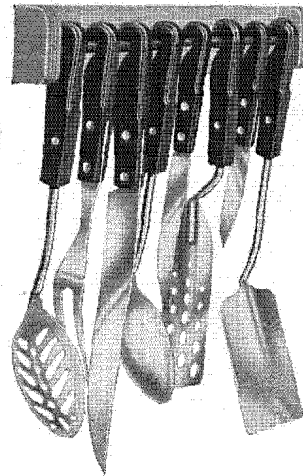
Arriving at the store, he was still brushing the snow from his coat, as Barney came forward with the usual greeting: "Hi, Bert, how's tricks?"

"Can't kick. But I'll be glad when this danged holiday is over. Don't know what to get the family. Noticed your ad. in tonight's paper and thought I'd drop in and see your stuff. If it's half as good as it looks in the paper you've got a customer."

"Here's the works . . . from the Remington line.

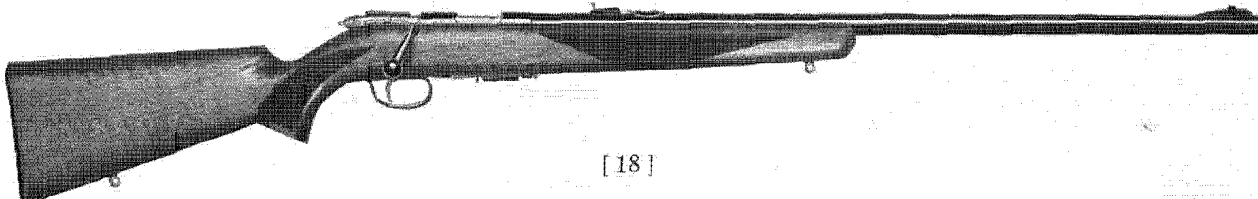
Where do you want to start? A rifle for the youngster? Righto. Here's a dandy . . . my own lad has been pestering me to give him one. It's a 'Sporter' . . . swell general-purpose .22 with detachable magazine box and streamlined sporting stock. Reasonably priced, too."

Raising the gun to his shoulder, Uncle Bert sighted it, put it down again, looked over some others and finally allowed the Sporter was the ticket. "Fred's only fourteen, but I guess he can handle this gun. Wrap it up and put in a carton of those .22 long rifle cartridges, too."



"Now, how about some streamlined kitchen tools," he continued. "Martha's crazy about cutlery and might like some."

Barney led him to a model kitchen, set up in a corner of the store. Hanging on the wall was a "No Fumble Rack" containing a complete set of kitchen utensils—pancake turner, parer, mixing spoon, knives and a fork. He demonstrated how each piece fitted into its place by means of a notch in the handle. "Mark that one as sold," said Uncle Bert. And then his roving eyes were attracted to a set of stainless steel tableware with red plastic handles.





"These Domino sets are the very latest. They come with ivory handles, too, and look mighty nice."

"Guess we could use some new tableware." A pause followed as Bert critically examined the knives. Then, looking up, he added, "I'll put a set under the tree for Martha, a set with the red handles."

"One thing more, give me one of those Boy Scout sets for Fred and those heavy brass candlesticks for the living-room. Martha's been hinting about them and I've found it pays to give the missus what she wants."

As Bert surveyed the pile of gifts, he said, "Well, I guess that takes care of everyone but the pooch. Hand over that harness for Snooper. I'll let the wife do the picking for Gladys."

As Hendricks started to pack the order, Uncle Bert aimlessly strolled around in the store examining various and sundry items of merchandise. He was looking at a de luxe carving set. Barney came up at that moment with the package, and, noting this further evidence of interest, said, "You've selected useful gifts for the family, why not give yourself a present? Martha was in yesterday looking at this Remington Master's Special which is really a fine set—buffalo horn handles, high-carbon steel blade, hollow-ground to a razor edge that stays sharp . . . said she wanted to buy one for you, but didn't dare to make the purchase."

Uncle Bert was already fingering the set with the pride of ownership. Finally, he said, "All right, I'll take it," and with that selection he declared that he was through for the night.

"I'll shut up shop, too; it's getting late. Come along, I'll take you home in the flivver."

On arriving there, Uncle Bert sneaked up to the attic and hid his treasures. When they were safely stowed away, he came downstairs with an exaggerated air of nonchalance just in time to unlatch the door. Martha entered, beaming excitedly as she dropped a box on the table and hastily untied the string.

"Been Christmas shopping?"

"Sh! Don't let Gladys hear you . . . this is for her, a Clarepotter skeet costume. That'll keep her warm as toast even when shooting weather is brisk. We'll mark it 'To Gladys, with love from Mother and Dad.'"

"That will please her," he said, and his unspoken comment was, "That settles the women problem, too. I guess we're ready for Christmas!"





The Call for Color

By ANSCO G. BRUINIER, JR.

IN THE holiday spirit color plays a major role. While red and green may be dominant at Christmas time, all the hues of the rainbow may now be seen. Perhaps you remember the flashy necktie your wife bought last year under the holiday spell. Shirts, too, are favorite gift items, but this year there will be less cause for embarrassment, for shoppers need no longer go astray on color.

The shirting industry has been outstanding in the successful use of color. While its appeal was recognized many years ago by dyers and printers of shirting fabrics, color did not get full play until the invention of vat dyes. They gave the designer richer materials to work with and the consumer a quality never before approached.

Before the advent of vat colors, the dyes used did not have sufficient fastness to withstand the exposures a shirt is subjected to in service. The disappointments over color failure were many. The dyes and pigments then in general use for printing shirtings imposed limitations in designing and color-fastness properties as well. From 1914 to 1918, the shortage of dyes in the United States brought into use colors of an inferior

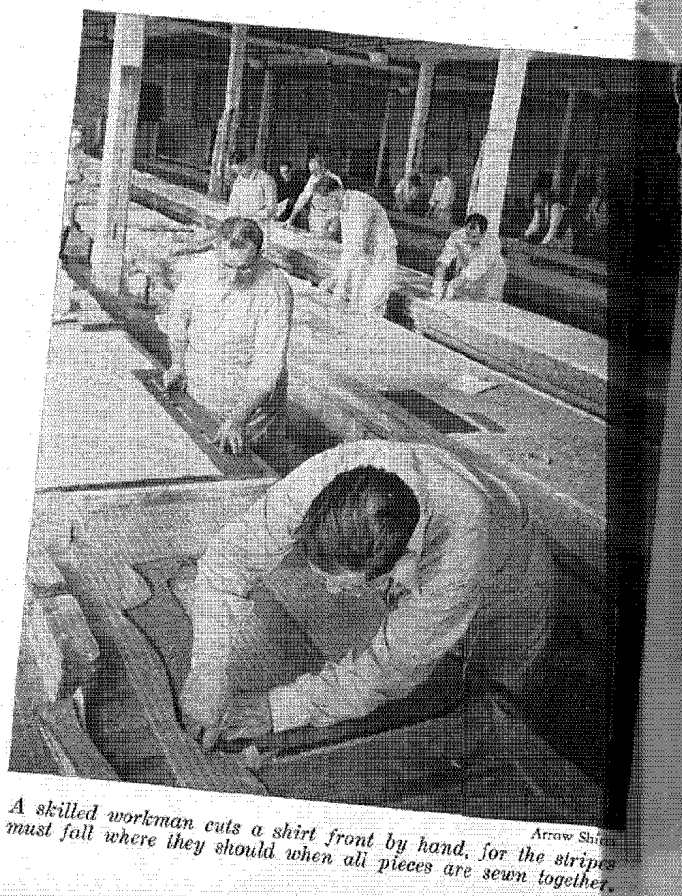
Fast-colored shirts are increasing in popularity

quality. At that time both manufacturers and consumers voiced their dissatisfaction.

Large-scale production of vat colors in America by Du Pont and other chemical manufacturers early in 1920 gave the shirt industry a sound basis for using color, and ever since then the trend in colored shirtings has been on the up-swing. A few years ago the ratio of white shirt sales to colored was in the neighborhood of 65 per cent to 35 per cent. Gradually color moved up, and 1939 saw nearly an even distribution between the two—white, 52 per cent with color taking up the balance. This year, according to the National Association of Shirt and Pajama Manufacturers, over 150,000,000 men's and boys' shirts will be produced with more than half carrying color in one form or another, either printed, dyed in solid shades or woven with colored stripes and effects.

FASTNESS

Attractive designs, patterns and weaves, coupled with harmonious color effects, have a tested sales appeal. But consumer acceptance goes beyond the point of purchase. Serviceability is highly important. Colors are expected to last; they should not fade, wash out, run or rub off.



A skilled workman cuts a shirt front by hand, for the stripes must fall where they should when all pieces are sewn together.

Arrow Shirts

The demand for color has continued to grow because of the general use of the highest-quality dyes available—vat colors. Their resistance to color-destroying influences has been accurately determined, and the industry now recognizes their merits.

Few wash-goods are sent to either the home or professional laundry as frequently as shirts. Week after week they go through soaping, rubbing, drying and ironing. If colored with a vat dye, the color remains fresh and clear after many trips to the tub. The color will outlast the fiber to which it has been applied, and no one should expect better service than that. George Johnson, general manager of the American Institute of Laundering, has this to say: "Shirting materials, either dyed or printed with vat colors, are able to withstand repeated laundering satisfactorily, according to the numerous brands of shirts which are guaranteed to the consumer under the Institute's Laundry-Tested and Approved Seal." Millions of shirts annually are now processed with vat dyes, and the consumer gets complete color satisfaction without even asking for it.

VERSATILITY

Vat colors may be applied to materials intended for shirtings by piece-dyeing, yarn-dyeing, and by printing. During the past several decades much progress has been made in the technique of applying this group of colors, and the processor is no longer restricted to pastel shades, pencil stripes and small, figured designs. Today, fabric designers may create checks, squares, dots, stripes, plaids and heavy blotch patterns, knowing that they can be duplicated. The popularity of heavy shades requiring one hundred per cent coverage gave added emphasis to the success story of vat colors. And vat-dyed filling yarns with the same shade and fastness properties as the warp threads was another achievement.

The art of vat-color application by the medium of printing has attained a high degree of perfection such

as processors of a generation or so ago would scarcely have believed possible. The methods of those days did not permit printing intricate patterns on a piece of cotton cloth. But advances in application and engraving have given the designer a free hand. Textile printers are now able to reproduce any design, whether it be large or small, one color or sixteen, with amazing fidelity. By double printing and other methods, stripes, textures, photographs and clipped-figure effects are printed so cleverly that few consumers know how they are obtained.

COMPARABLE FASTNESS

It should be pointed out that one of the most important characteristics of vat colors is that they can be applied to vegetable fibers in the form of raw stock, piece goods or yarn without any sacrifice of color fastness. Whether dyed or printed, these colors have comparable resistance to light, laundering, perspiration or other destructive influences.

SALES APPEAL

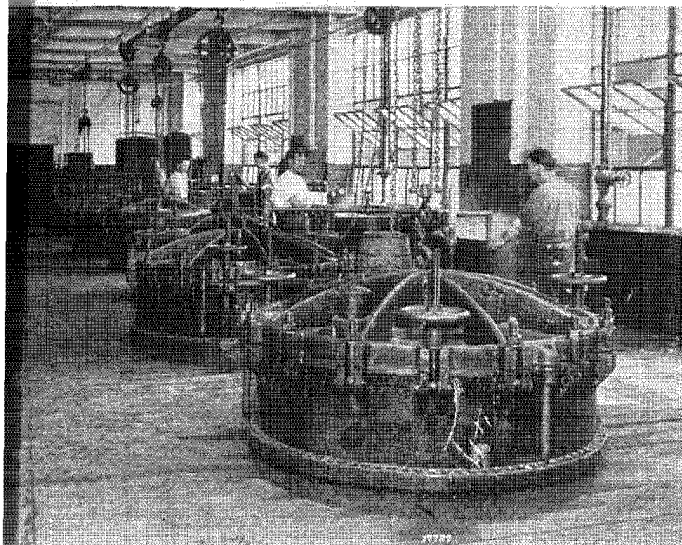
Although women purchase 75 per cent of the men's and boys' shirts, styles change slowly, with the staple items constituting most of the volume sales. Undoubtedly, women have influenced the swing to color and have tuned their demands to quality at a price, as well.

There is now evident a strong, normal demand for color in shirts. The present popularity of fancy shirts has opened a larger potential market, giving the designer the opportunity to appeal to current fashion interest. Merchandising tie-ups with related items are of course based upon color.

Increasing use of color has perhaps marked the most constant trend in styling shirts during the past twenty years. Other style factors are collars, pattern, construction and general design. These in turn have influenced the use of color.

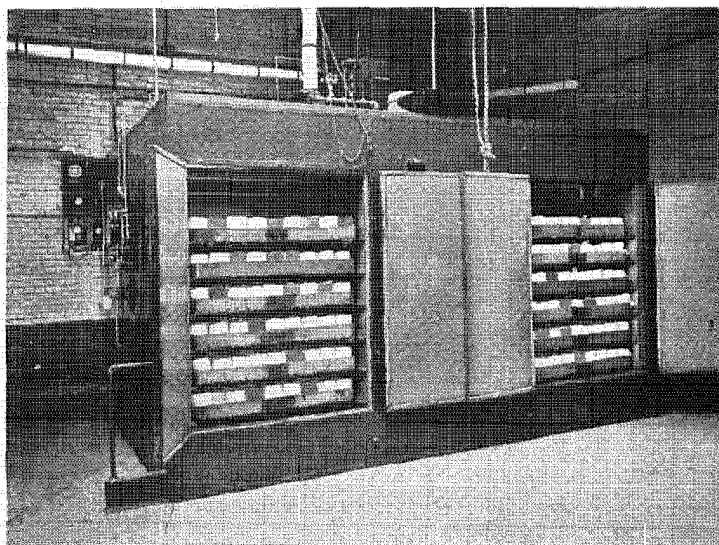
While staple items change slowly, new style offerings attract a considerable portion of the public. This

(Continued on Page Twenty-Four)



Franklin Process Co.

A battery of Franklin package-dyeing machines in service. Each unit is capable of accommodating 1,000 pounds of yarn at a time.



Advertisers' Studios

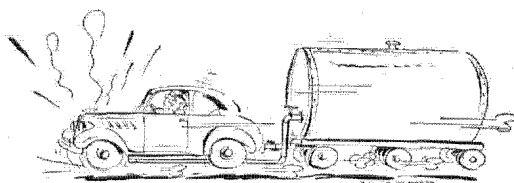
After the dyed packages of yarn are removed from the machines, they are transferred to dryers and subjected to controlled heat.

Rambles in the Wonder World of Chemistry

(FROM CAVALCADE OF AMERICA)

WHEN you step into a grocery and ask for a bottle of household ammonia you are speaking Ancient Egyptian. The substance we now know as ammonia was used in bleaching their cloth under the raging Egyptian sun to make it snowy white—not a surprising thing when you recall they were priests of a sun god and held a sort of monopoly on the local sunshine. "Ammon" by the addition of an "i" and "a" becomes our word "ammonia." Ammonia today is used as an alkalizing agent in bleaching, but instead of depending on the sun's rays and the dew on the grass to liberate oxygen which did the actual bleaching, we now have "chemical sunshine"—peroxide compounds which do the trick in a tiny fraction of the time once necessary.

Why do you need an anti-freeze solution in your car? When you drive at thirty miles an hour you're burning fuel fast enough to keep

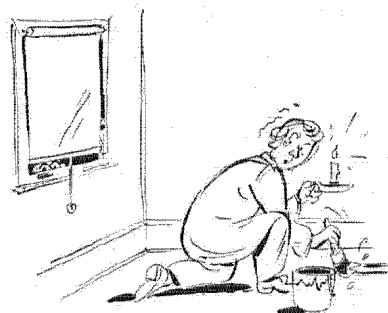


a seven-room house comfortably warm on a zero day. You're generating so much heat, in fact, that if you didn't get rid of it somehow the engine in your car would melt! Temperatures inside an automobile engine mount as high as 2,000 degrees. Why doesn't your motor melt? Because water in the cooling system is rushing around at the rate of fifty or more gallons a minute. Without a cooling system, driving would be different—and very awkward! If you went out for only an hour's drive you'd have to hitch a tank trailer behind your car and tow along 3,000 gallons of water! But water has two faults. It rusts iron and steel—and it freezes. A good

anti-freeze such as Du Pont's "Zerone," "Zerex" or "Five Star" takes care of the two natural faults, as you might call them, of water.

* * *

In the year 1639, in the austere little settlement of Charlestown, Massachusetts, a clergyman who had sinned grievously was brought before the elders of the town council and charged with a wicked offense. He had actually painted the rooms inside his house! Such worldly van-



ity was not to be forgiven; nor was it any more pardonable because the reverend gentleman had used his paint indoors. Not the worst sinner in Charlestown would have dared to paint the *outside* of a house, where everyone could see it!

Time plays curious tricks with our notions of right and wrong... A hundred and fifty years later in New England a painted house became a mark of social distinction, thanks to the fact that a barrel of paint cost a small fortune. If your house was painted, people felt pretty sure you were a fine gentleman or a rich one.

How different those early attitudes are from our own! While we can understand the Puritans' severity, we wonder how they could have believed that a Creator who gave us field daisies and mauve winter twilights could wish His children to live in ugliness. As for the other New Englanders who thought painted houses were only for the rich—why didn't they have gumption enough to invent some sort of paint they could afford, we wonder?

Our modern feeling is that not

only houses but our health and happiness, too, are better off for color. And the part Du Pont has played in brightening the surface of America is no small one.

* * *

There is mystery everywhere around us. Why do the leaves turn red in the fall? Why is apple cider sweet? Why is water wet? We take mystery as a matter of course.

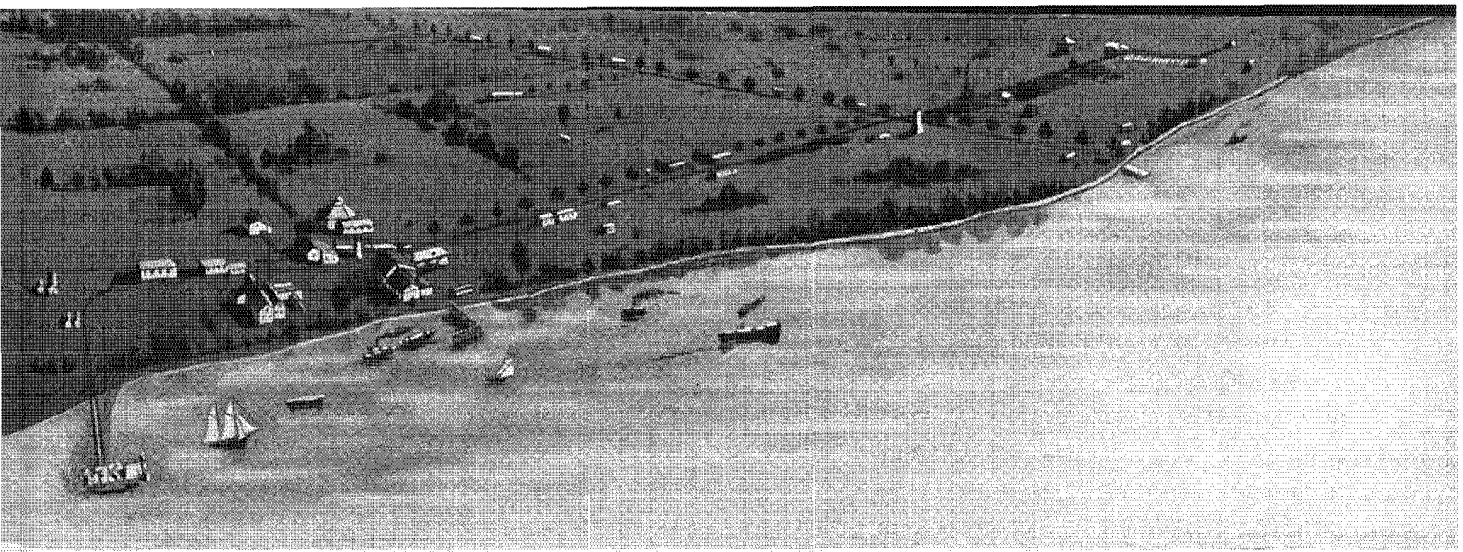
So with rayon. Once thought of as a possible substitute for silk, today a textile fiber in its own right, rayon is made of cellulose from cotton or wood. Most people know that. Not so many know that rayon yarn is also spun of Time, the fourth dimension.

The chemist knows Time must be *steeped* into rayon, *soaked* into it, *spun* into it. He knows exactly how much Time; two days here,



ninety-four minutes there. Because he wants to make the best rayon he gives it the Time it needs. Time is an ingredient he stirs into it along with his other materials; every bit as much a part of the mixture as they are—a master ingredient without which the others would not flow harmoniously together.

Everyone has heard these days of relativity, the fourth dimension, space-time. The woman who buys a dress made of rayon yarn may think she is merely buying a dress, but it's every bit as true to say she is buying a garment cut of the mysterious cloth we call Time. She is wearing seconds, minutes and hours from the great brocade of the Universe with its clock-face pattern that no man has deciphered.



The first ditch blast

*The story of an emergency that started a new technique
in explosives engineering*

ICE FLOES in the Delaware River during the spring of 1899 were unusually troublesome along that waterway from New York State to the sea. Jams formed at bridge piers and caused floods at many points along the upper reaches of the river. Newspapers were warning residents downstream to prepare for a serious flood.

Below Philadelphia, complications other than ice had to be taken into account. High tides, prolonged rainfall and a stiff easterly wind added to the flood-water menace at the dynamite plant of the Repauno Chemical Company, across the river from Chester, Pennsylvania. Even then it was the largest operation of the kind along the Atlantic seaboard. Now it rates among the world's largest.

Years before, a levee had been constructed at Repauno, but plant officials were fearful that it was neither high enough nor strong enough to cope with such conditions as prevailed at the time this story begins. One morning as O. R. Jackson, plant superintendent, looked over the ice-filled river battering the levee, he saw that something must be done immediately to avert a disaster. The bank of earth and stone was beginning to give way in two or three places, and workmen with sandbags were rushed to the scene.

He realized that unless an accumulation of water near the nitric acid house could be led off to lower ground, the fire-boxes would be flooded. Clearly, there would not be time to dig a trench with hand-tools to a lateral ditch that was still functioning. Furthermore, men could not be spared from the levee work. The immediate and pressing problem was to avoid shutting down the plant. Could a serviceable ditch be blasted with dynamite? Possibly. He would see.

Calling one of the explosives chemists, Arthur

La Motte, he directed that a ditch be opened up at once with dynamite. And a few moments later a quantity of the explosive, electric blasting caps, leading wire and a blasting machine were rushed to the place. So far as is known, explosives had never been used before for this purpose. Holes about three feet apart were made in the ground and into each one was loaded three or four cartridges of 40 per cent straight dynamite. One cartridge in each hole was primed with an electric blasting cap. The work was done hurriedly, and, according to Mr. La Motte's recollection, with not too much confidence that the shot would be effective. However, when all connections were finally made, the rack-bar of the blasting machine was thrust down. The blast was spectacular. A tall column of mud and water rose high in the air and came down again. When the smoke cleared, the new ditch began to function, and before long the pool of water surrounding the nitrating house was drained into the lateral. This shot, made in an emergency, is believed to be the first one—and it was successful; the flood menace in that locality was relieved.

Ditch blasting by the propagated method, which requires only one blasting cap to detonate a succession of charges loaded in the ground, was a later development. About 1907 or 1908, word came from California of ditches blasted by this new method. Since then ditching with dynamite has become commonplace practice in agricultural districts throughout the world. Wherever conditions make it impracticable to construct ditches by hand or with machine tools, Du Pont Ditching Dynamite can do the job quickly, effectively and economically. The first emergency ditch blast at Repauno started more than water flowing; it was the beginning of a new technique in engineering.

Vitamins a la carte

(Continued from Page Five)

trace elements as they are called. The chemical function of these elements in the soil and their effect upon the rate of growth and yield have become matters of keen interest. Inasmuch as our mineral salts come to us through what we eat, and they can be present only in food that has been grown on land which contains them in sufficient quantities, it now appears that soil deficiencies may become human and animal deficiencies as well.

A new science of soil chemistry is evolving. It is experimenting with all kinds of inorganic chemicals and with a number of complex organic compounds produced synthetically. It is analyzing soils, studying the condition and performance of live stock that is reared on their products, and finally the chemistry of the animal products which become human food. Likewise, a new conception is developing of fruits and vegetables. They breathe just as animals do. They give off or take in moisture. They are subject to illnesses. Nobody would think of eating a sickly chicken. A sickly vegetable may be equally undesirable in the family cook pot.

Let me say, in closing, the fact that so much is yet to be done is encouraging rather than otherwise, in the light of what has been accomplished. It is said that what is now known of food values can add seven years to the average span of life, if generally applied. The work is not stopping there. In spots, the ballyhoo may be overdone; some claims may be exaggerated in the enthusiasm of salesmanship, but the inherent soundness of the development has been demonstrated, its promise of greater good to come is established. The need is better understanding, through more and better cooperative research.

The Call for Color

(Continued from Page Twenty-One)

season gray instead of white is used in the filling to soften the pastel grounds that have been well received. Plain colors, iridescent and novelty shades should be prominently featured. Flannels are again popular and many now come in small self-checks, stripes and contrasting checks. Fancy oxford weaves should also be in demand.

Matched shirts, handkerchiefs and ties will be heavily promoted this year and will help to increase sales on the combination items as well as on unit sales. Color fastness in these shirts and kerchiefs is extremely important because the color must continue to match or harmonize in spite of repeated launderings and wearings.

In this vital retention of original color quality and value, no other class of dyes will give service comparable to that of vat colors, and the shirting industry in using them is giving consumers quality that is doing much to stimulate increased purchases.

So, when you open your wife's gift this year and find a colored shirt, chances are all in favor of its being both attractive and in good taste. You can wear it with confidence for the colors that give it snap and appeal will probably outlast the shirt itself.

Swinging into Winter

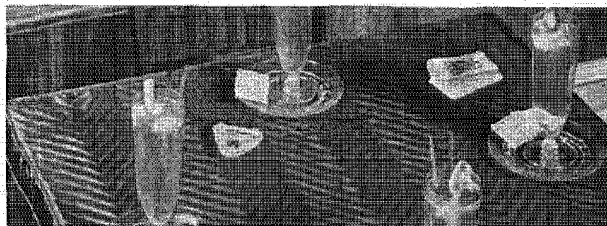


"Aridex" water-repellent finish
serves indoors and out

IF YOU could see "Aridex" on fabrics, you would be surprised by the versatility of this repellent, which is used on articles ranging from automobile seat covers made from paper-fiber fabrics to velvet evening wraps. Some of its most common applications are on woolen sportswear, marquissette curtains, mattress ticking, topcoats and shower curtains. Many a family dog, too, struts in a blanket treated with this finish.

To all these, "Aridex" adds service and appearance values, for it sheds water, resists spots and stains, helps to keep fabrics looking fresh and smart, and wearers of treated apparel dry and comfortable.

"Aridex" does not coat or seal the fabric, but forms an invisible film on the individual fibers. The pores of the fabric are not closed, so that normal circulation of air needed for body comfort is permitted.

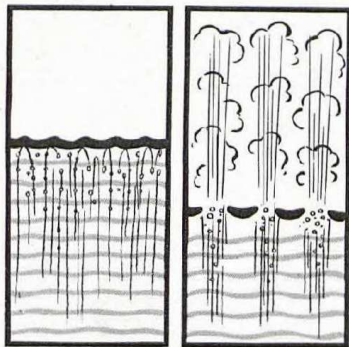


Peace of Mind
...at a Quarter a Quart

DU PONT
FIVE STAR
ANTI-FREEZE
5 POINT PROTECTION



**Why "FIVE STAR"
is Economical**



• Heavy unbroken line represents unbroken film produced by the exclusive dual-retardant in "Five Star" Anti-Freeze. By preventing vapor from escaping, it holds evaporation to a minimum.

• Broken line shows how broken film of ordinary retardants allows anti-freeze solution to evaporate freely. The vapor, rising to the surface, passes off at the points where the film has separated.

This filling-station attendant knows nothing about chemistry—but because he knows a *lot* about cooling systems *he* will use "Five Star" this year as he did last.

His comely young customer knows nothing about *either* chemistry or cooling systems, but that doesn't matter. With "Five Star" in her car she need not worry about freezing or corrosion—rust-clogged radiators, engine overheating, or excessive evaporation.

"Five Star," du Pont's *ethanol* anti-freeze, affords full protection against all of these. It is the research chemist's answer to the widespread demand for low-cost, all-winter protection.

The "Five Star" salesman sells far more than just another anti-freeze. He sells "Peace of Mind" in cans!—at a quarter a quart.



FIVE STAR THE IMPROVED ETHANOL
ANTI-FREEZE

EXCITING CHRISTMAS PACKAGES



CREATED QUICKLY AND EASILY WITH



"Cellophane" is a trade-mark of E. I. du Pont de Nemours & Co. (Inc.)

This red and blue label identifies all Christmas gift wrapping accessories made from Du Pont film.

DU PONT COMPANY,

"CELLOPHANE" DIVISION, Department 21,
WILMINGTON, DELAWARE.

Please send me without obligation your folder "Gift Magic
with 'CELLOPHANE.'"

Name _____

Street Address _____

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