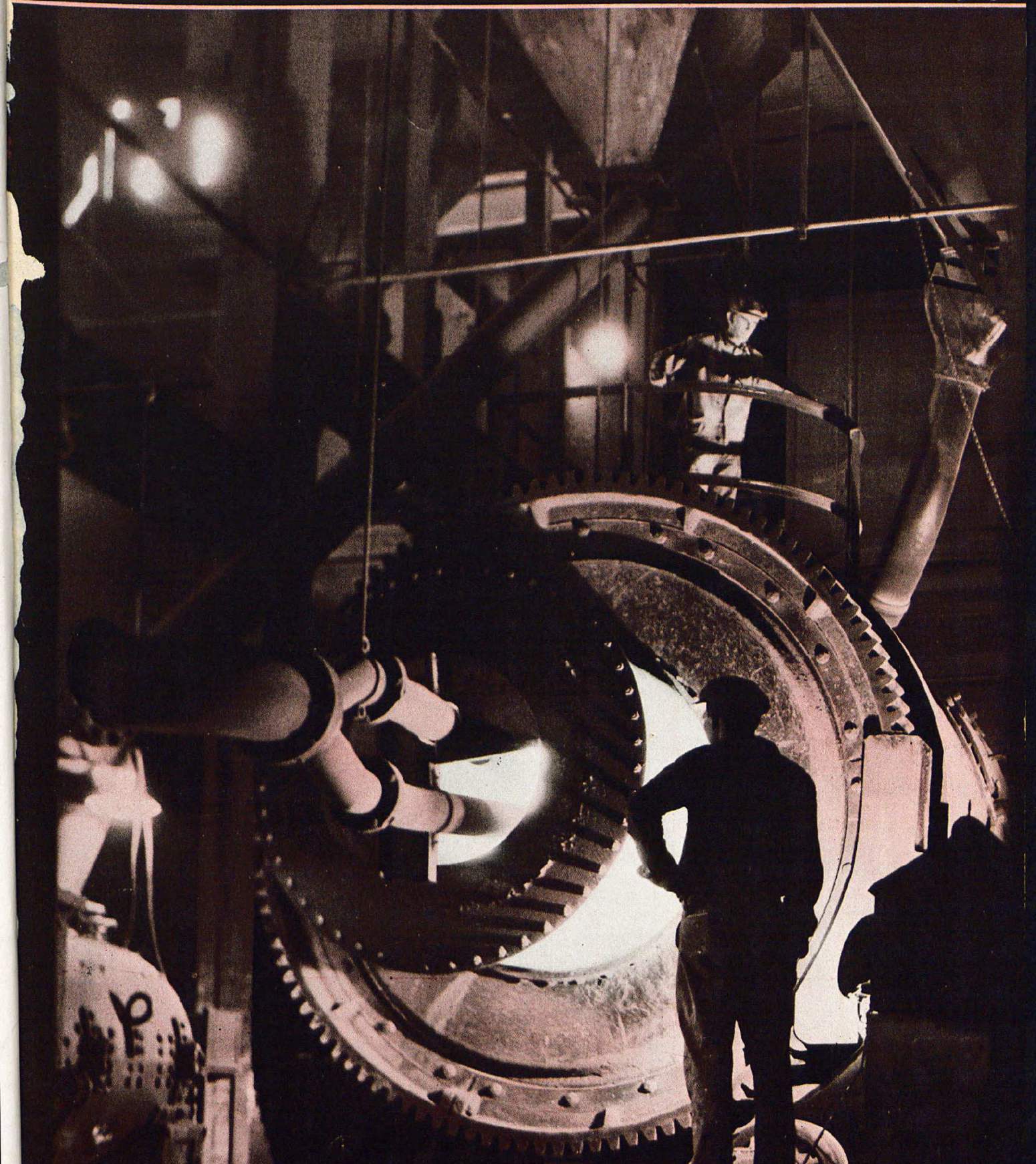




MACY FINDS A SALES HELP IN CELLOPHANE



All the details of design and texture are completely visible to customers when textiles are wrapped in transparent Cellophane. And because Cellophane protects merchandise from dust, dirt and handling—spoilage and "seconds" are reduced to a minimum. This picture shows some of the Cellophane-wrapped products found in Macy's.

Famous New York store uses modern wrap to increase eye appeal of merchandise and reduce spoilage and seconds

MACY'S was one of the first department stores to recognize the value of Cellophane in helping to increase sales.

Cellophane has helped earn sales increases for certain drug items, towels and sheets, men's shirts, blankets and other products. And because of the sales preference that Cellophane gives to so many articles of merchandise, Macy is planning for its wider use.

There are two reasons for Cellophane's success in Macy's and other stores. Its 100% transparency strengthens the appeal to the customer's eye . . . makes a product doubly attractive . . . and adds a note of extra quality which impels purchase even at a higher price. Its protection against handling and against dust and dirt reduces "seconds" to a remarkable degree.

In up-to-date stores Cellophane is rapidly finding new uses from basement to roof. Investigate this transparent, protective sheeting . . . for possibly there are many ways that Cellophane can help increase sales in your own department. Du Pont Cellophane Company, Inc., Empire State Building, New York City.



Sparkling Cellophane gives cosmetics and other products a touch of luxury that aids impulse sales. Here are some of Macy's own products wrapped in Cellophane.

Cellophane

Cellophane is the registered trademark of the Du Pont Cellophane Company, Inc., to designate its transparent cellulose sheeting.

THE DU PONT MAGAZINE

VOL. XXVI

MARCH, 1932

No. 3

LOOKING BACK AT 1931

*A résumé of activities in the du Pont organization,
from the President's Annual Report*

"... more real advance has probably been made during the past two years of adversity than during the immediately preceding years of comparatively easy progress." This, from President Lamont du Pont's brief survey of general business conditions, applies as well to the company's own business during the year under review. A forward-looking program of development work was maintained. The results show that progress was made. In 1931, the company broadened the scope of its activities to render a more complete service in its field, continued and intensified research activities to develop new products and improve old ones, maintained its plants in a high state of operating efficiency and generally set its house in order.

In introducing his report, Mr. du Pont comments on existing conditions as follows:

"We are passing through no ordinary depression. Business in general throughout the United States and in many foreign countries has been declining since the middle of 1929 until the present rate of activity is farther below the estimated normal than at any previous period for which records are available. However, the rate of decline allowing for seasonal conditions has recently been measurably checked, and there is evidence of ap-

proaching stability. Wholesale prices on the average were relatively steady during the last half of 1931. Our central banking system is still as strong as any in the world, and our national gold reserves are very ample.

"Although the going has been hard, more real advance has probably been made during the past two years of adversity than during the immediately preceding years of comparatively easy progress. Yet we must all continue to be more industrious. Both public and private budgets must be balanced. Errors in judgment are largely responsible for creating present economic difficulties, and only by our own efforts can we overcome our past errors.

"As soon as confidence returns, and the time should not be far away, the wheels of industry and trade will begin to turn more rapidly, and the

stimulus of our wants, combined with the energy and capacity of the American people, will gradually bring back a sounder prosperity based on a recognition of real values and an abandonment of unsound speculative dreams."

In reviewing the du Pont operations for 1931, the report indicates that on a tonnage basis the company's volume of business as a whole was somewhat less than for the preceding year. Some departments and subsidiaries experienced a decline in volume as compared with 1930; others maintained or exceeded their volume of the previous year. To quote from the report, "those supplying products to such basic industries as coal and metal mining, steel and iron, petroleum, agriculture, automotive and construction, felt the depression in those industries. On the other hand, the tonnage volume of dyestuffs, rayon and Cellophane increased substantially over the previous year."

Referring to new industries and new products, President du Pont notes the acquisition of The Newport Company's dyestuffs and organic chemical properties and business. "The amalgamation of this business with the du Pont Organic Chemicals Department," we are told, "should result in a further useful development of the domestic dye and organic chemical

We believe the information published here will be of interest to DU PONT MAGAZINE readers as well as to the company's stockholders for whom it was originally prepared. It outlines some developments that have not been referred to previously in these columns.—Editor.

(Continued on page 7)

A MARVEL OF ECONOMICAL OPERATION

*The Chrysler Building in New York City is impressive
below ground as well as above the street level*

From an interview with C. C. LAWRENCE, Operating Manager

By PAUL W. SAMPSON

PEOPLE who believe that the tail of a comet is going to brush the world out into cosmic space believe, along with other phantasmagoria, that the weight of the buildings on the Island of Manhattan will some day crush the rock crust and drop the city into an abyss.

It is a popular delusion. People who fear such a calamity are needlessly alarmed. They will be amazed to learn that the weight of the rock removed in excavating for the foundation of one of the great buildings is actually greater than the weight of the super-imposed finished structure.

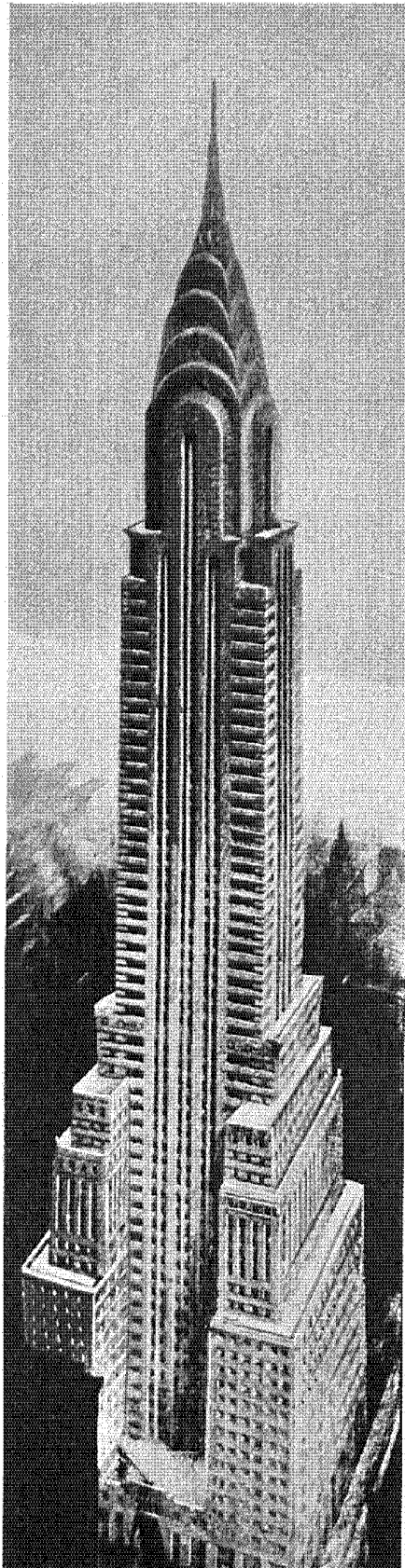
This is true in the case of the Chrysler Building, which rises to its spearhead 1,046 feet above the sidewalks of New York.

Once below the ground level in the Chrysler, you begin to see why this is so. Downward the building goes four stories—rooms and rooms of which the 6,000 tenants of the building are totally unaware. Here are the headquarters of the 250 people who look after it—keeping the elevators running, the floors clean, doing the small things such as seeing that the door checks work and the keys don't stick—as well as the more important ones, like watching to see that no leaks occur in the plumbing and that electrical circuits, which keep the wheels turning in the building, are in order.

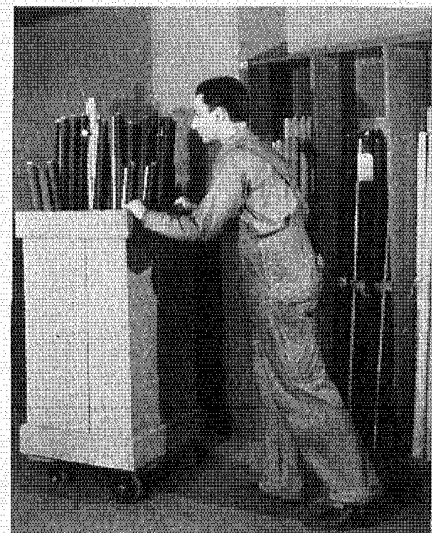
Nothing has been too small to escape the watchful eye of the operating manager, Mr. Lawrence. Here are completely equipped machine shops with turret lathes, carpenter shops, electrical shops, plumbing shops, wizard-like electrical control boards that detect leaks in circuits, fire-alarm systems and even boards to show where the permanent lights are out—lights, for example, that mark exits and staircases.

Here New York City water from Ashokan Reservoir, 110 miles away in the Catskills, is distilled into the purest of drinking water and delivered to the tenants. Here is an enormous air-conditioning plant, newest development in civilized living, where the air is washed, cooled, heated, humidified or de-humidified, as desired, by the temperature of the water through which it passes, and it is delivered through ducts by huge fans to the various sections of the building.

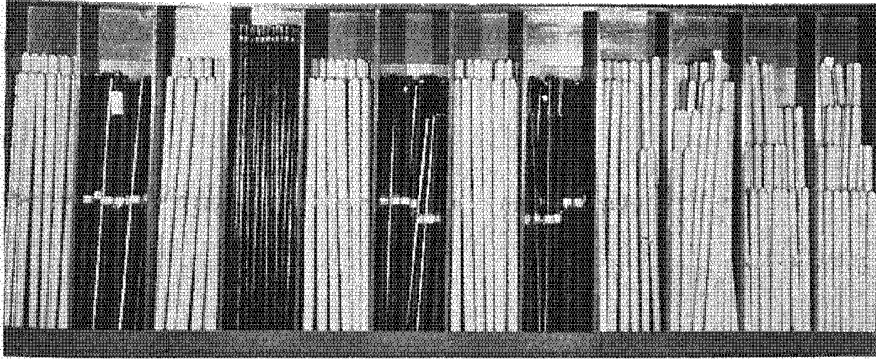
Every inch of space has been put to



Left—The Chrysler Building
as seen from the top of one of
its neighboring structures



Right—This truck is used to
collect soiled shades on the
upper floors and carry them to
the cleaning room in the basement



Before and after washing, the shades, tagged and classified by floors and rooms, are kept in these bins. In one of them you will note the window poles referred to in the article.

good use. Working in these ventilated, concrete-lined caverns are a great many of the 250 people who keep the building running so smoothly that tenants are—as they should be—oblivious to the activity going on in the honeycombed basements below them.

It was an amazing thing to discover that there is in the Chrysler Building an enormous flue, about fifteen feet square, running from the very top to the bottom. This is engineered so that it serves as a flame and smoke-trap in case of fire, leaving the adjacent stairways free from such hazards.

The Chrysler Building is an office

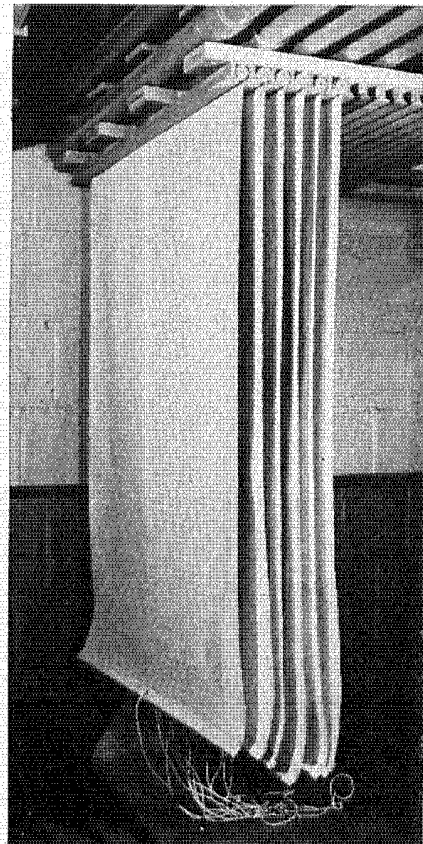
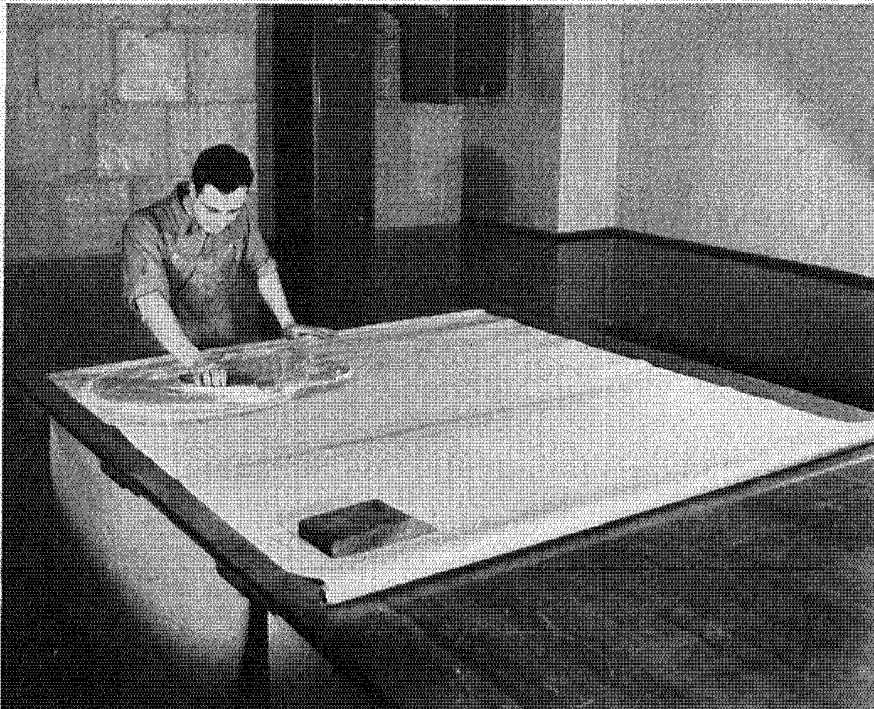
structure. It is also a testing laboratory for many manufacturers whose newest equipment has been installed here. For example, many of the things learned here have been put into practice in the Empire State Building, completed only a few months later. And doubtless, some of the things that develop in the running of the Empire State will find useful expression in the new Metropolitan Life Insurance Company Building, now nearing completion, and Radio City, still in the hands of the designing engineers.

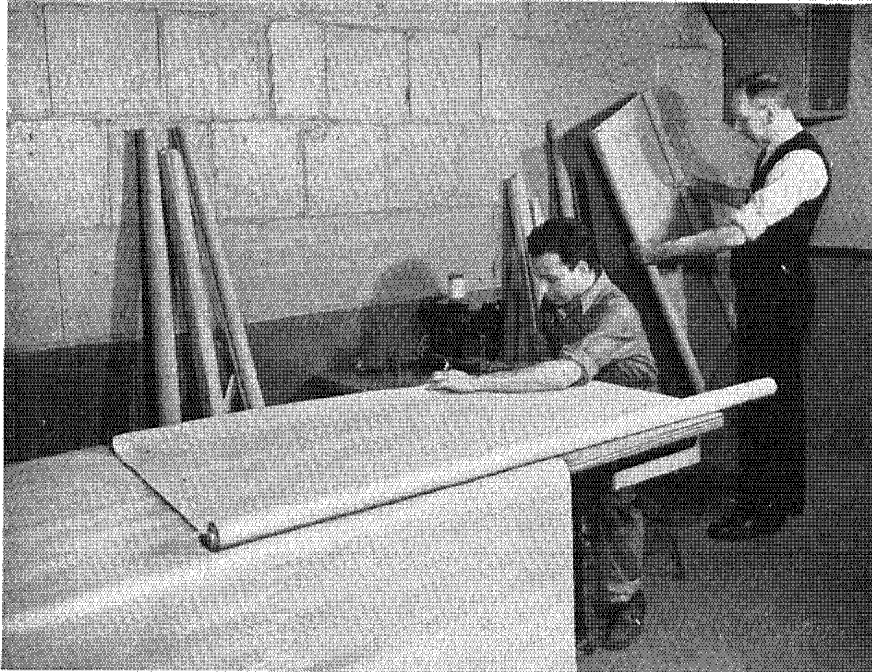
For example, it takes a complicated mass of machinery, motors, rotating

discs—occupying space on three floors over the elevator wells—to move the high-speed Otis elevators to the proper levels automatically. A discrepancy of one-sixteenth of an inch on the disc means a three- or four-foot error when the elevator is stopped by it.

Here, in this small inferno of noise, motion and smell of hot oil, a squad of building engineers work daily, watching every last operation of the plant, so that there may be no delay in service. One seldom waits more than seventeen seconds for a car going in either direction. Forty-eight cars handling over 45,000 passengers travel 700 miles, make 36,000 stops and 73,000 complete door operations per day. These figures make it quite easy for one to understand the constant care and vigilance necessary to maintain an efficient service.

Below—The actual washing operation is done on a flat, smooth table. Note the brush and soap-suds. Badly soiled shades require scrubbing. A good sponging with soap and water takes care of those only slightly soiled. This workroom is three floors below the street level. Right—A drying rack for washed Tontine shades. They are hung up in this manner until thoroughly dry.





Sometimes Tontine shades are cut down and made over. Here you see the stitching work being done on a Singer sewing machine. Operating economies, even in small tasks like this, are not overlooked in big-building management.

Mr. Lawrence, operating manager, scans every operation, every item of expense on the budget, to see where savings might be effected.

One of the most complete jobs he has done is with the window shades. These are all du Pont Tontine, and, of course, washable. Whenever a tenant is about to move into leased space, the shades are taken to the basement, scrubbed clean, and rehung, fresh and beautiful.

In one corner of the vast basement has been set up a complete shade shop. Here is all the equipment for washing and drying, renovating and manufacturing. Damaged shades are cut down and remade. A special Singer machine for sewing these shades has been installed for this purpose.

A man working in this shade shop can clean and rehang fifty shades per day at a cost of seven cents per shade.

This makes it possible to wash all of the 5,400 shades in the Chrysler Building once a year at a yearly cost of \$378. The remainder of the shademan's time is taken up with renovating damaged shades, making new ones, cleaning, painting and repairing door checks, and maintaining hardware in general throughout the building.

No saving is too small to be effected. For example, good poles for opening windows cost about sixty cents each. The management thought these might be turned out in the carpenter shop. As a result better poles than they could buy are now being made there for about twenty-six cents apiece.

Contrasted with this is the steam consumed for heating the building and for supplying hot water, the cost of which runs into many thousands of dollars per year. Yet by carefully watching changing temperatures and

wind velocities, it is possible to forecast the daily steam consumption and compare it to the amount actually used. Thus the management can determine whether or not the chief engineer is turning his controls off and on at the proper time and maintaining the proper pressure and vacuum on the numerous lines supplying the various sections of the building.

True, the saving of money in any building begins with the installation of the proper equipment. Mr. Lawrence said: "We are never through changing around. Equipment originally installed has in many cases been completely rebuilt for more efficient operation. We have called on the manufacturers for improvements, and in a great many cases have made changes ourselves."

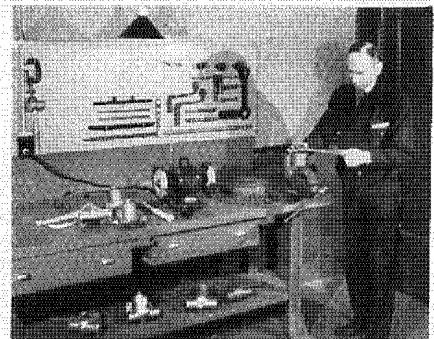
It is vital that the managing and operating staff of such a "city within a city" should be conscientiously concerned with maintaining the highest degree of comfort for the thousands of workers in the building. Surely the question of proper lighting is essential, and good shades help to insure that.

Tontine shades contribute to the efficient, economical management of the largest buildings and meet the needs of the most fastidious housekeepers. Their installation in the Chrysler Building merely shows how completely and smoothly they fit into any economy program.



Left—Some tenant wants a duplicate key to his office. It will be made in this shop, at a saving of time and money, by one of the two men who also look after the 5,400 Tontine shades in the Chrysler Building.

Right—There are facilities for doing a hundred and one other jobs, such as keeping door checks in good condition. Much work of this kind is done in the shop illustrated here. Note the orderly arrangement of tools on the wall.



GEORGE WASHINGTON PRINTS

THE people of the United States have entered upon a nine months' celebration of the 200th anniversary of George Washington's birth. Many months ago a commission headed by President Hoover undertook the task of planning for it with the idea of maintaining such a high pitch of interest in the nation-wide program that every city and hamlet in the land would actively participate. State, municipal and civic organizations, patriotic societies, the Army, the Navy, newspapers, magazines, schools and colleges, fraternal organizations, manufacturers, merchants and citizens all have their place in these plans.

It is believed that millions of citizens will desire to have something commemorative of the life and service of the "Father of His Country," and many American manufacturers are busily engaged in designing a great variety of such articles.

One of the most interesting developments of this type has recently been announced by Witcombe, McGeachin & Company, of New York City. It is a series of print fabrics of wide application for many home decoration uses. That they fit admirably into the Washington bicentennial celebration plans will be apparent from the historic back-

The bicentennial of the great leader's birth is commemorated in fast-color prints on Toile de Rae and glazed chintz

By DONALD McGEACHIN

ground which was their inspiration.

In the eighteenth century, during the period of Washington's childhood, when in elite circles periwigs, silver buckles and other vanities of dress were affected, hand-painted silks were much in vogue. Later, to serve a broader market, similar designs were printed on cotton by means of movable wooden blocks. Still later, when the demand for these printed cottons increased, it became desirable to give them a shiny appearance more nearly approximating the sheen of hand-painted silks, and so these fabrics were developed and came to be known as glazed chintz.

The same charm and beauty of these earlier fabrics have now been preserved and accented in more modern materials, some of which were not even dreamed of in Colonial times. They reveal noteworthy improvements in textile-making and printing art, for much progress has been made through the years. Of the two fabrics used in the Washington bicentennial prints, the first and finest is Toile de Rae, a happy combination of Du Pont Super Extra rayon yarn and cotton. This fabric has the soft luster of silk—a texture that approaches perfection. As a drapery material, it hangs in beautiful soft folds on which the play of fleeting lights adds an extra note of charm. It is also well chosen

for pillow covers and bedspreads, because it is washable and possesses greater strength and durability than its prototype, silk.

The other fabric, known as Washington chintz, is a fine English poplin—also beautifully soft for draping, and yet substantial enough for upholstery use.

These prints are the result of a new and exclusive photographic process developed in conjunction with the Bellman Brook Bleachery, of Fairview, New Jersey. The background consists of a large floral design of Colonial type, with four pictorial medallions which are reproduced with astonishing artistry from well-



Left—The George Washington armchair suggests an interesting use for this printed fabric



Right—The glazed or unglazed fabric is entirely suitable for making smocks of distinction



One corner of a Colonial room displayed by Strawbridge & Clothier, Philadelphia, shows the print to advantage as a drape material. The fabric is Toile de Rae, a combination of Du Pont Super Extra rayon yarn and cotton.

known works of art. One is Gilbert Stuart's world-famous portrait of Washington. Another shows the Commander-in-Chief of the Revolutionary Army on horseback. The third reproduces the much-discussed painting of Washington crossing the Delaware, and the fourth, Washington in prayer at Valley Forge.

The method used to reproduce these scenes on fabric is in itself highly interesting, for it is in effect a combination of rotogravure and color, printed so as to bring out the minute details with surprising fidelity. Even the smallest decorative elements seem to rise clear-cut from the cloth. The subtleties of the Washington portrait are preserved with amazing accuracy. And yet, the effect is entirely harmonious. While the medallions "key" the design definitely to Washington, they are not conspicuously dominant; in fact, one's first impression is that of masses of roses in the conventional Colonial manner.

The colors, too, are interesting and timed to the period. Natural-colored ornaments are placed on rich backgrounds of walnut, linen or green. Old toile effects are achieved with tawny brown ornaments on old rose or blue-jade grounds—and these colors are fast to sunlight and washing; they are printed with the famous du Pont vat colors. Here indeed is a toile of exquisite beauty that may be expected to have a permanent place in Colonial interiors. Even if it were

not brought out in connection with the Washington bicentennial, it would still be a "find."

During the nine months of 1932 which will be given over to this patriotic celebration, Colonial will rank first among the popular decorative periods. On this account it will be interesting to consider for a moment the uses to which these fabrics may be put. Homes, schools and libraries come first into mind and suggest a multiplicity of applications. Some have already been mentioned. Other uses for these prints are for pillows, slip-covers, panels, school banners, fire-screens, smocks, upholstery, counterpanes and the like. Either the Toile de Rae or the glazed chintz, or both, will meet the requirements and likewise make it possible for everyone to share in this celebration in a befitting and practical way.

Among the famous men who surrounded Washington during the critical years of the Revolution, perhaps no name stands out with greater luster than that of his good friend Marquis de Lafayette. It should be mentioned that Witcombe, McGeachin & Company designers have also developed an interesting commemorative design in his honor. This is known as the Lafayette Toile and is rich in historic and decorative value.

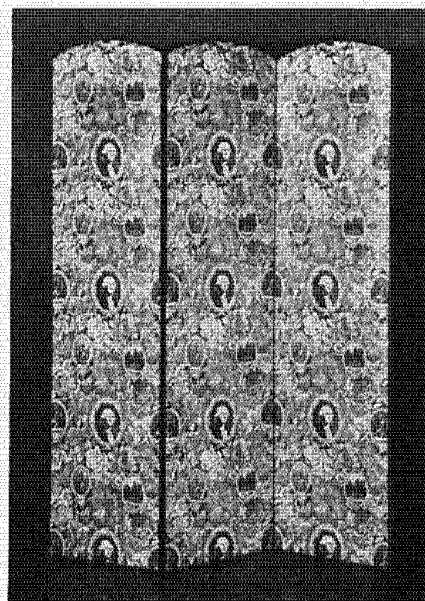
When Lafayette returned home in 1782, the French Government had a medal struck off in his honor. On one side was a profile of his head with the inscription "Libertas Americana—4 Jul. 1776." The other side carried a symbolic picture of the infant republic being defended from the attack of a leopard, which was the usual representation of England at that time in Continental Europe. Above it, a Latin motto, a free transla-

tion of which is, "The soul of the infant is under the protection of the Gods." And below the picture are the dates of Lafayette's war service record.

Baron de Oberkampf, the famous textile printer of Jouy, used this medal as a design and reproduced it on linen, a print that was immensely popular with the French nobility of that period; in fact, it is still seen in some of the old French chateaux and in many museums. Today, the old design is being reproduced by an essentially similar but more modern process of printing. Lafayette Toile is a faithful likeness of the original, but the colors are now sun and tub fast. It is printed on linen in a number of interesting color schemes.

Both the Washington bicentennial prints and the Lafayette Toile are examples of fine "document prints," which show the remarkable advances made in printing on cloth during the past 150 years.

It is perhaps in order to add that the bicentennial celebration, which brings these fabrics to the fore, is itself a historic event that in years to come will be commemorated on its own account. Collectors say that these prints will be considered as valuable as those made in Washington's time. The implication is that an investment opportunity exists for those who buy and hold these interesting prints for the future.



As a screen-covering material what could be more up-to-the-minute than a George Washington commemorative print, such as is shown here?

LOOKING BACK AT 1931

(Continued from page 1)

industry, for," as he points out, "it will eliminate duplication of research work and thus make available considerable talent and facilities for research to be applied along new lines."

Service to consumers of pigments and dry colors was likewise broadened by the consolidation of the du Pont Company's business in these lines with the titanium dioxide business of the Commercial Solvents Corporation, the Krebs Pigment and Color Corporation having been formed to carry on this line of activity.

One of the most important developments of the year was a new synthetic rubber which closely resembles natural rubber in strength, elasticity, toughness and other physical properties. This new product, called "Du Prene," is adaptable in an emergency for any commercial purpose requiring the use of rubber. Its basic raw materials are very cheap, but cost of production for some time to come will probably be greater than present prices of the natural product. For that reason it probably will not be generally adopted in the near future as a material to take the place of natural rubber. Nevertheless, there are important differences in its chemical and physical properties as compared with natural rubber which, it is believed, will make it more suitable for a number of commercial purposes. A small plant for the manufacture of "Du Prene" has been erected at Deepwater Point, New Jersey.

Among other important developments of the year may be mentioned:

A synthetic drying oil exhibiting great resistance to the action of chemicals and the weather. This oil produces a protective finish and is useful for painting chemical apparatus and equipment, especially where they are subjected to severe exposure or chemical corrosion.

Dyestuffs in the class of new vat colors for cotton. These are the fastest colors known and for that reason are among the most important of the synthetic dyes. Valuable azo colors

for cellulose acetate fibers and for tin-weighted silk have also been developed.

New fungicides for citrus fruits—products now being evaluated in the field in Florida.

Dimethyl ether, which should find wide use as a solvent and as a refrigerant with particular application in the quick freezing of foodstuffs. This material has recently been added to the company's line of products.

Higher alcohols, which are particularly useful as special solvents, foam preventives and fluids for hydraulic systems. These are in addition to the higher alcohols ordinarily used as lacquer solvents.

Mention is also made of the increasingly important use of pyroxylin cement as a means of attaching the soles of women's and children's shoes to the uppers without stitching.

"As soon as confidence returns, and the time should not be far away, the wheels of industry and trade will begin to turn more rapidly, and the stimulus of our wants, combined with the energy and capacity of the American people, will gradually bring back a sounder prosperity based on a recognition of real values and an abandonment of unsound speculative dreams."

During the year the company extended and modernized its manufacturing facilities and completed a sixth section to the home office building at Wilmington. These projects involved an expenditure of approximately \$13,000,000. That the company has adhered to the policy of maintaining large chemical and engineering organizations is indicated by the expenditure, in 1931, of approximately \$1,600,000 for chemical control of quality and yields of existing products, and about \$5,400,000 more to improve present processes and products and to develop new ones.

These year-by-year expenditures for research have resulted in the development of many products that are familiar to readers of this publica-

tion. Among those mentioned are Duco; Moistureproof Cellophane; synthetic resin finishes of the "Dulux" type; rubber accelerators and antioxidants; methanol; Tontine window shade cloth, and Everbright—a rubber-coated fabric for automobile tops. Reference is also made in the report to the ammonia oxidation process which the company developed for the commercial production of nitric acid. These are noted as "a few of the interesting contributions to the development of the chemical industry" during comparatively recent years.

Continued research activities year after year, plant maintenance to insure operating efficiency, standardized production of quality products have long been factors in the success of the du Pont organization. The President's report shows that consistent progress was made in spite of depressed business conditions.

On December 31, there were approximately 29,000 people employed in the du Pont organization. Throughout the year regular dividends were earned and paid to the company's stockholders. Incidentally, there was a marked increase in the number of people sharing in these distributions, particularly in the case of the company's common stockholders. As compared with 34,643 at the end of 1930, the report for 1931 shows a total of 42,465, a gain of 22.6 per cent. This broader distribution of ownership may be accepted as an indication of the American investor's faith in the future of the chemical industry and of the stability and earning power of the du Pont Company.

NEW DULUX PLANT

A NEW factory for the manufacture of Dulux will be erected at the paint and varnish plant in Philadelphia. The total cost of the building and equipment will be approximately \$350,000. Increased facilities for the production of Dulux have been made necessary by marked public demand for the product within the past few months. It is now available in white for house painting in addition to the colors for various industrial purposes.

A FEW TRANSPARENT IN CARTOONS



"How do you like the new wrappers on Camels?"

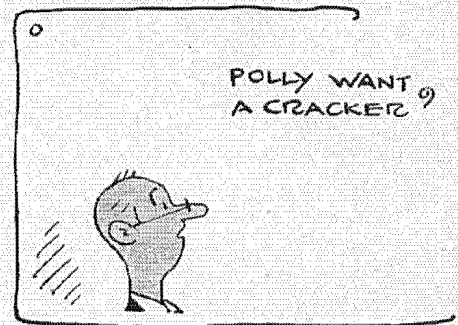
COURTESY, "JUDGE"

ON the radio, on the stage and before or after dinner the Cellophane joke is inevitable—some say because it is so easy to see through.

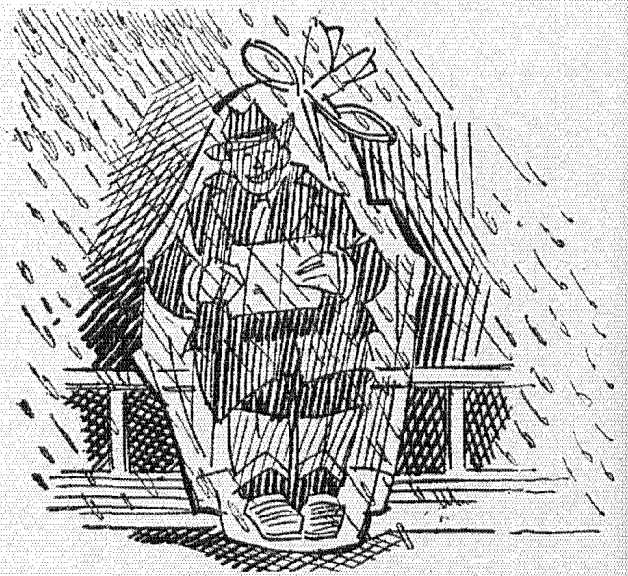
Comedy stars use Cellophane to shine up dull spots in their "business." More than one stage manager has used Cellophane.

"Since it's the custom to wrap everything untouched by human hands in Cellophane, it might also be a good idea to wrap our heavy-weight fighters that way."

"And some musical comedy producer is going to clean up a fortune by wrapping his chorus girls in Cellophane."



COURTESY, "N. Y. HERALD TRIBUNE"



WRAPPED IN CELLOPHANE

IF THE WEATHER MAN DOESN'T GIVE US A BETTER BREAK ON FOOTBALL DAYS WE WILL NEED SOME SUCH PROTECTION.

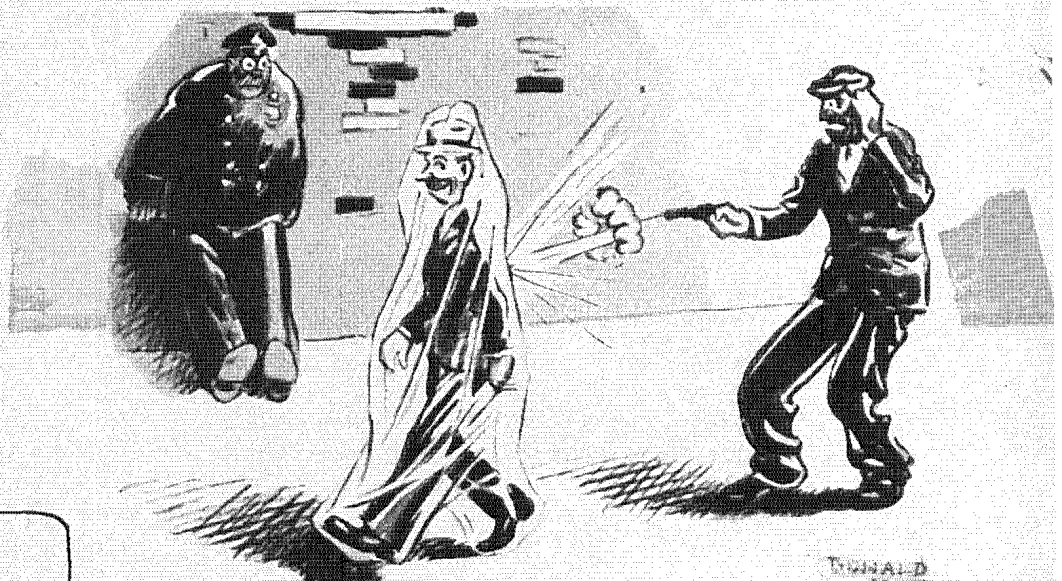
COURTESY, "THE GRAND RAPIDS HERALD"

CELLOPHANE JOKES AND STORIES

phane to bring his girls to the attention of the public.

Seriously though, when punmen, joke-smiths, cartoonists, actors and radio announcers "plug" a subject constantly, they choose a popular one. And Cellophane is uppermost in the public's mind.

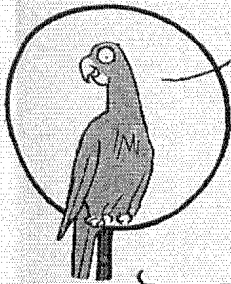
"Not being an expert in New York Stock Exchange affairs, we appealed to the financial editor of *The Cleveland Press* to explain to us why stocks made such a strong rally Tuesday. 'Because,' he answered, 'The brokers are now wrapping stock in Cellophane when they deliver it.'"



"Bullet-proof cellophane! There ought to be a law!"

DONALD
MCKEE

COURTESY, "BALLYHOO"



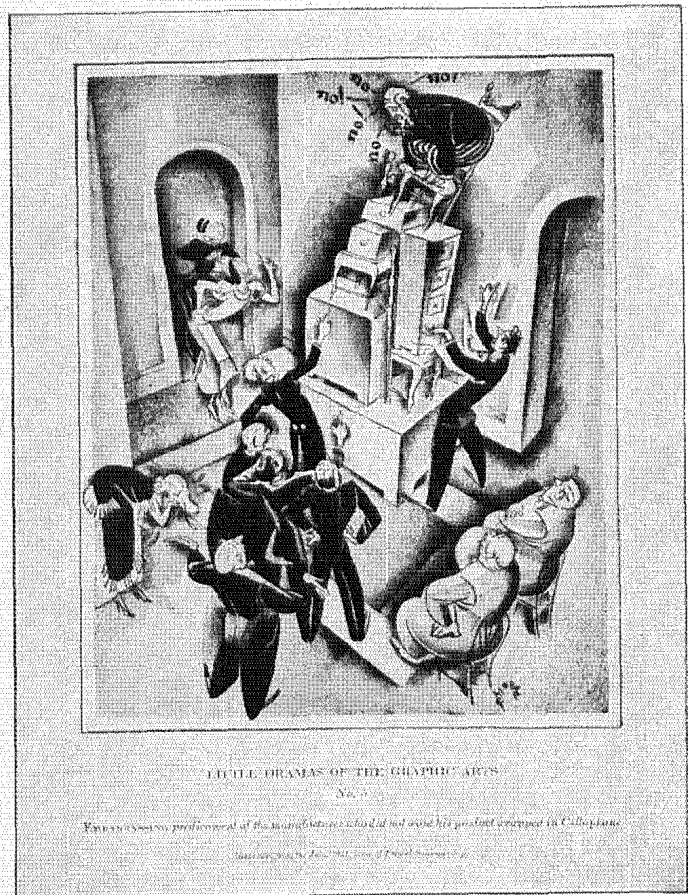
YES, IF IT'S THE
BEAUTIFUL
BISCUIT COMPANY'S
BIJOU SALTINE!
THESE Dainty
TIDBITS COME
TO YOU CRISP
FROM THE OVEN
AND WRAPPED
IN CELLOPHANE!

Has It Come To This?



"My word! No cellophane?"

COURTESY, "THE NEW YORKER"

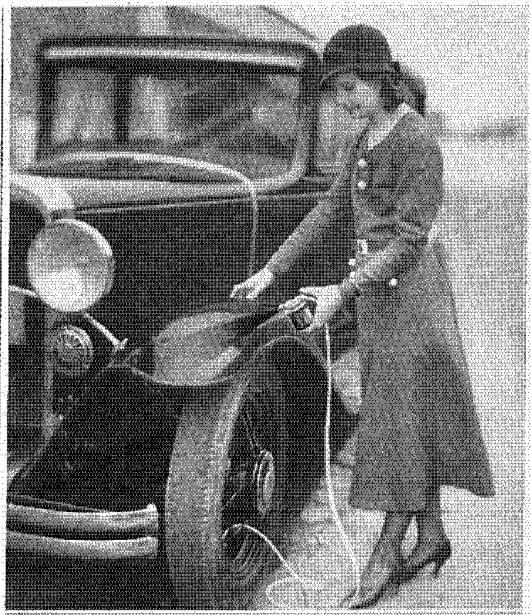


LITTLE DRAMAS OF THE GRAPHIC ARTS

No. 1

YOUNG MAN'S EXCESSIVE PREOCCUPATION WITH THE QUESTION OF HOW TO WRAP HIS PRODUCT IN CELLOPHANE

Illustration by Justin Brown



While satisfactory touch-up work can be done with a brush, many people prefer the more modern method. Here you see how an unsightly spot on a fender is being refinished by the use of the little spray gun.

NOW YOU CAN SPRAY THE FENDERS

The little gun does the touch-up work with air pressure from one of the automobile tires

By G. W. SHERIN

A CLEVER little spray gun for use by car owners in retouching scratches and worn spots on automobile fenders has just been placed on the market by the du Pont Company, makers of Duco. This gun uses the tire as a source of air pressure. It is made especially for use with No. 7 Touch-up Black, a retouching enamel sold in a small can equipped with an unusual type of nozzle. The gun is equipped with a cap that exactly fits this nozzle, making it possible to attach the gun and spray directly from the can. The enamel requires no thinning or other treatment, and dries with a glossy black finish which does not require polishing.

The gun is simple, inexpensive and easy to use. After removing the cap on the can and attaching the gun in its place, the hose is connected to the tire, and one starts spraying by pressing the little gun-trigger.

Part of the air pressure passes directly through tubes to the nozzle, causing a suction which pulls the paint up the tube in the can, and forces it out of the nozzle in a fine spray. Some air, however, is forced through another tube into the can, creating actual air pressure inside. This insures a steady paint flow and a uniform spray. The gun cannot be used with an open container; air pressure within the can is required for operating efficiency.

Before spraying a scratch or worn spot on a fender, it is desirable, of course, to remove the dirt and smooth

down the edges with fine sandpaper or steel wool. However, it is not necessary to apply an undercoat or prepare the surface in any other way.

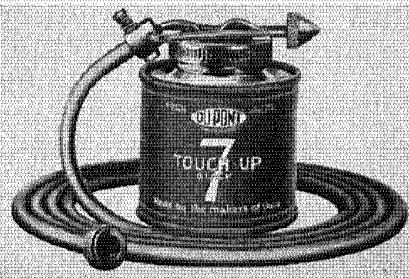
Spraying does not reduce the tire pressure very much. If the car owner inflates the tire a little more than usual before using the gun, he is likely to have the average tire pressure when the job is finished.

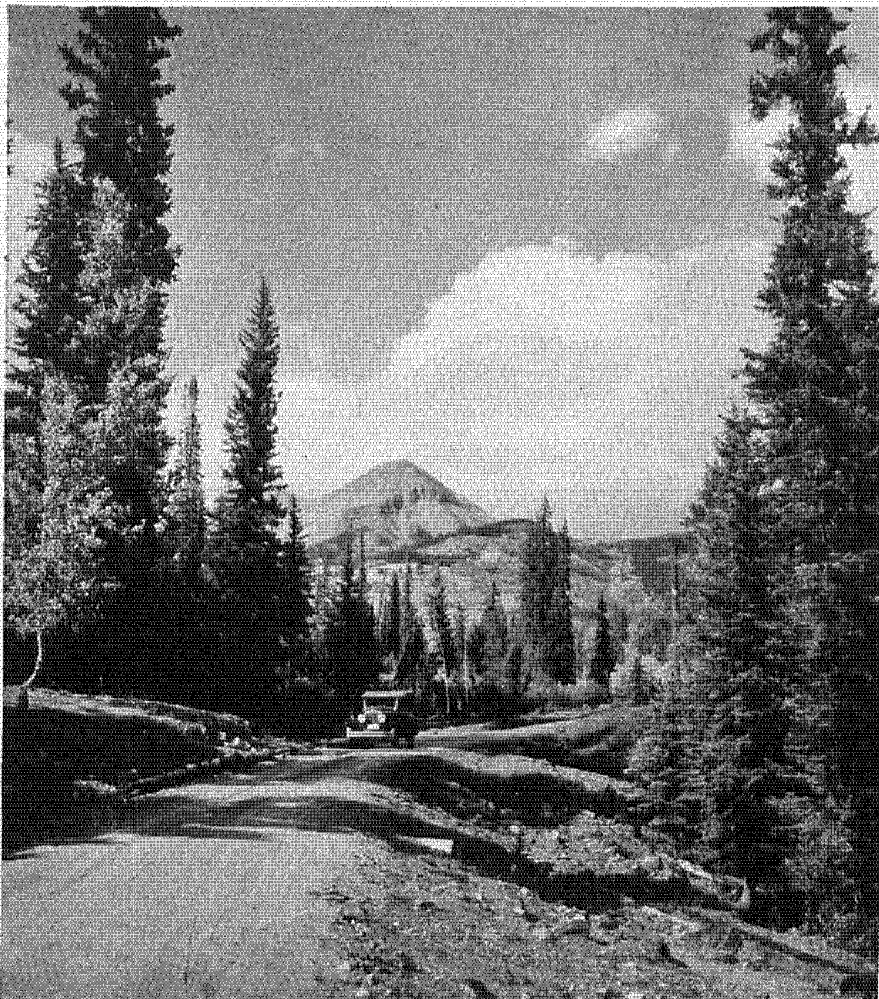
A small bottle with a nozzle like that used on the No. 7 Touch-up Can is supplied with the gun for cleaning purposes. After the gun has been used, a little gasoline, turpentine or kerosene should be placed in the bottle and the gun mounted on it. Forcing one of these solvents through the gun cleans out the tubes and nozzle, and prevents any stoppage which might occur if the paint were permitted to dry in them.

This gun is designed for spraying scratches and worn spots on fenders; for refinishing spokes on wire wheels, which are difficult to brush; for spraying black-enameled lamps, bumpers, bumper fittings, hub caps, shock absorbers, wheel rims, running-boards, gasoline tanks and other parts finished in black; and also for repainting the undersides of fenders, which are likely to become badly rusted after the finish has been worn away by cinders and pebbles thrown by the tires.

The motorist who takes pride in the appearance of his car will be interested to know that this spray gun can be obtained from dealers who handle No. 7 Touch-up Black, and that the device is inexpensive.

This spray gun is for use by car owners in retouching scratches and worn spots on automobile fenders. A tire is used as the source of air pressure. The gun is shown here attached to a can of Touch-up Black.





COURTESY, THE COLORADO ASSOCIATION

Engineer Mountain as seen from the Chief Ouray Highway. Beautiful spruce trees along this roadway add interest to such scenes

SCENIC HIGHWAYS IN THE COLORADO ROCKIES

Excellent roads now lead over the mountain tops where the motorist can see some of America's finest panoramic views

By IVAN E. HOUK

IN 1910, when the first Colorado Highway Commission was organized, there were but few roads in the Colorado Rockies that could properly be termed highways. In those days you could hardly drive beyond the foothills region in anything more luxurious than a wagon. Today, you can drive over approximately thirty mountain passes in practically any kind of an automobile. You can drive

up scenic mountain highways to the summits of peaks having elevations of from 9,000 to more than 14,000 feet above sea level. You can leave the foothills on a warm summer afternoon, climb five thousand feet in elevation, through beautiful forests of pine and spruce, and reach the snow banks above timberline before the sun sets in the West.

Two of Colorado's scenic mountain

highways are said to be higher than any other automobile roads in the world. These are the Pike's Peak Highway near Colorado Springs and the Mt. Evans Highway near Denver. The former climbs to the summit of Pike's Peak, elevation 14,110 feet; and the latter, to the summit of Mt. Evans, elevation 14,260 feet. Probably some of the higher mountain pass roads of Colorado also enjoy the distinction of being higher than any roads outside the state, either in this country or abroad. Eleven of the mountain pass highways are more than two miles above sea level at their highest points.

A few of the higher mountain pass roads may be briefly mentioned. State Road Number 81, between Buena Vista and Glenwood Springs, crosses Independence Pass at an elevation of 12,095 feet. State Road Number 91, between Silver Plume and Dillon, now open as far as Loveland Pass from the Silver Plume end, crosses Loveland Pass at an elevation of 11,922 feet. State Road Number 16, between Estes Park and Grand Lake, crosses Fall River Pass at an elevation of 11,797 feet.

Pike's Peak Highway, which is operated as a toll road, was built with private capital about fifteen years ago. It is eighteen miles long, has a width of twenty feet or more throughout, cost about three hundred thousand dollars, and was traveled by more than seventy-five thousand people during the summer of 1930.

The recently completed Mt. Evans Highway is a public road and can be used without charge. All the motorist needs in order to reach the top, after the snow has been cleared away in the spring, is a tank full of gas and the ability to keep his eye on the road while driving along the dizzy heights, hundreds, and even thousands, of feet above timberline. The road is amply wide and entirely safe at all locations. Nevertheless, the motorist, unaccustomed to driving in the higher mountains, is sometimes awed by the view

MOUNTAIN VIEWS OF COLORFUL COLORADO



PHOTO BY SMYTH

Just above the timberline on the Mt. Evans Highway, from a photograph taken in the fall of 1930.
This public road has only recently been completed

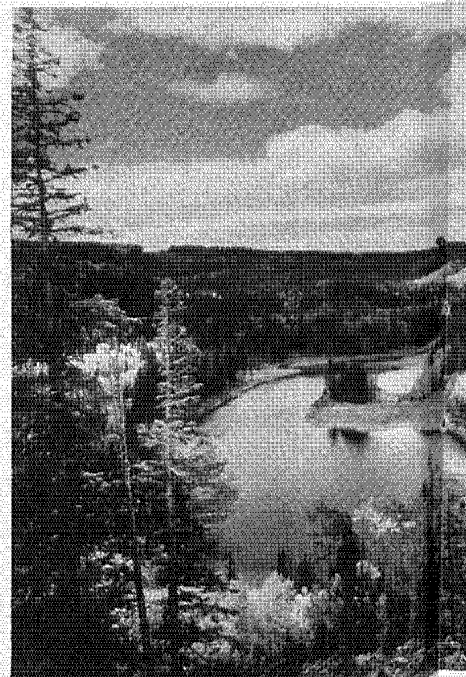


PHOTO BY FOX

An interesting view of Alexander's lakes

A winter scene along the Berthoud Pass Highway



COURTESY, THE COLORADO ASSOCIATION

Hairpin Turn on the Victory Highway near Berthoud Pass. It's a good place for the motorist to keep his eyes on the road and a firm hand on the steering-wheel

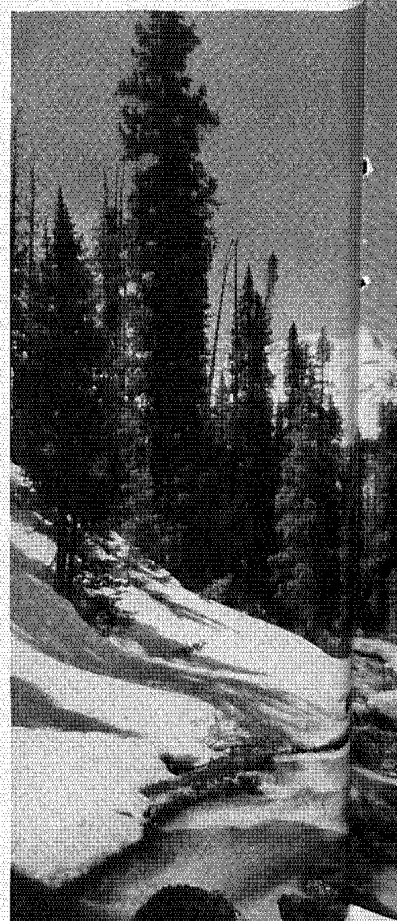


PHOTO BY PRICE

COLORADO ARE REVEALED BY FINE NEW ROADS



View of Alexander Lake near Grand Mesa, Colorado

Along the Berthoud Pass Highway near Denver, Colorado

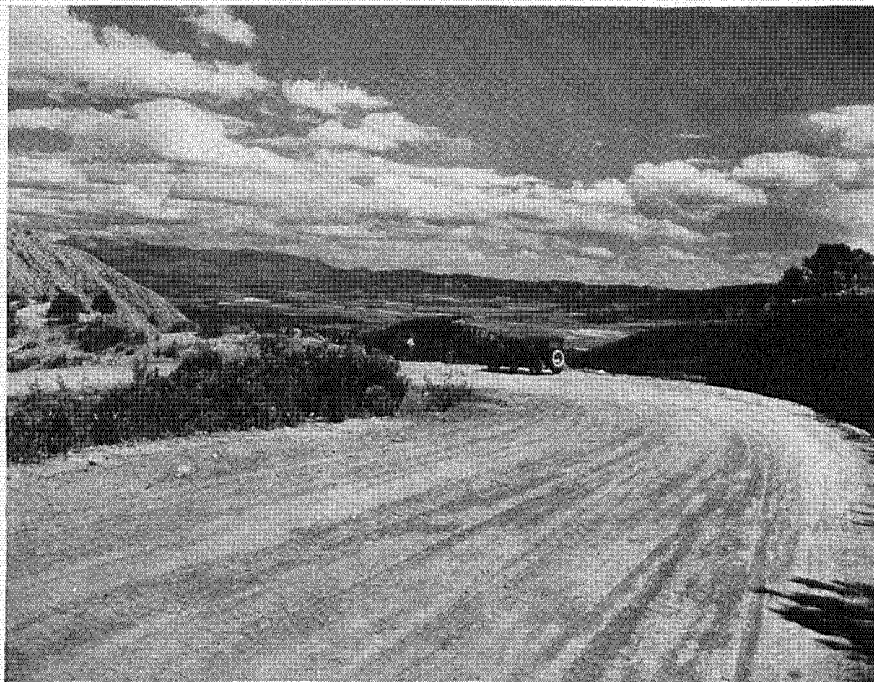


PHOTO BY FOX

Looking toward the La Platte Mountains from the Mesa Verde Highway in southwestern Colorado, where the topography is less rugged, but still interesting

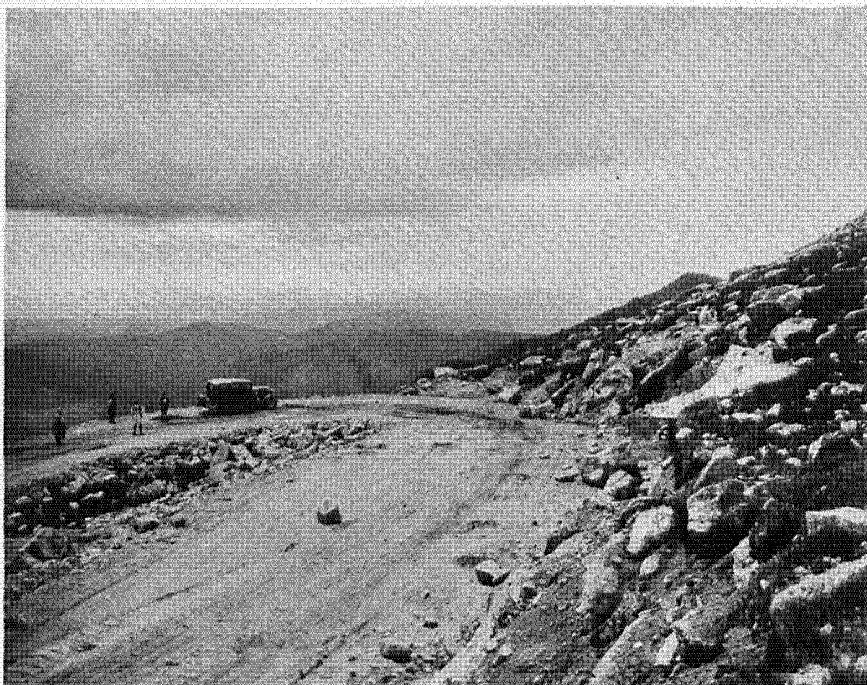


PHOTO BY SMYTH

A view of the Colorado Rockies as seen from a point on the Mt. Evans Highway near the summit of the peak; its elevation is 14,260 feet

down sheer precipices, where scarcely a projecting rock or bush intervenes between him and eternity. Below timberline, the presence of tall evergreen trees on the mountain slopes gives one a sense of security not experienced at the higher elevations.

At the present time the Mt. Evans Highway is simply a continuation of the Harding Memorial Highway which climbs around the mountain slopes from Echo Lake, elevation 10,618 feet, to the saddle between Mt. Evans and Mt. Epaulet, elevation 13,000 feet. The Harding Memorial Highway was completed in the fall of 1925 and the Mt. Evans Highway, in the fall of 1930. Some day the people of Denver hope to see a highway up the Deer Creek Canyon, southeast of Mt. Evans, to the saddle between Mt. Evans and Mt. Epaulet. Then the motorist can make a circle trip from Denver to Lookout Mountain, Bergen Park, Echo Lake and Mt. Evans, returning by way of Bailey, Shaffer's Crossing, Conifer Junction, and either the Turkey Creek or Bear Creek Highways.

The new Trail Ridge Road in Rocky Mountain National Park, north central Colorado, will be opened to traffic in the summer of 1932. This is another scenic highway which climbs through virgin mountain territory to dizzy heights above timberline, the maximum elevation reached being 12,220 feet above sea level. The motorist who visits Rocky Mountain National Park in the future can take the new road at the saddle west of Deer Mountain, seven miles west of Estes Park. Proceeding in a westerly and north-westerly direction, he will pass beautiful Hidden Valley with its aspen groves and thriving beaver colonies, climb to the summit of Trail Ridge, and follow the old Ute Trail along the top of the ridge to Specimen Mountain, the summer home of the Rocky Mountain big-horn sheep. Circling Specimen Mountain he will descend to the headwaters of Colorado River

and follow the river in a southerly direction to Grand Lake.

Incidentally, all wild game is protected in Rocky Mountain National Park. Consequently, one can hardly drive along a park road without seeing deer or other interesting animals browsing by the roadside. Even the wary big-horn sheep are sometimes seen along the highways in the spring of the year, before the tourists begin to visit the park.

Of all the roads under construction in the Colorado Rockies at the present time the one that means most to the people of Denver is probably the Loveland Pass Highway between Silver Plume and Dillon. When it is completed, the people of Denver will have practically a direct route across the mountains to Leadville, Glenwood Springs, and all points west, saving many miles over the present indirect routes. The Loveland Pass Highway takes the motorist through the old mining towns of Idaho Springs and Georgetown, up Clear Creek Canyon which has furnished so much of the world's gold supply, past the historic Georgetown railroad loop, and on through the old mining town of Silver Plume.

The roads mentioned thus far are only a few of the scenic highways in the Colorado Rockies. Many additional roads might be discussed. Moreover, many additional highways are continuously being constructed, rebuilt, or improved in various parts of the Colorado Rockies. A few of the

more important, now under contract, or only recently completed, include the Willow Creek Pass Highway between the Middle and North Park sections of the state, known as State Highway Number 125; the Berthoud Pass Highway, west of the Pass, known as United States Highway Number 40; the Kenosha Pass Highway on the route from Denver to South Park, known as State Highway Number 8, and the Wolf Creek Highway between Del Norte and Pagosa Springs, known as State Highway Number 10.

The construction of highways in the Colorado Rockies requires the use of many carloads of explosives. The H. C. Lallier Construction and Engineering Company of Denver used more than three carloads of powder and many tons of dynamite in building a four-mile section of the Wolf Creek Highway mentioned above. This section of the road is located in a box canyon, along cliffs of solid granite, where the blasting requirements were unusually severe. Du Pont Red Cross powder was used, after the bottoms of the drill holes had been sprung with dynamite.

The construction and maintenance of highways in the Colorado Rockies is a coöperative enterprise. Naturally, the State Highway Department is the leading organization engaged in the work. However, it is aided by county, municipal and federal agencies. The City and County of Denver coöperate

(Continued on page 24)

The Never Summer Range as seen from the Fall River Road near Grand Lake, Colorado



THE VENTURAFIN METHOD OF HEATING

AN ORIGINAL man started something when he conquered his fear of fire and began to use it for his bodily comfort, and ever since men have been constantly devising new and better heating systems. The open fireplace and chimney, the stove, the warm air furnace, steam and hot water heating plants are all milestones in man's progress toward an ideal system.

One innovation of the past decade, while not a radical departure, has completely revised the popular idea of what an ideal system should be. This is the development and general acceptance of unit heaters, of which the Venturafin, made by the American Blower Corporation of Detroit, Michigan, and Cincinnati, Ohio, is a type. They were designed originally for factories and similar structures where rather large spaces were to be heated, but their advantages and economies were so immediately apparent that new units were soon developed for other applications. Today, this equipment is giving satisfaction not only in industrial plants, but also in airplane hangars, garages, stores, offices, service stations and even in private homes.

The Venturafin method is a modified steam-heating system, requiring

Where temperatures must remain constant this system has proved to be superior to other types

By W. L. PROUT

a boiler and the usual supply and return piping. Heat is delivered to the rooms by means of one or more units. Each consists of a specially designed light-weight copper and bronze radiator, or heating element, a motor-driven disc fan, and an attractively finished casing. The fan forces air through the heating element and out into the room, and deflectors on the face of the unit direct it to places where it is most needed.

The superiority and economy of this method are due entirely to the rapid circulation of the warmed air. How important this is will be apparent when you consider the experience of textile mill owners. In such mills an even temperature is essential. It is claimed that a difference of only two degrees from one end of a mill to the other may cause a breakage in the delicate machinery.

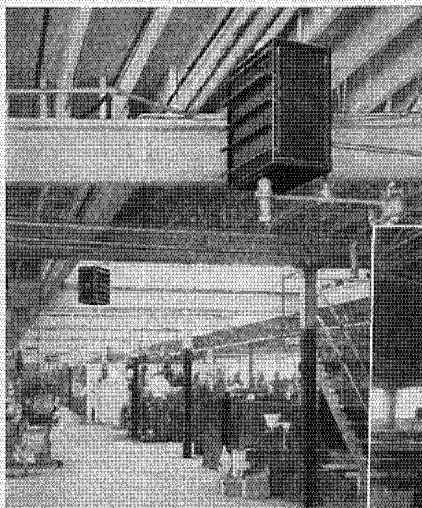
Years ago when textile machines were driven by line shafts and belts, practically all of these mills were

heated by means of pipe-coils placed along the outside walls. With the change to direct motor-driven machinery, mill operators and owners were surprised to find that their old heating systems no longer functioned well. There was no longer any fast-moving belts to keep the air in the room circulating. Unit heaters, which made their appearance about this time, were tried and proved to be an ideal solution to the problem. Today, consulting engineers will consider nothing but unit heaters for textile mills.

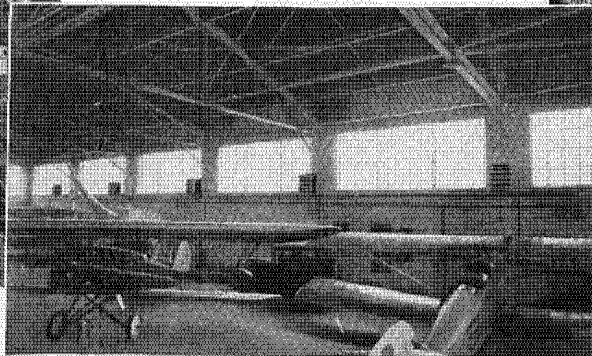
The use of Venturafin units also reduces considerably the time required for heating up on cold mornings or after shutdowns. It likewise reduces fuel bills, for the stirring action tends to counteract the natural tendency for the warmest air to rise to the ceiling, and the occupied areas are made comfortable without excessive heat in the upper part of the room.

Temperature control is very simple. With the steam turned on the heating element, the full capacity of the unit is made instantly available. Stopping the motor cuts it off just as quickly—and that can be done automatically by means of an electric thermostat. All standard units are equipped with three-speed motors, another control factor.

(Continued on page 24)



Here are three typical installations of Venturafin Heaters—a factory, an airplane hangar and a small drug store. Originally these units were designed to heat large spaces in factories, but now they are being used in garages, gas-filling stations and even in some private homes. Note that the units and piping are placed overhead, out of the way



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VOL. XXVI MARCH, 1932 No. 3

THE COVER ILLUSTRATION

WE take you this month to the plant of the Krebs Pigment & Color Corporation at Newport, Delaware, just to give you a glimpse of a big rotary furnace where, in kitchen vernacular, barytes ore is "roasted to a turn." The picture shows one stage in the manufacture of Ponolith, a well-known brand of lithopone.

This white pigment has a great many interesting uses in industry as an ingredient of paints, rubber, linoleum and the like, but as Kipling would say, "that is another story."

Ponolith is a mixture of barium sulphide and zinc sulphate, and the barium is obtained by roasting barytes ore in rotary furnaces of which there are five in one building at Newport. The unit illustrated is said to be one of the largest ever installed in a lithopone plant. It measures, overall, more than twenty-one feet in length and has a diameter of ten feet. There is a carload of firebrick in its inner lining, and under operating conditions it carried a load of 19,200 pounds of ground barytes ore and 3,500 pounds of pulverized coal.

The raw materials drop down through hoppers from storage bins on the floor above, and after the fire is started the big tube remains at rest for the first fifteen minutes. Thereafter, it is made to revolve slowly. Two hours later the charge still lies almost dormant in the bottom and has the appearance of a liquid. Then

it begins to "boil;" that is, bubbles appear on the surface. The reduction has started. This proceeds rapidly during the last stage of the four-hour burning period, when the sticky, red-hot material is carried high up the walls of the unit and innumerable particles of black ash, in the fiery glow, drop back creating the illusion of falling snow. It is a fanciful idea, considering that charge attains a temperature of approximately 1,200° Centigrade.

Once the burning operation is completed the ash containing a large percentage of soluble barium sulphide, an essential ingredient, is removed, leached, purified and combined with zinc sulphate to make the snowy-white pigment called Ponolith.

ACCELERATED FILL SETTLEMENT

IMPROVED technique is to be expected in every branch of the construction industry. Somebody is always discovering a better method of doing useful work. The use of labor- and time-saving machinery has already gone far to speed up road-building operations, but it has remained for explosives experts to point the way to progress in constructing roads through swamps where exceptionally difficult conditions are met.

Earth fills in muskeg or other soft material have a bad habit of not "staying put." Fresh earth dumped on top of such a right of way does not settle fast enough to suit the contractor who is obligated to build a permanent road, and is anxious to get the job done easily and quickly. Hence, accelerated fill settlement through the use of explosives has been and continues to be a live subject in the road-building fraternity.

The *Earth Mover* recently devoted two pages to an Illinois project under the caption "Shooting Muck in Highway Work," describing how a Chicago contractor, R. T. Madden, handled three contracts last year, one of which called for grading six and one-half miles on State Highway Route No. 173, near Antioch. The

The DU PONT Magazine

grading, we are told, included 56,000 yards of excavation, the removal of 35,000 cubic yards of peat and the placing of 72,000 cubic yards of filling material. From this journal we quote:

"An interesting feature of the work was the large amount of peat, or muck, encountered and the method of handling it. The unstable material in places reached a depth of thirty feet. The plans required that it all be removed from a section forty feet wide at the base . . . and fill material put in its place. Where the muck was shallow, it was taken out by a dragline, but the deeper deposits were removed by blasting.

"The contractor first put in a floating fill to the required depth on top of the unstable material. Holes were then sunk through the fill and muck, in which dynamite was exploded. The gas pressure compacted the muck, forcing it to either side, and let the fill sink into place."

Straight-line road construction forces contractors to cope with such problems in many parts of the country, and because explosives can be used advantageously, du Pont explosives engineers are frequently called upon for advice and suggestions as to blasting practices. A bulletin on fill settlement work has been prepared, and the du Pont Company will be glad to send a copy to those who are interested as soon as the edition comes from the press. Requests should be directed to E. I. du Pont de Nemours & Company, Inc., Explosives Department, Wilmington, Delaware.

On the Air "Today and Yesterday" Tune In

Radio fans will be interested to know that a half-hour program of unusual entertainment, both musical and dramatic, sponsored by the makers of No. 7 Duco Polish and Duco Refinishing materials, will be heard over the basic Columbia network every Friday evening, beginning March 4, from 8.30 to 9.00, Eastern Standard Time.

Pacific Coast Columbia stations will broadcast a similar program every Thursday evening, beginning March 3, from 9.30 to 10.00, Pacific Standard Time. You are invited to make note of these dates and to "tune in."

A REWARD FOR OBEDIENCE

A KNIFE, as well as a hatchet, influenced the life of the "Father of His Country." That statement may sound like "Believe-it-or-not" Ripley, but the information has been dug up in various histories by one of the nation's leading manufacturers of pocket-knives, and this concern is producing miniatures of the original knife which is on display in the Masonic Lodge at Alexandria, Virginia.

When George Washington was only eleven years old, his father died. Shortly thereafter, the young man took up his residence with his step-brother, Lawrence, at Mount Vernon, and also lived for some time at the nearby home of William Fairfax, father-in-law of Lawrence. Through the influence of these men Washington later on obtained a warrant as a midshipman in the British Navy.

All preparations were made for his departure. But the thought of his joining the Navy worried his mother, who begged him to give up the idea. Finally, in deference to her wishes, he surrendered his commission and returned to his studies.

As a reward for submitting to her will, his mother bought a knife and gave it to him with this injunction: "Always obey your superiors."

George Washington carried this token all through life, and once to General Knox he explained the significance of the gift.

Years later at Valley Forge, when Congress failed to provide food and

A miniature of George Washington's knife is introduced, and here is the story about the historic original

By REGGIE ELLIS

shelter for his starving army, but would only send worthless continental currency, Washington, in despair, yielded to his feelings and wrote his resignation as Commander-in-Chief, called his staff together and told them what he had done.

Among the officers present was General Knox, who recalled the knife episode and the motherly injunction—"Always obey your superiors."

"You were commanded to lead this Army, and no one has ordered you to cease leading it," said the General.

Washington paused and then replied: "There is something in that; I will think it over."

Half an hour later, he had torn up his resignation. Thus, indirectly, this little knife played its part in changing the destiny of a great nation.

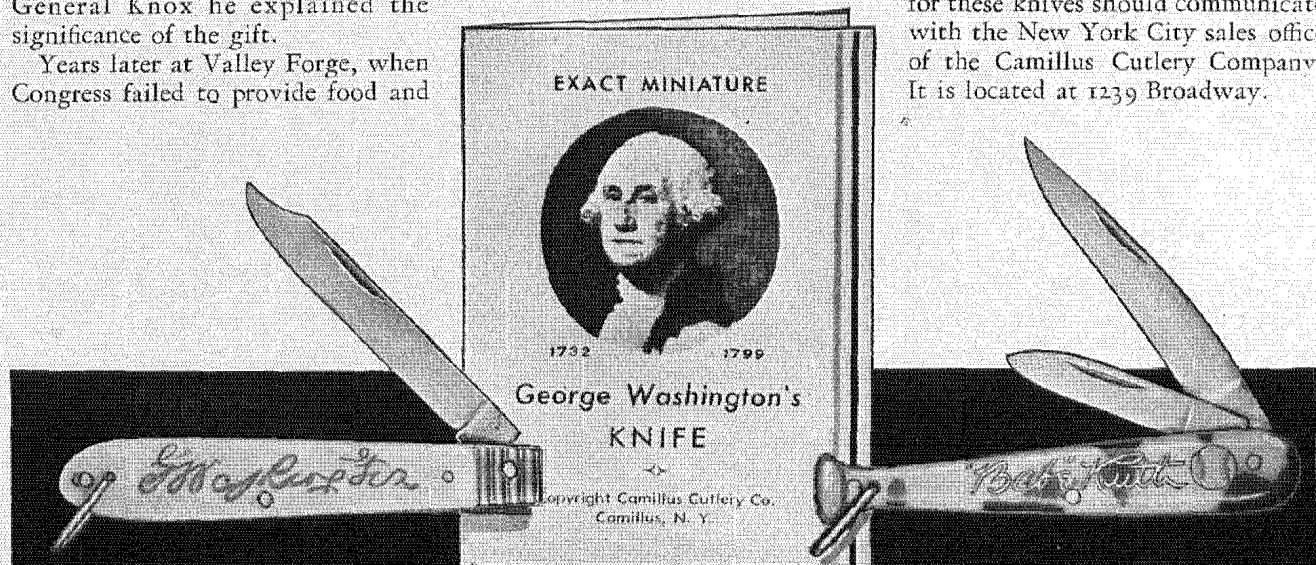
Appropriately for the George Washington Bicentennial Celebration this year, the Camillus Cutlery Company has made a strong, beautiful knife, an

exact miniature just one-half the size of the original, and therefore less unwieldy and more practical. Each knife is packaged in a transparent envelope together with a little descriptive folder. The blade is made from the finest steel, sharpened to a lasting cutting edge and the handles are full mirror polished Pearl Pyralin.

Incidentally, this company also pays its respects to a well-known hero of the baseball diamond. The "Babe" Ruth Knife, manufactured last year, proved so popular that another one, the "Babe" Ruth Mascot, has been added to the 1932 line. The reproduction shows it in exact size, bearing a facsimile of the player's signature. These knives have received whole-hearted approval by retailers, and volume sales are expected.

Pyralin has long been used for knife handles. Lustrous and beautiful in all its shapes and forms, and available in an infinite variety of colors, tints and effects, Pyralin offers the manufacturer a wider range of choice than any other material. It is readily adaptable to all sorts of mechanical processes. It is economical to fabricate. It is practically unbreakable. These properties and qualities make it especially suitable for knife handles.

Readers who may be interested in placing quantity or individual orders for these knives should communicate with the New York City sales office of the Camillus Cutlery Company. It is located at 1239 Broadway.



THE YELLOW PINE ENTERPRISE

A NEW mining district of magnitude is being developed at Stibnite and Yellow Pine, Valley County, Idaho, through the activities of the Yellow Pine Company, of which Fred W. Bradley, of San Francisco, is president. He is also president of the Bunker Hill & Sullivan M. & C. Company; Alaska Juneau Gold Mining Company; Treadwell Yukon Company, Ltd., and others. A mine output of 2,500 tons per day, the construction of a 2,500-ton mill and the erection of an 8,000-h.p. hydroelectric plant are plans of the company, and their realization will make this enterprise one of the largest mining operations in the United States. Mercury, gold and silver bullion, and electrolytic metallic antimony will be produced—the latter for the first time in history on a large commercial scale.

This project calls for courage, initiative and caution—qualities which

The scene is laid in Idaho, where ores containing gold, silver, mercury and antimony are now under development

By STEWART CAMPBELL
Inspector of Mines, State of Idaho

have made Mr. Bradley one of the outstanding figures in the mining world. His genius applied to metallurgical methods and to the technique of mining and milling has been directly responsible for a large addition to the gold, mercury, lead, zinc and silver reserves of the United States. He now plans to add antimony to this list.

Antimony is a brittle metal of silvery luster, easily powdered, of low melting point and one-half as heavy

as lead. Unalloyed, it has few industrial uses, but it combines readily with most metals, the alloy being harder than the two pure metals and in most cases possessing the property of prompt expansion on solidifying. Type metal, bearing metals, Britannia metal, storage battery plates and antimonial lead are the principal alloys. The compounds are used in medicine, safety matches, paints, vulcanizing rubber, enamelware and building trades. It is a very important war metal, being used especially in shrapnel, for bullets, in primers, and to produce a white smoke for range finding.

In 1930, no antimony ore was produced in the United States, but lead smelters yielded 1,685 tons as a by-product in antimonial lead. Approximately 8,563 tons of metal and 1,403 tons of compounds were imported that year, principally from China.



The tariff on the metal and oxide is two cents a pound, and six cents on most of the chemicals. The present price is six and one-half cents a pound.

HISTORY

It is impossible here to trace the vicissitudes of the mining claims in this enterprise from their discovery, through ownership by prospectors and many small promotional companies, to their consolidation as the United Mercury Mines Company and their final acquisition by the Yellow Pine Company.

Their discovery dates back to the finding of gold in Thunder Mountain in 1889 or 1890 by the Caswell Brothers, the subsequent boom from 1901 to 1903 and the overflow into the adjacent areas by prospectors who discovered the principal cinnabar and antimony veins now under development. Many of the first locators soon abandoned their prospects; some, particularly Pringle Smith and Albert Hennessey, remained.

Little work was done on any of these veins until 1918, when the World War caused an excessive demand for

mercury and antimony, and prices rose greatly. Mining became attractive and over a dozen different companies acquired practically all of the properties. Some of them produced and marketed a small tonnage of hand-sorted antimony ore and a few flasks of mercury, however, despite high war prices, road and transportation conditions made mine operations impractical, and everyone except J. J. Oberbillig, of Boise, became discouraged and quit.

In January, 1921, he organized the United Mercury Mines Company, which absorbed twelve of the original companies, and for the next six years he directed all mining operations, besides personally selling and supervising the sale of stock, which was disposed of at a cost of less than 5 per cent to the company. The development work proved that the mines would require an outlay of many million dollars before they could be operated profitably. As the company could not raise such a sum through the sale of stock, it was decided to sell the properties.

In 1925, Mr. Oberbillig tried to dis-

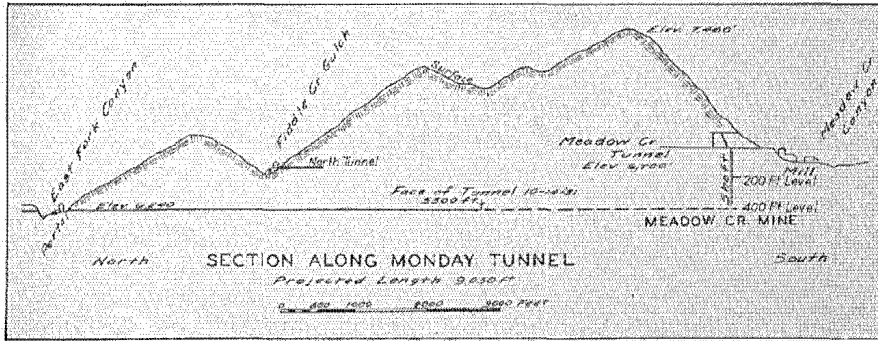
pose of the Meadow Creek group, but his plans miscarried. Undaunted, he continued his efforts and in May, 1927, succeeded in optioning the Meadow Creek and Cinnabar groups, and in 1930, the Antimony group, to Mr. Bradley.

DEVELOPMENT ACTIVITIES

The achievements since 1927 are impressive. At that time there was no telephone, no mining equipment, other than hand tools, and only one small duplex cabin on the Meadow Creek group. The properties could be reached by two trails. One led from the Antimony group on Johnson Creek over a high mountain through No Man's Land and thence down Meadow Creek, a distance of twelve miles. The other followed the east branch of the south fork of Salmon River from the Yellow Pine settlement to

General view of the Yellow Pine Company's property at Stibnite, Idaho. Establishing mining and milling facilities in this mountain-locked region has been an undertaking of real magnitude





This profile map shows the relative location of the tunnels and the progress made in driving Monday tunnel to October 14, 1931

the mine, a distance of fourteen miles.

After Mr. Bradley acquired the property, a telephone line was erected, Meadow Creek camp was enlarged, new buildings were erected at North Camp on Fiddle Creek, supplies were laid in and active development was started in Meadow Creek and North tunnels. This work progressed without interruption and by spring, 1928, the results were sufficiently encouraging to warrant an expansion of operations.

Earlier geologic reports refer to the old state road to Thunder Mountain, built during the boom, as "abominable." Nevertheless, over this road in the summer of 1928 two large boilers, steam engines, a complete sawmill, a compressor and other mining equipment were transported to the head of South Meadow Creek and thence down the steep mountain side to the mine. Over much of the last four miles it was necessary to let the equipment down by means of snubbing blocks and tackles.

New buildings were erected at Meadow Creek camp and also at Monday camp—the new site selected for the Monday and Cinnabar tunnels. Land was cleared for an airport and roadwork was started. The company coöperated with the U. S. Forest Service in constructing four miles of highway from Yellow Pine up the river, and built independently ten miles more down the stream to connect with the Government road. The entire distance involved the heaviest

kind of mountain construction, much of it through a precipitous box canyon. This work, completed early in 1929, made it possible to replace pack strings and saddle horses with motor trucks and automobiles.

During 1929 additional buildings were erected at Meadow Creek and Monday camps; complete mining equipment was installed at the latter, and Cinnabar tunnel was started. There were now three independent mining operations—Meadow Creek, Monday and Cinnabar tunnels. By the following spring sufficient ore from these workings had been proved to warrant proceeding with another expansion program.

The expenditures during 1930 exceeded those of any other mining company in the state. A large hydroelectric power plant was constructed. All machinery was converted to electric drive; additional buildings, compressors, mining machinery and an

electric hoist were installed; and work was started on sinking a 400-foot vertical shaft in Meadow Creek tunnel.

In November, 1930, George Stonebreaker, who holds the Government mail contract, replaced dog-team mail delivery, requiring three days from Cascade, with airplane service, requiring less than one hour. Passengers and light supplies are transported on regular schedules from November until June. This service proved valuable to the company during the winter of 1930 when the power source was lost through freezing of the hydroelectric plant. A gas-driven compressor was substituted, fuel for it was delivered by airplane, and Monday tunnel was advanced without interruption. So far as the writer knows, this was the first time in the United States that gasoline was so transported for power purposes in conducting mining operations.

By the spring of 1931 sufficient ore had been proved in the Meadow Creek vein to indicate a future mine output and milling capacity of 2,500 tons a day. The metallurgical treatment of the ore had been solved by Mr. Brad-



Another view of the workings at Stibnite, Idaho, where the Yellow Pine Company is developing ore bodies in a wilderness location. Note the heavy stand of timber in the background

One of the mining camps on the property. Comfortable quarters for the men are provided in a picturesque environment that is beautiful with its many forest trees



ley and his staff, and as the milling methods involved some new procedure, Mr. Bradley displayed his usual caution by deciding to construct first an experimental mill of 150 tons capacity before building the larger unit. Meadow Creek camp was selected as the location of this mill, so that operations in Monday tunnel would not be interrupted and because of the large tonnage of ore available above the level of the Meadow Creek tunnel. Plans were then made for the year and \$450,000 appropriated to carry them out.

These plans included cross-cutting and drifting on the 200- and 400-foot levels in the Meadow Creek tunnel shaft; advancing Cinnabar and Monday tunnels; rebuilding South Meadow Creek power plant and constructing a forty-foot dam; covering the 11,000 foot redwood pipe to prevent freezing; logging and sawing more than a million feet of lumber;

starting a new 6,000-foot tunnel on the Antimony group at Yellow Pine and constructing the experimental mill referred to. The company also established a public school at Meadow Creek camp and assisted in the construction of more than a dozen houses for its employees.

Mr. George W. Worthington, mine superintendent, was in full charge of this work. Incidentally, he established a new mining tunnel record for the United States by advancing the Monday tunnel 663.6 feet during August, 1931. The daily average was 21.4 feet. Du Pont special gelatin has been used exclusively at this operation.

Monday tunnel has a projected length of 9,050 feet and is being extended through hard granite, its

dimensions being six by eight feet in the clear and seven by nine feet where timber is required. At the end of August the face was 4,820 feet from the portal, having been advanced 1,964 feet during May, June, July and August, an average of 491 feet per month.

In establishing the record three shifts of six men each were employed daily. Two drilling machines, mounted on a crossbar, were used, and the muck was handled by hand and trammed by an electric storage battery locomotive.

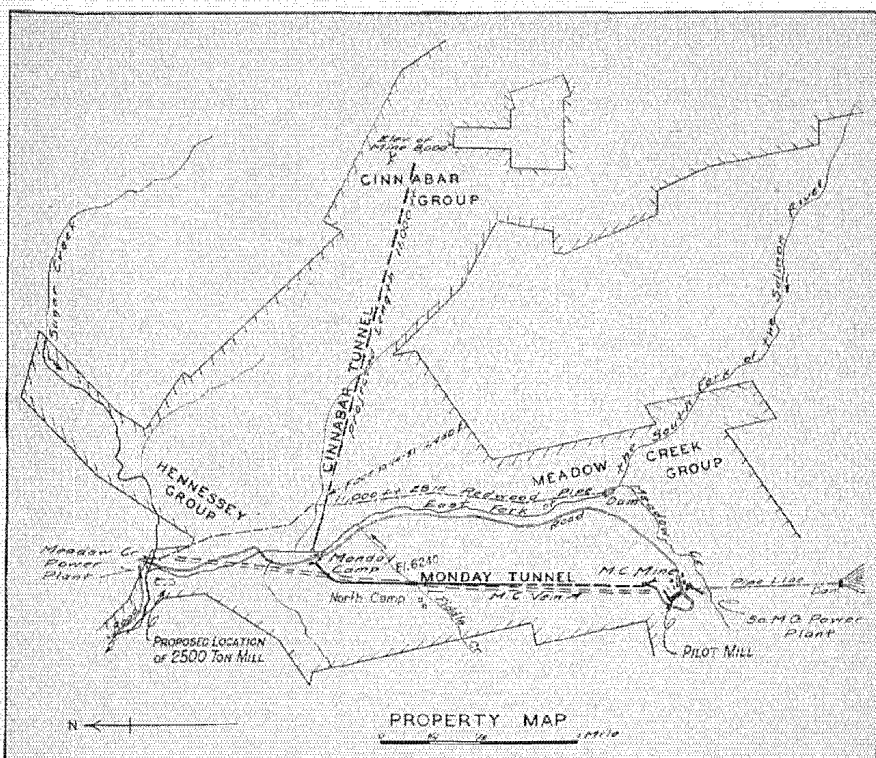
The highest record heretofore made in Idaho, where muck was handled by hand, was in the Atlas Mining Company's tunnel in the Coeur d'Alene district. It was extended 551 feet during March, 1926.

As this is written, it is expected that the mill at Meadow Creek camp will be in operation within a short time. Thus, a mountain wilderness has been transformed into a hustling mining community with all modern facilities and conveniences at a total cost, since 1927, of more than \$1,300,000.

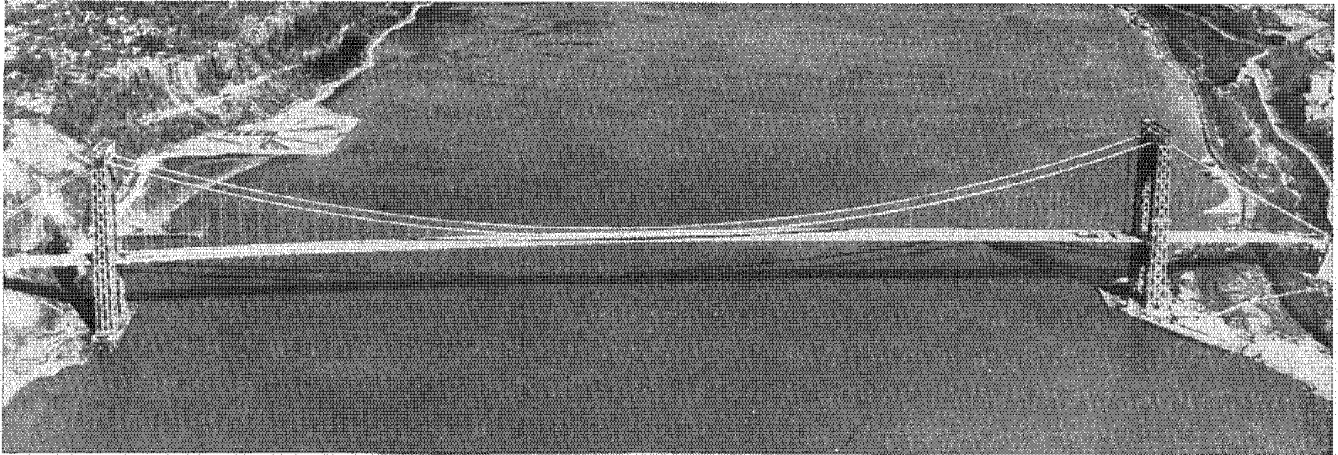
LARGE PROPERTY HOLDINGS

The property holdings have been expanded from 6 patented and 87 unpatented mining claims in 1925 to 9 patented and 518 unpatented claims, containing an area of 10,540 acres. The various groups and the principal

(Continued on page 24)



From this plan view of the Yellow Pine Company's property you can readily note the position of the various groups of claims under development in October, 1931.



PHOTOS BY UNDERWOOD & UNDERWOOD

HAIL! MONARCH OF THE HUDSON

THERE is a peculiar affinity between the old covered bridges of yesterday, with their hand-hewn timbers and wooden pegs, and the gigantic symphony of steel and concrete that now spans the Hudson River between 178th Street in New York and Fort Lee, New Jersey. For even when many of these old structures were being built, engineers were contemplating the possibilities of a bridge across the Hudson.

Their dreams, however, were little more than visions of what might some day be accomplished. Fifty years ago another generation of engineers began seriously to consider this problem. The railways were pushing forward, their needs were growing greater and more pressing, and agitation for a bridge over the Hudson, linking New York City and New Jersey, led to the formation of several private companies which have made many plans within the past fifty years to build such a bridge, only to have them fail because of the lack of sufficient financial backing.

It is interesting to note that all previous demands were for a railroad bridge over the Hudson, and that all the sites considered have been in downtown New York—at Tenth Street, at Twenty-third, and then further out at Fifty-seventh, at Fifty-ninth, and at Sixty-eighth. It was not until 1910, when the development of the automobile had made the highways of increasing importance, that

A triumph of modern engineering is the George Washington Bridge on which du Pont Dulux was used for the finish coats

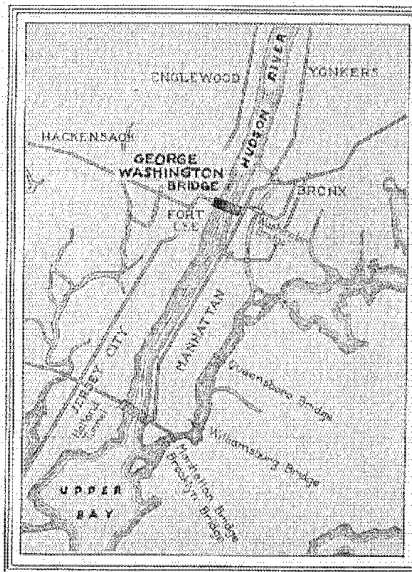
By GORDON W. WARE

the idea of the bridge as it now stands was conceived, and its present site considered. At that time the Interstate Bridge and Tunnel Commission, representing New York and New Jersey, considered the possibility of building at 178th Street a 1,400-foot cantilever bridge with river piers.

Borings into the river bed, however, showed that rock could not be reached at a feasible depth below the mud of the bottom, and the scheme was abandoned. It was out of the work of this commission that the project of the Holland Tunnel was finally conceived and executed.

The 178th Street site was reviewed once more in 1923 by Mr. O. H. Ammann, then an engineer in private practice, later bridge engineer, and now chief engineer of the Port of New York Authority. His researches gave new impetus to the project, and in 1925, the dream of four generations of bridge builders was assured, with the passage of legislation by New York and New Jersey, empowering the Port of New York Authority to build a span in the general vicinity of Fort Washington Park (178th Street) on the New York side, and Fort Lee on the New Jersey shore. The two states made contributions to the initial fund of \$10,000,000, and the remaining \$50,000,000 needed was obtained through four and one-half per cent bonds issued by the Port Authority, and secured by the toll revenues of the bridge.

The tremendous increase of vehicular traffic made the selection of this



This map will help you fix in mind the location of the new George Washington Bridge spanning the Hudson River and linking the States of New York and New Jersey

location a logical one, escaping as it does the congestion of downtown New York. But even beyond the traffic problem, this site seemed ideally suited to its purpose. The difficulty of striking rock below the river bed made any type but a suspension bridge impractical, and here the high land on either side of the river provided adequate anchorage for the cables, and allowed for sufficient navigation clearance. The property it was necessary to acquire for the approaches was much less expensive here than in downtown New York.

On the New Jersey side, it tapped a highly desirable but little-developed suburban residential territory, and gave access to Paterson and Passaic. And finally, with the completion of the proposed Tri-Borough Bridge over the East River, it will provide a continuous route from New Jersey to Long Island, entirely outside the congested sections of New York City.

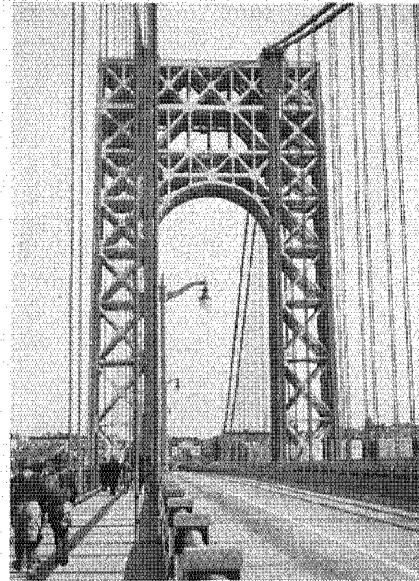
The bridge itself is surely one of the greatest of modern engineering achievements, throwing itself in a gigantic single span from shore to shore. And this span, 3,500 feet long, is nearly twice as long as the Quebec cantilever bridge over the St. Lawrence River and the Ambassador suspension bridge over the Detroit River, each of which measures 1,800 feet.

Contracts were let on November 4, 1927, and the first steel was set in the New Jersey tower on June 25, 1928,

Pedestrians may cross the George Washington Bridge, for on both sides of the eight automobile traffic lanes are sidewalks

and in the New York tower on August 8 of the same year. With amazing speed the towers reared their thousands of tons of steel skyward. Each, when completed, weighed 20,106 tons, equivalent to the registered tonnage of a moderate-sized ocean liner. And five days less than a year later, the towers were turned over to the cable contractor.

Holding the weight of the 3,500-foot roadway, which also weighs 20,000 tons, are four giant cables—two on each side of the towers. These cables, 42 per cent larger than any that have been made heretofore, measure thirty-six inches in diameter, and each contains 26,474 cold-drawn galvanized wires 0.196 inches in diameter, having an ultimate strength of 240,000 pounds per square inch. It is these great strands that support the roadway, with its eight traffic lanes, and over which, it is estimated, 8,700,000 vehicles will pass in 1932, and 25,100,000 in 1946. Provision has also been made for the addition, later, of a "lower deck" built under the present span, to carry four high-speed railway lines.



Each step in the planning and erection of the remarkable bridge was characterized by a constant consideration of the durability factor. Every possibility of stress and strain, every vagary of wind and weather, was provided for by the engineers, so that the safety factor is far in excess of the actual requirements.

But the dreams of a century, the genius of the engineers, the planning and work of two decades, would all count for nothing if this tremendous assemblage were not protected against steel's worst enemies—rust and corrosion—by adequate painting. And for this vital job Dulux, the du Pont Company's most recent contribution to the paint industry, was chosen. On all the steel work, after erection of the bridge, finishing coats of Dulux were applied—a barrier and a protection against wind and weather.

Seen through the mists of a winter afternoon, the graceful sweep of its cables dimly reflected in the Hudson, the George Washington Bridge is indeed a glorious and fitting memorial to the great man whose name it so proudly bears.

This view of the new \$60,000,000 George Washington Bridge, looking down from the New York anchorage, gives some idea of its tremendous span, which is two-thirds of a mile long. The cables are three feet in diameter, each containing more than 26,000 separate wires



SPEND FOR THE HOME IN 1932

"THE American people have come home," is the rather striking statement of the editor of a Chicago business paper. And he adds: "I believe that we are about to witness the greatest renaissance in home-making that this country has ever known."

The statement is of particular interest at this time, because most financial authorities are agreed that the building industry is a "key" industry, in that its activities affect many others. One authority has listed some fifty-five other industries which, when building is active, are likewise busy. Thus, if this editor's opinion is correct, it may well be that America's interest in the home in 1932 may be a vital factor in bringing the country out of its present uncertain state of mind.

"There are a number of reasons for this state of mind on the part of our people," he says. "Spiritually we are reacting to the frenzied post-war years; intellectually we are beginning to count the costs of the 'whoopie' years; and economically we have just had a thorough chastisement. And human nature never gets down to thinking about fundamentals so well as when it is on its way back from the woodshed.

"All of the many forms of amusement to which we turned in the years after the war—from the movies to the cabarets and roadhouses—have suffered. Loss of positions, reduction of salaries and incomes from investments, uncertainty of the future, all have conspired to slow down the spending, not only of the older crowd that reached maturity during the war, but of the younger crowd that came to so flaming a maturity in the post-war years.

"All this has thrown thousands of people back upon their homes and apartments. And, perhaps for the first time in years, they are looking at those living quarters with a critical eye. For now they must center their social life in their homes and apartments. Any man who has brought an unexpected guest for dinner at a time when his wife did not

think that the home was at its peak of beauty knows what this critical study of the home means.

"It's going on now all over the country. As one business acquaintance said to me: 'At a time like this a man has a tendency to draw in his lines and to dig himself in at home—the source of his strength.' With social life once more centered on the home, the home is going to come into its own and there will be more charm in entertainment than feverishness. Perhaps even the art of conversation, buried for a decade under the blare of jazz bands, will be rediscovered.

"If the men who have thought most profoundly on matters of national life and interest are correct, the home is the test of any civilization—the backbone of our country, as it used to be called. This being true, we may expect that the new interest of America in its homes is going to have a profound influence on our history in the next generation. The American people have come home—and that means that first our homes and then our national philosophy are going to get an overhauling."

SCENIC HIGHWAYS IN THE COLORADO ROCKIES

(Continued from page 14)

in the construction and maintenance of highways to the Denver Mountain Parks. These include about thirty-six scenic locations in the mountains west and southwest of Denver.

There probably always will be many mountainous areas in Colorado where the true lover of nature can seek solitude amid the evergreen forests, far from honking automobiles. However, the construction of modern highways through the Colorado Rockies has been well worth while. They have made many scenic areas available to the thousands of automobile tourists who cannot afford the time required to follow the trails. The building of these highways has been of inestimable value to the business activities and general welfare of the state.

THE VENTURAFIN METHOD OF HEATING

(Continued from page 15)

Although relatively small, each unit is capable of distributing heat over a quite extensive area. This means fewer units, less valves, fittings and pipes and considerable reduction in installation cost as compared with older systems.

Protected with du Pont finishes, Venturafin units are in keeping with the finest of modern interiors. The rich, deep olive-green casing, with black motor support, fan and deflectors form a dignified and pleasing color combination for this equipment which combines real utility with an attractive appearance.

THE YELLOW PINE ENTERPRISE

(Continued from page 21)

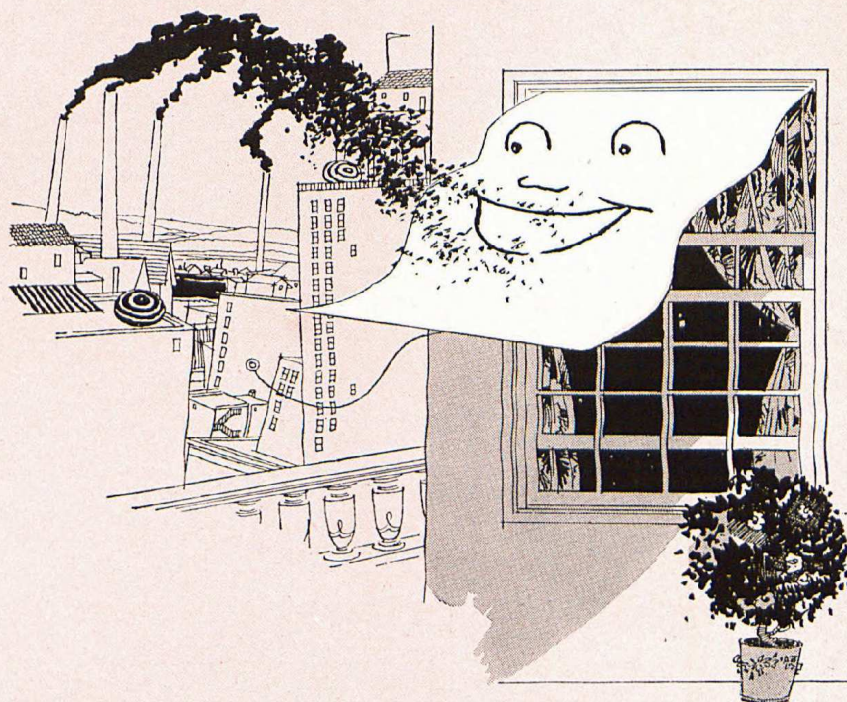
metals contained in them are as follows:

GROUP	NO. OF CLAIMS	PRINCIPAL METALS
Meadow Creek...	160	Gold, silver, antimony
Hennessey	17	Gold, silver, antimony
Antimony.....	80	Antimony, gold, silver
Cinnabar.....	240	Mercury
Yellow Pine		
Placer Country..	30	Placer gold

The Antimony group is located on Johnson Creek, two miles south of Yellow Pine. Below the town is the Placer Country group, which includes the site of the proposed 8,000 h.p. hydroelectric plant.

The geologic formations encountered and the methods of mining, milling and processing the ores are too involved for discussion here. The ramifications of this enterprise are multitudinous, and the benefit the state has received and will receive from it cannot be estimated. It has created a big market for the farmer, home institutions and labor. It has also proved that many years and large expenditures are usually required before a prospect becomes a profitably operating mine. Idaho is fortunate in having laws that encourage such an undertaking.

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