

From a painting by Howard Pyle

The old du Pont powder wagon en route to Lake Erie with supplies for Commodore Perry during the War of 1812

The DuPont Magazine

February 1925



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POWDER MAKERS SINCE 1802

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"Something Worthy to be Remembered"

Wherein we direct attention to the cover illustration this month, portraying as it does a memorable incident of the days when the nation was young

"LET us develop the resources of our land, call forth its powers, build up its institutions, promote all its great interests and see whether we also in our own day and generation may not perform something worthy to be remembered."

Graven on the courtyard walls of the fine new $2,750,000 home of the Chamber of Commerce of the United States of America in Washington, D. C., is the legend just quoted. It is an excerpt from one of the speeches of Daniel Webster, and most fittingly is it inscribed there. It is indicative of the purpose that inspired the foundation of this Chamber of Commerce and the building that stands for it; also, this structure is erected on the site of the home occupied by Daniel Webster during his residence in Washington.

Read that first paragraph again for its inspiration. The thought was timely when Webster gave voice to it, for the nation was then growing and expanding industrially and commercially. It would have been just as timely a half century before when American commerce and industry were just getting under way. And now that the United States has arrived and ranks as the leading nation of the earth, the statesman's plea is still timely. It will always be timely.

Our cover illustration last month portrayed E. I. du Pont de Nemours discussing the location of the first du Pont powder mill in America with his friend, President Thomas Jefferson. From what we know of these two men, either might have expressed Webster's thought in their day; for both were men of broad vision, both actuated by patriotic impulses of the highest order. Each in his own sphere of activity helped to lay the foundations on which have been built, since their day, the structure of the nation's great prosperity.

The du Pont Company today is but the lengthened shadow of the founder's personality. Its business has grown up with the nation's business. Its products have helped to develop the resources of our land; they have called forth its powers; they have had a part in building up its institutions, and they have promoted all its great national interests both in times of peace and in times of war.

Pictorially, so far as it is possible, we are planning to use our front cover space to show in what ways this has been done. And that brings us to the color illustration for this month, which portrays the old du Pont powder wagon en route to Lake Erie with supplies for Commodore Perry during the War of 1812.

This subject was painted expressly for the du Pont Company by one of the nation's foremost artists—Howard Pyle—who did the work at Florence, Italy, early in the spring of 1911—only a few months before his death. The original canvas, now hanging in the lobby of Hotel du Pont, was first reproduced as a calendar subject for 1912—the 100th anniversary of the memorable powder-wagon trip to Lake Erie.

At that time a powder wagon, similar to the one shown in the illustration, followed the same overland trail from the starting point on the Brandywine Creek, near Wilmington, to Lake Erie. All along the route this caravan was hailed by the citizens of every community and at Lake Erie, where the centennial celebration of Perry's victory was held, the old du Pont powder wagon was one of the principal attractions.

The War of 1812 is a milestone in American history; it is also a milestone in the history of the du Pont Company. This illustration draws attention to only one of its memorable incidents.—E. R. M.

Ditch Blasting Within City Limits

The Engineering Department of the City of Flint, Michigan, solved a park drainage problem with du Pont dynamite

By H. C. McCLURE
City Engineer
Flint, Michigan

ALTHOUGH ditching with dynamite has become quite common in recent years, perhaps the experience of the Engineering Department of the city of Flint, Michigan, may prove interesting to others contemplating such work.

Within the city limits of Flint are several small lakes, and near one of them is a summer amusement park. Each year, about the time the park is scheduled to open, high water, due to spring rains, has interfered with the plans; for an old county drainage ditch, which serves as an outlet for the lake, has failed to meet the requirements. To give adequate relief we found it necessary to clear this ditch for a distance of approximately 7500 feet.

In this distance heavy clay and gumbo soil, a stretch of swamp land and a portion of timbered area were encountered. Any one method of opening and deepening the ditch for its entire length was out of the question, for the job was not big enough to warrant bringing in the type of equipment best adapted for each portion.

Shovels or draglines could not operate through the swamp because of no bottom; nor could they operate through the woods for lack of clearance. Slips were not advisable through the swamp and could not be used on the farm land section because of the heavy clay and gumbo. Land dredges could not well be brought into the swamp section. It was finally decided to use dynamite at a time when the drainage ditch carried enough water to warrant blasting by the propagation method.

Short test sections were blasted at first to determine the size of cartridges and the space and depth at which they would give best results. Finally, it was decided to use half-pound sticks of 50 per cent du Pont straight dynamite in holes spaced 14 or 15 inches apart and with the charges placed at a grade of four to six inches above the proposed ditch bottom. The charges were set off with a No. 3 du Pont blasting machine. Short sections were blasted first, then longer ones, until 150 feet was found to be the proper length for each shot.

On encountering the clay and gumbo it became necessary to place an extra booster stick about every ten to fifteen spaces. While it was perhaps unnecessary in this section, connections were also made at points approximately twenty-five feet each side of the center in addition to the center connection.

In the swamp land, with its dense growth of marsh grass and with water in places two feet deep, the heaviest gumbo soil was encountered. The ditch through the woods was a mass of broken limbs and roots, so that after blasting the men had to gather and burn large quantities of brush and rubbish. On the other sections it

(*Continued on page 15*)



Above—A 200-foot section was blasted in the swamp land. Indistinctly, at the lower right edge may be seen the two-story farmhouse from which you may judge how high the material was carried by the blast



Right—A 150-foot blast through gumbo soil. Note the large chunks of material in the air

Oval—The ditch here was deepened only a little—about 15 inches



As the ditch appeared after the shot at the left was fired. Note the men at work on the next section

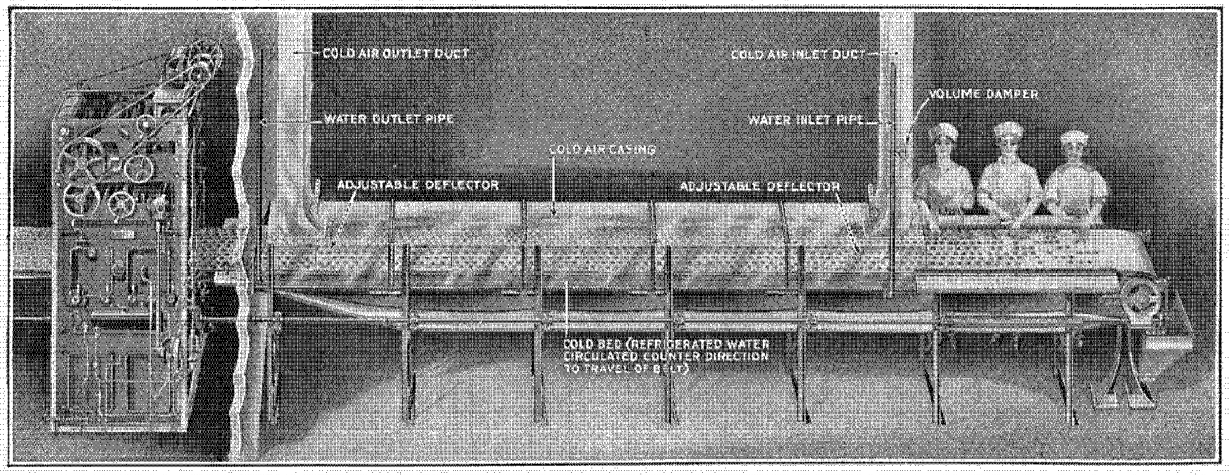


Illustration by courtesy of the Bentz Engineering Corporation

A river of chocolates—showing the use of an Indestructo Enrobing Belt on the Bentz Coldbed and Enrobing Unit

A River of Chocolates

Produced in an unfailing stream on an endless belt of Fabrikoid

By F. W. HOTCHKISS

ORIGINALLY, the candy requirements of any locality were supplied from a candy kitchen. But it is a long jump in production methods from little candy shops, where hand labor was employed exclusively, to the immense chocolate factories of today. In these great plants the chocolates are rarely touched by hands; many ingenious machines do the work.

No machine more vitally important for chocolate production has been invented than the enrobing machine, which eliminates the dipping of chocolates by hand and makes big-scale production possible. This machine applies a coating of chocolate to the candy centers and delivers them to an endless belt which runs through a refrigerating chamber to the packing room.

The conveyor belt has served in two ways. By one method the chocolates were deposited by the enrobing machine on plaques which were carried on a belt through the refrigerating chamber to the packing room. The plaques were removed to racks, and the candy was packed from them. The other method—a more practical one—was to have the chocolates deposited on an endless paper conveyor which carried them at an even speed through the refrigerating chamber to the packing room, where girls packed them directly into boxes. This paper belt was necessarily of light weight with a highly glazed finish, and for some time it was the only type adapted for this work. But it was very fragile, lasting only from one-half to one day.

Both methods had their drawbacks. The use of plaques meant double handling and slow production. The paper belts broke frequently; and this meant lost time while a new belt was being installed, and the spoilage of chocolates on the belt at the time of its breaking.

Troubled by these conditions, one of the leading chocolate manufacturers came to the Fabrikoid Division of the du Pont Company with the request that we endeavor to produce a belting that would overcome the inherent weaknesses of the belts then in use. So we developed the Fabrikoid Indestructo Enrobing Belt.

These belts were first made by combining a specially glazed paper to a strong fabric base, giving a belting of good tensile strength with correct surface properties. These belts were then further refined, the latest development being our "Durable White Belt," which is all-fabric, with a highly finished surface. It has proved to be the most satisfactory belt for the purpose.

The illustration demonstrates how the Indestructo Belt is used in connection with a modern enrobing machine. At the left is shown the enrobing unit, into which a wire screen carrier conveys the nuts, fruits and centers to be coated. After they are enrobed they fall on the Indestructo Belt, which carries them through a refrigerating room or coldbed. Cooled and hardened, the chocolates move on to the packing room, where they are immediately packed in boxes by girls. During these operations, the belt moves continuously—about one foot a minute.

The life of a Fabrikoid Indestructo Belt is from six weeks to eight months—a ripe old age compared with the very short life of the old paper belt. These Fabrikoid belts are made solely for use in connection with enrobing machines, and can be depended upon to give the best service during their life. They are supplied in widths of from 14 to 35 inches and in lengths of from 20 to 50 yards. If an enrobing belt is needed, a Fabrikoid belt will best answer the requirements.

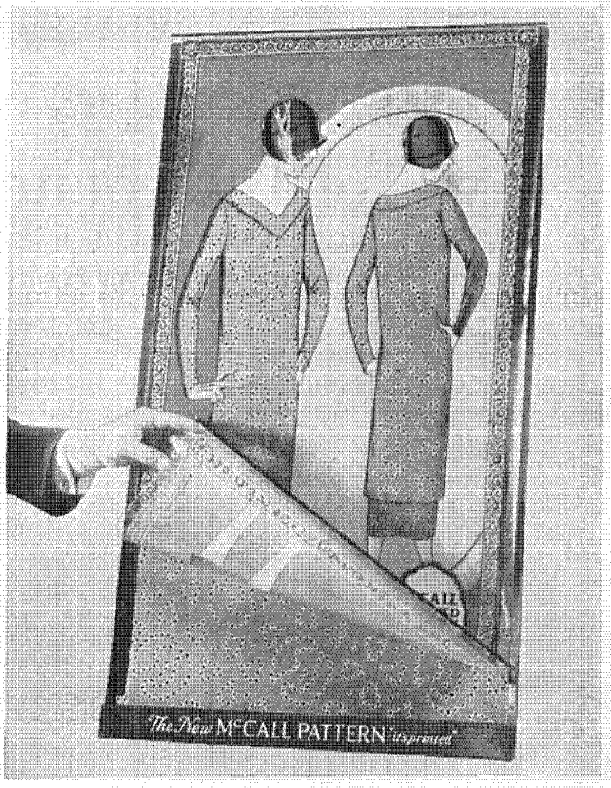
Pyralin Helps Madam Select Her Dress

This product is not a stranger to Fashion, but in this article it is presented in new, interesting role

By L. B. STEELE

WHEN womenfolk go shopping for dress materials they are of course eager to select shades that will harmonize with the particular style of dress they intend to make. Frequently, however, Madam Shopper has found it impossible to visualize just how the material will "make up" and has discovered that her finished dress looks quite different from what she imagined it would from seeing the goods on the counter.

To overcome this difficulty, the McCall Company of New York City—famous the world over for its dress patterns — has perfected a device for showing the finished effect of a material in whatever style of dress or pattern the customer is considering. This device is called the style display poster and is shown in the accompanying illustration. Briefly, it consists of a metal frame with easel, and a piece of transparent Pyralin sheeting, on which is lithographed in color the figure of a girl wearing a certain style of dress, and standing in front of a mirror. The actual dress on the figure is transparent — the outlines only being indicated.



We turn back the Pyralin shield of the display poster to show you how it works

How is it used? Let's go shopping and see. Mrs. Customer comes in the store for some ribbon, perhaps, strolls past the dry goods counter, and in passing she notices a bolt of silk that intrigues her interest. She stops—examines it and remarks, "I wonder how that would look."

But the alert sales clerk, noting her interest and overhearing her comment, replies, "I'll gladly show you." He raises the transparent Pyralin shield of the display, drapes the silk over the metal frame and then replaces the shield in position. And there's the picture of a model—two views showing just how the material would appear as a finished dress made to pattern.

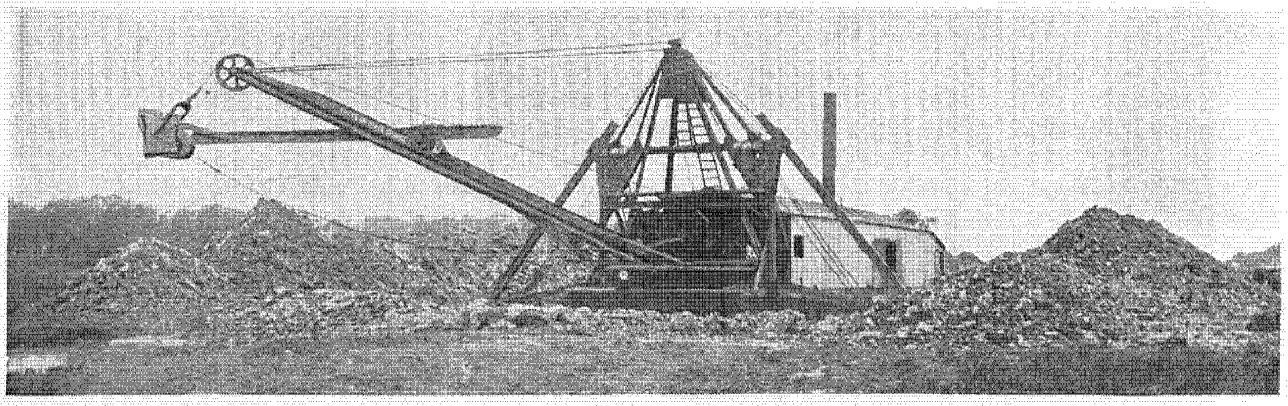
The effect is striking and Mrs. Customer soon determines whether the material will suit her taste. She may ask to see two—or three—or four other shades, but only a few—and finally a selection is made. The tedious time-consuming delays occasioned by searching through bolt after bolt of cloth for something the prospect vaguely "thinks" will look well are eliminated. And more important, she is far more likely to be pleased with the finished dress if she can see in advance how it will appear.

These style display posters won instant favor with women everywhere. Merchants, quick to see their possibilities, installed a number of them in their dress material departments, where they were found to be a big sales stimulant. Transparent shields, showing popular dress styles, are furnished by the McCall Company periodically in connection with its pattern service.

These shields are lithographed by the Sweeney Lithograph Co., Inc., of Belleville, New Jersey. This company, after making exhaustive tests, found that transparent Pyralin sheeting was best adapted for the work. It satisfied every lithographic requirement. By means of a special photographic method large illustrations are transferred to the Pyralin sheets by offset lithography as easily as with paper. The Pyralin registers well, takes the ink easily and doesn't smear or block. The extreme flexibility of the shield prevents it from cracking or tearing, and despite handling, it retains its original good-looking appearance.

Whether for lithographing or for printing, engraving, stamping, embossing, blowing, drilling, sawing or cutting—Pyralin proves its adaptability for many uses in the arts and industries.

If you are interested in determining whether Pyralin can be used on a product you are making or using, write to the Industrial Research Division of the du Pont Company's Pyralin Department at Arlington, N. J., outlining your proposed use, and its development laboratories will be placed at your disposal in an endeavor to adapt Pyralin to your requirements.



This view shows the big dredge pushing its way through the rock, which had been broken up with gelatin dynamite

Ditching Through Rock

Du Pont Gelatin Dynamite helped in the construction of a much-needed ditch in Indiana

By H. G. HORTON

FARMERS in Ryan Drainage District of Jasper County, Indiana, are rejoicing over the recent completion of a nine-mile ditch which affords drainage for 100,000 acres of rich corn land, much of which was previously under water in wet seasons. This ditch starts about two miles from the eastern boundary of Jasper County and, following a southwesterly direction, runs into a ditch that empties into the Iroquois River near the town of Rensselaer.

The excavation offered considerable difficulty because the ditch line crossed nine separate ledges of hard, tough rock varying in elevation above the desired grade from 6 inches to 12 feet. This necessitated drilling and blasting for a distance of five miles. The contractors, Sternberg & Horton of Chicago, put four Sanderson Cyclone well-drills to work on the deep ledges and drilled two rows of 5-inch holes spaced 10 feet apart across the ditch and 8 feet apart along its length and extending 3 feet below grade. The holes were loaded with 40 per cent du

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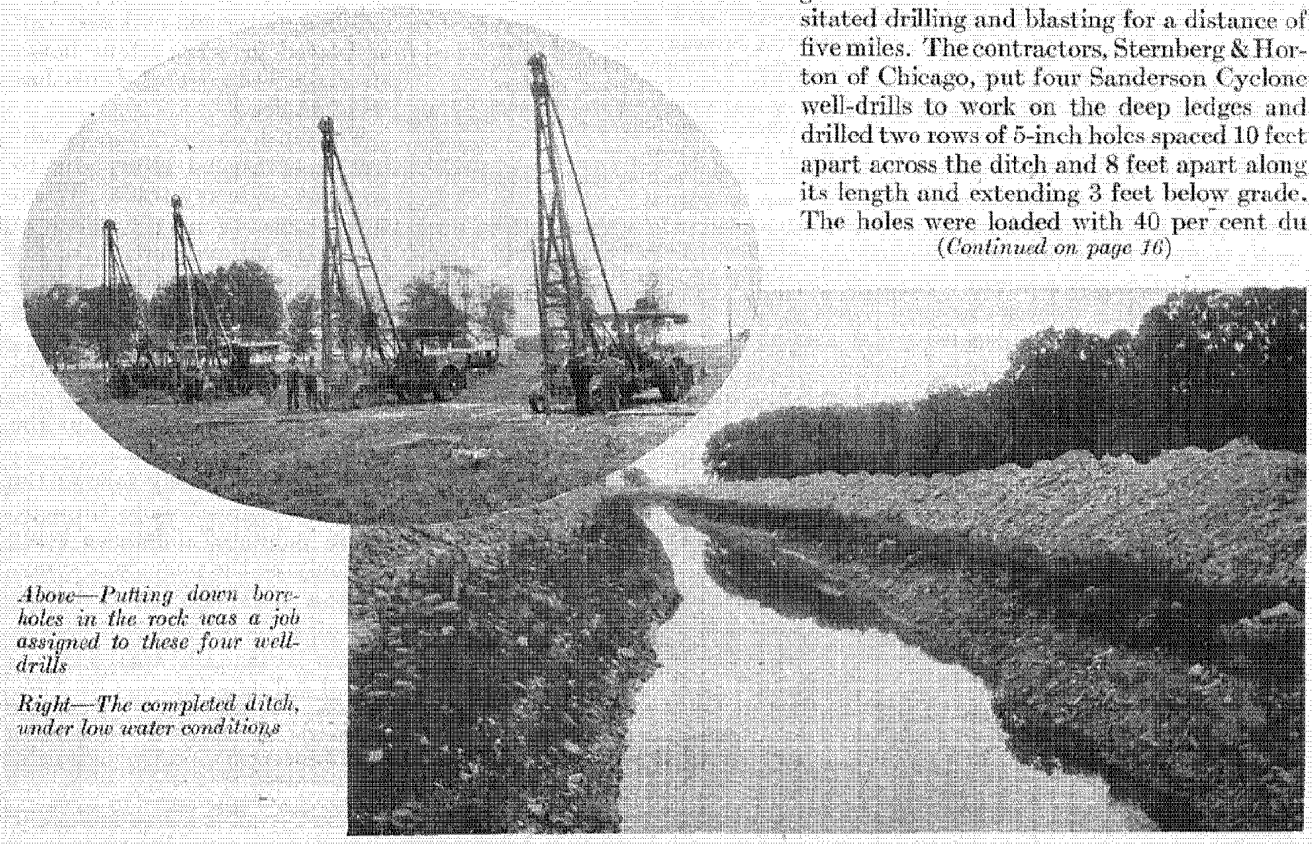


Above—Putting down boreholes in the rock was a job assigned to these four well-drills

Right—The completed ditch, under low water conditions

Duco Finish for Railway Equipment and Rolling Stock

The remarkably successful use of Duco Finish on automobiles and furniture has accelerated the interest of railway and traction officials in this product

By A. HINZE

IT is an established fact that a newly painted street car or railroad coach will attract more passengers than a car of dingy or dirty appearance. Because this is so, traction and railroad officials are much concerned to keep their rolling stock always well painted and presentable.

A finish to be suitable for railway equipment must not only look well when first applied, but it must also possess the quality of retaining its fresh, clean appearance for a long period of time. Aside from this, a locomotive, a passenger car or a street car is a costly item of equipment that must be protected from the deteriorating action of the atmosphere—another important consideration. The big problem has been to find a finish to meet both requirements fully.

Three years ago the automobile manufacturer faced the same problem, and found the solution in Duco. Its success in this field has naturally led to its adaptation for use on locomotive jackets, tenders, railway coaches and street cars, where the conditions under which the equipment is used are particularly severe.

The surface of a railway car is constantly exposed to a decided abrasive action caused by sand and cinders striking the car while the train is in motion. Therefore, the finish must be hard and tough to withstand this wear. Also, as railway cars are exposed to all the extremes of weather, the finish must be waterproof and sufficiently elastic to take up the expansion and contraction caused by sudden changes in temperature. The hard, tough surface produced by Duco resists the abrasive action of the cinders to a marked degree, and its waterproof and flexible characteristics show to particularly good advantage in this class of finishing work.

Tunnel conditions have a marked effect on the life of ordinary railway finishes due to the fact that the coating absorbs some of the locomotive gases which causes a rapid deterioration of the finish. Duco after its application is stable and chemically non-active and is therefore not appreciably affected by these gases.

The cleaning of railway cars is an important item of upkeep in the railroad maintenance budget. The exteriors of cars must be washed frequently to free the surface of dust and cinder particles. This cleaning can often be done by dry wiping on cars that are finished in Duco.

Duco is very rapid drying, so successive coats can be applied at two-hour intervals and cars can be placed in service four hours after the last coat of Duco has been applied.

The finish on street cars is subject to occasional injury, due to accidents in heavy traffic. When this occurs to cars finished in Duco, the injured portions of the finish can be speedily repaired and the cars returned to service in a few hours.

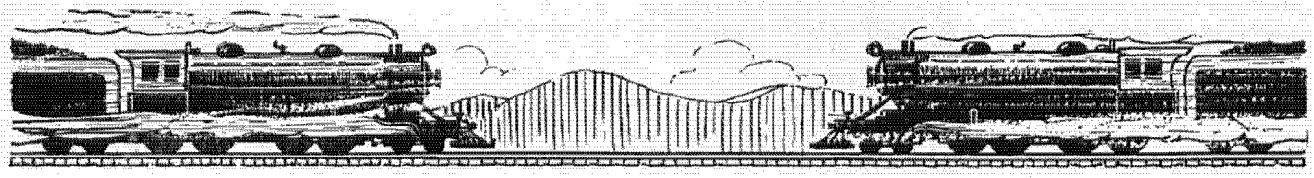
These distinctive characteristics are largely responsible for the interest shown by the railroad and traction systems of the country in the Duco system of finishing for their equipment.

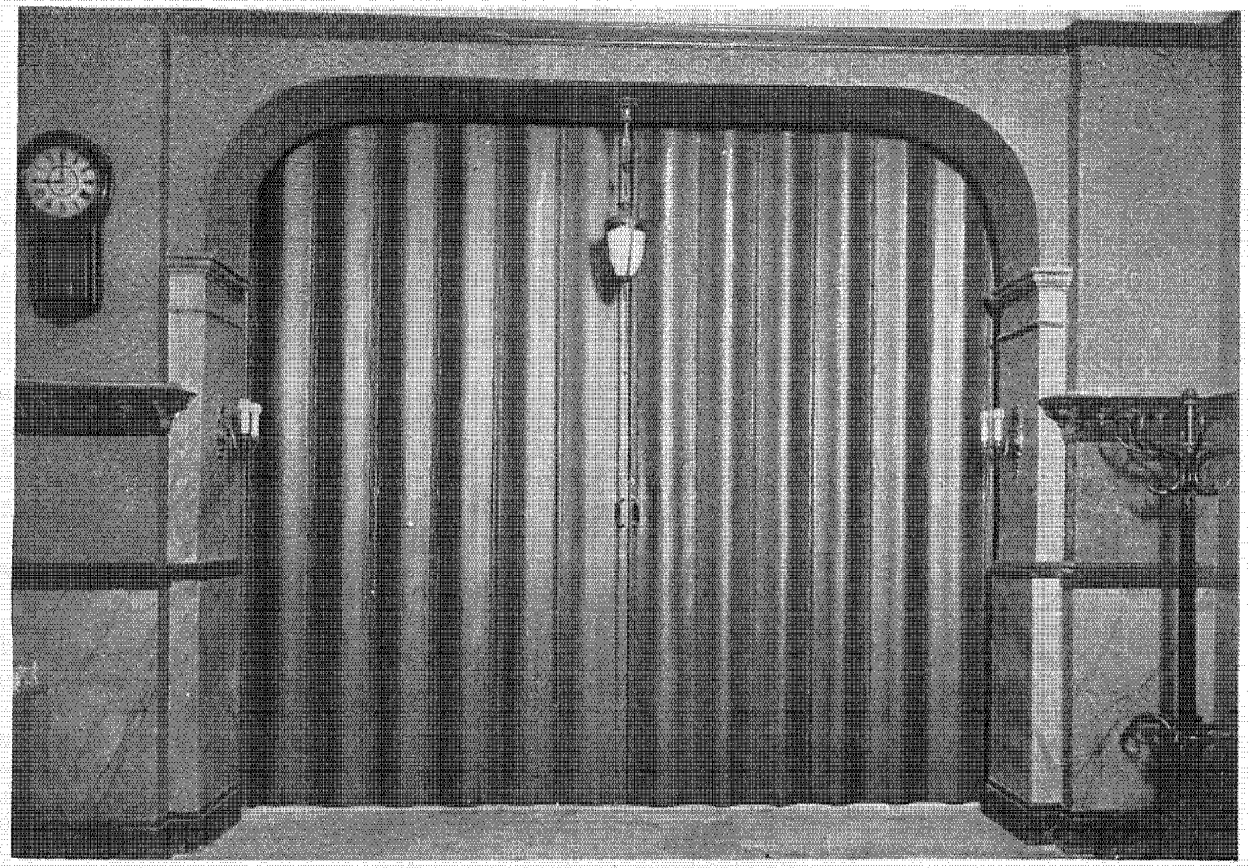
The Duco system of application closely follows the methods generally used in the railroad shops throughout the country, the main points of difference being that Duco can be applied only by the pneumatic spraying method, and that only a short drying period is required between the application of successive coats.

DUCO QUALITIES

IN addition to its truly fine appearance on railway equipment and rolling stock, Duco Finish is also recommended for these reasons:

1. It is the hardest, toughest, most durable finish made.
2. It is unaffected by changes of temperature.
3. It does not chip, crack, or become tacky.
4. It is unusually resistant to abrasion even under the most severe exposures—dust, sand, cinders, smoke, tunnel gas and other deteriorating influences.
5. It is waterproof.
6. Steam and boiling water do not mar or soften it.
7. It is easily and quickly applied by the pneumatic spraying machine.
8. It dries very rapidly.
9. It is easy to keep clean.





One of the five accordion-pleated partitions recently installed in the Lincoln Turner Hall and Cafe, Chicago, Ill.

Accordion-Pleated Partitions

One of the most interesting new uses for Fabrikoid that has come to notice

WHETHER Fabrikoid is used for the bellows of a pocket camera or for a folding door 32 feet high, the principle is the same, and the Fabrikoid is available in types which are practical in thickness and strength for both of these purposes. At the same time the idea of accordion-pleated doors and partitions using Fabrikoid for the part that "doubles up," is certainly novel and interesting.

The most recent installation of these pleated partitions that we have heard of is at the Lincoln Turner Hall and Cafe in Chicago. Five of these partitions are used in this cafe, where their chief purpose is to enable the management to partition off the dining rooms according to the number of guests present. There are various other installations of these partitions in Chicago where the idea originated with Mr. George Markscheffel, an engineer who has to his credit many ingenious productions and who now has a plant for making these partitions at 2741 Sheffield Avenue, Chicago, Ill.

We understand that these folding partitions are practically noiseless in operation. They open and close like curtains or draperies, and lock with a key like sliding doors of wood. In addition to dividing large rooms into smaller units to assure privacy, they act as insulators in cold weather, keeping out drafts, and it is said that their use sometimes improves the acoustic properties of a room or hall to a great extent.

These partitions can be installed as high as 32 feet and in single sections as long as 100 feet. Folded, they take up only one-seventh of the opening they cover when extended. They run on ball-bearing sheaves.

Both sides of these partitions are covered with a very heavy grade of Du Pont Fabrikoid, which is always available in colors to match the woodwork or draperies. The Fabrikoid makes a beauty-keeping partition which does not absorb dust or dirt nor become stained, and one that can easily be cleaned with soap and water.

Mr. Markscheffel particularly recommends these Accordion Folding Partitions for assembly and dance halls, churches, hotels, restaurants, undertaking rooms, factories and hospitals. They can also be used to good advantage for certain requirements in private residences.

Another Million Dollar Highway

This highway, built under Federal specifications, is cut, for a great part of its length, from the sheer face of precipitous cliffs

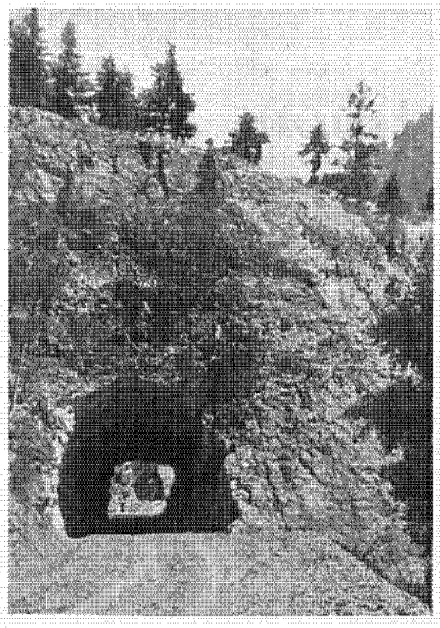
By R. F. CRAMER

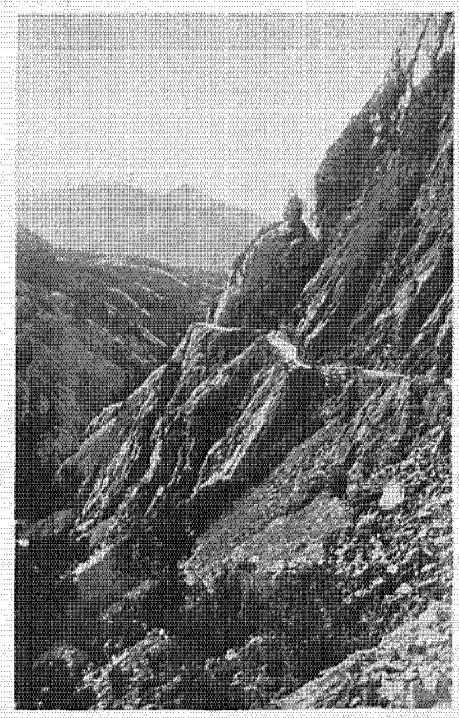
THE scenic highways of Colorado, particularly those in the north central section of the state, in the vicinity of Denver and the Rocky Mountain Park, are justly famous. They are numbered among the state's principal tourist attractions. But famous as these roads are as examples of wonderful highway building, and even though they reach up into the high places and make accessible to motorists some truly wonderful scenery, there are other highways in the state less well known, perhaps, but equally deserving of notice, and for the same considerations.

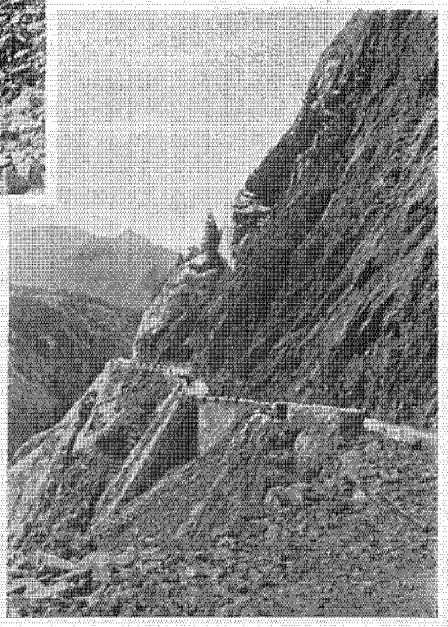
Away down in the southwestern corner of Colorado, for example, is a million dollar road called the "Ouray-Silverton-Durango Highway." It links together three county seats—Ouray, in the county of that name; Silverton, in San Juan County; and Durango, in La Plata County. The boundary lines of these counties form a picture that may be helpful in visualizing their position on the map. La Plata County sits on the northern boundary of New Mexico. San Juan County is piled on top of La Plata County, and together they appear as a great big pyramidal mountain. Ouray County is seemingly cut from the same mountain-shaped pattern, but is tipped over on its nose on top of San Juan County, occupying a precarious position there. You may think of the "Ouray-Silverton-Durango Highway" as a dowel pin holding these three counties together, and in a sense that is what it really does, for the upper two counties in particular.

The distance between Ouray and Silverton, as scaled on the map, is about fifteen miles. By automobile, over this wonderful winding highway, the distance is just about twenty-four miles. The same journey by rail is two hundred miles, so it is easy to understand why this highway is so important to the people of Ouray and Silverton. The point of general interest is that this million dollar road traverses a mountainous section, so rough and rugged and colorful that it is called the "Switzerland of America" with good reason. The Swiss Alps have only nine peaks over 14,000 feet high. Here in this district nearly every outstanding peak attains that elevation, and the scenic attractions are said to be quite as impressive and in some respects more so than those of the European Alps.

Incidentally, tourist interest in this far-off corner of Colorado has for some years past been stimulated to quite an extent by the publications of the



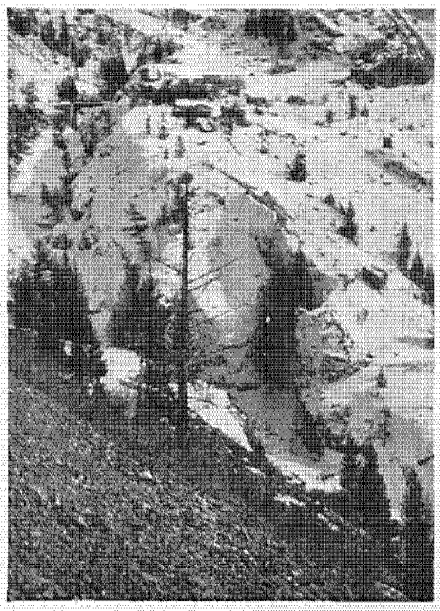




Left—This view shows the 200-foot tunnel driven through solid quartzite rock a few miles south of Ouray, Col. It is one of the interesting features of the Million Dollar Highway

Center—One section of the old stage road before reconstruction work began

Right—This shows you the same section after it was widened to 18 feet, and regraded and protected with new retaining walls



Left — The contractor's camp in the heart of the Rockies

Center—The new road winding around Mount Abrams



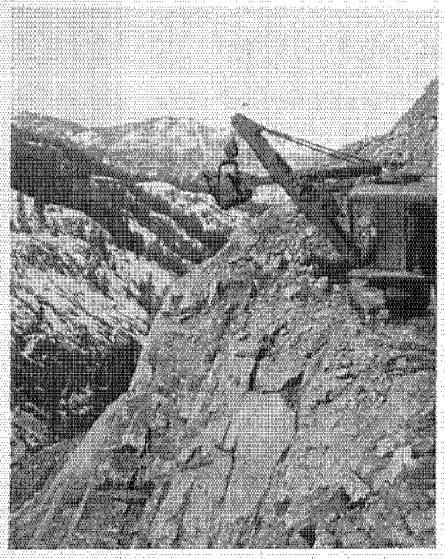
U. S. Department of Interior, for the Mesa Verda National Park, with its prehistoric cliff dwellings, is located west of Durango.

But let's get back to Ouray. Leaving this "Gem City of the Rockies" the road winds up the mountainside by hairpin turns, following up the Uncompahgre River on an easy grade of seven per cent—a boulevard eighteen feet wide and smooth as a ribbon, a road that is a delight to tourists, because of its excellent construction and also for the magnificent scenery along the way. Passing through a tunnel and later rounding a curve, four miles from Ouray, it brings the traveler in full view of Bear Creek Falls.

These falls are spanned by a modern concrete bridge about two hundred feet long. The bridge itself is a marvel of engineering construction; it was necessary to build it at an angle across the chasm, which is several hundred feet deep. Standing on this bridge one has a wonderful view of a great mass of water plunging over a semi-circular apron of granite and falling two hundred and fifty-three feet into the gorge below. It is a magnificent spectacle—the water dropping away at one's very feet. The mist, rising from below the falls, catches the sunlight and forms a perfect rainbow, an iridescent, unforgettable picture of beauty that defies description.

After leaving Bear Creek the road winds upward along the precipitous side of the mountain. This section of the road, from all highway reports, has proved to be one of the most difficult pieces of engineering and construction work in the United States. Originally an old stage road, the new, broad highway has been cut out of the mountainside with a sheer drop of approximately five hundred feet to the canyon bed below. In order to build this shelf-like section so that the road would be eighteen feet wide, as required, and properly guarded, it was necessary to move more than 10,000 yards of solid quartzite rock. Contractor K. V. Johnson, in charge of construction on this highway, was compelled to use thousands of pounds of high explosives in order to break down this hard, unyielding rock so that it could be removed by steam shovel. He and his men deserve much credit for the able manner in which they handled this difficult and hazardous section of the work.

Further along the highway passes over beautiful Uncompahgre Creek. This, too, is spanned by a concrete bridge, from which one may well pause to watch the waters of the stream tumble in a wild torrent over the boulders on their way down into the canyon. At this point also Mr. Johnson established his road camp, and a more picturesque spot for one can hardly be imagined. This camp is complete in every detail, with its well-equipped blacksmith shop, bunkhouses for workmen, kitchen and other buildings.



Right— A steam shovel on the job at Windy Point, removing rock after a blast

Passing along, the road winds around the foot of old Mount Abrams, always ascending at the same grade. It crosses other beautiful streams, makes several hairpin turns and finally leads out of the canyon where one may have a panoramic view of Ironton Park. Here the valley widens out to almost a mile, with the ramparts of the San Juan range on the right and the reddest of red mountains on the left. No matter how wonderful

(Continued on page 15)

Are You as Sound as Your Business?

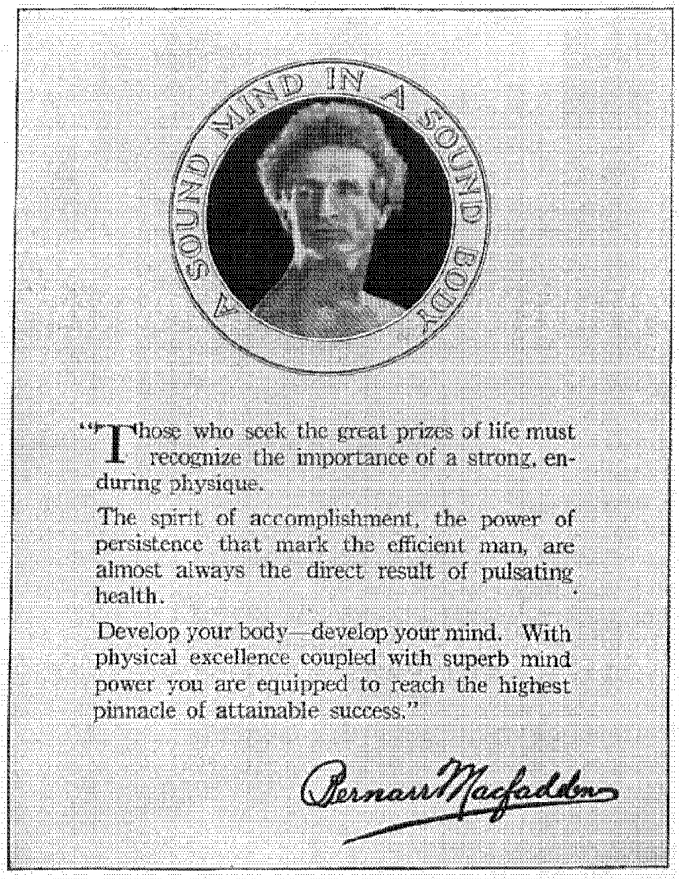
Your physical assets can be strengthened and losses forestalled by simple methods of physical culture

By A. H. BERWALD

I REMEMBER as a boy being much aroused by the newspaper reports that America's then wealthiest business man would pay a million dollars for a new stomach. I thought seriously of offering mine but I despaired of anyone accepting a boy-size stomach who was rich enough to keep a full grown one filled. Oh, that I were already a man!

As I grew to manhood I followed with unabated interest the career of this Croesus and his stomach through the public press. He still gets his share of the headlines, and if I interpret these correctly he has both acquired his new stomach and kept his million — the latter less the cost of some bushels of golf balls spent in achieving the former.

The readers of this magazine are mostly business men, men altogether too prone as a class to indulge in sedentary and debilitating habits and to work at high mental pressure without some compensating balance on the physical side. To all such the experience of the peerless business man, above referred to, says that health which has been squandered by unnatural methods of living can be restored by natural methods of healing; that physical neglect yields to physical culture when doctors and medicines fail.



But why should there be physical neglect? Why cannot business building and health building go hand in hand? They can, and the idea is broadcast that they must. Considered only as a business proposition, it pays better to keep fit than just to keep alive.

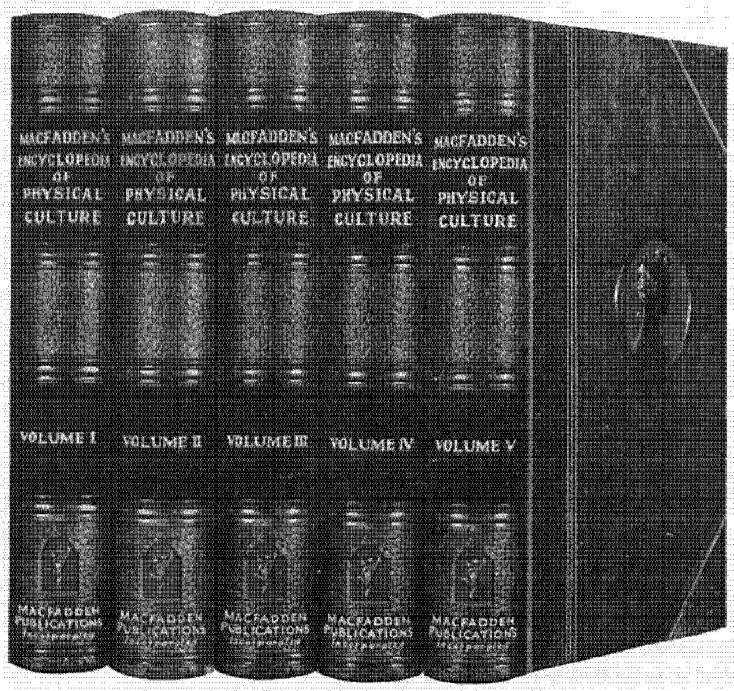
When one needs medicine he seeks out the best doctor to prescribe it. When he would overcome disease by assisting the natural processes of repair, or would seek to forestall disease by building up a dominant vitality against its inroads, he will again find the most authentic advice available to be the best and cheapest.

If one asks anywhere, "Who is the best doctor?" he will get many different answers. But if he inquires, "Who is the greatest authority on physical culture?" the answer will always be the same—"Bernarr Macfadden." Seldom has a great movement proceeded so positively from a single individual as has the physical culture movement from the vision and vim of Bernarr Macfadden, its founder and prophet for nearly forty years.

In his teens Bernarr Macfadden became convinced that by rational living, right thinking, proper exercise and intelligent diet, the weak could be made strong and the sick, well. A poor man, he was rich in this big idea and in the dogged determination to establish its truth for all mankind. There was opposition and cruel indifference from the beginning, but there was no surrender, and at last by careful planning he was able to broadcast his message in a little pamphlet, issued monthly, which he called *Physical Culture*. That magazine still is the mouthpiece of the Physical Culture Idea, having grown tremendously in circulation and influence as the truths for which it stands have been tested and accepted to the physical profit of millions.

Crystallizing the material which has proved most valuable in *Physical Culture Magazine* over a long period of years and supplementing it from his abundant experience and that of many eminent co-editors along specialized lines, Bernarr Macfadden has built a five-volume Encyclopedia of Physical Culture, which is the most comprehensive work of its kind ever attempted. This work has been very popular, going through six editions, the last of which in completely revised form is only recently off the press. That edition will be briefly described so that our readers may know how comprehensive and valuable are its contents.

As our illustration shows, there are five big volumes. Each of these is 6½ x 10 inches, and over 1½ inches thick. Together they contain over 3000 pages and more than 1300 illustrations, many of them full-page plates in color. Among the illustrative features is a dissectible manikin or model of the human body, showing every nerve, muscle and organ in its natural colors. The five volumes constitute an amazing fund of data and advice on questions of diet, exercise, physiology, disease, natural curative methods, eugenics, sex hygiene, marriage, beauty culture, etc. They list and describe more than six hundred diseases, telling how these may be detected and treated by natural methods. The brief description of the five volumes that follows gives a bird's-eye view of this valuable set:



The five volumes of Macfadden's Encyclopedia of Physical Culture are most attractive in their full red Fabrikoid bindings

VOLUME I: A complete anatomy and physiology of the human body, amply illustrated with color plates and dissectible manikin; hundreds of pages and scores of illustrations devoted to the subject of diet — with a complete cook book.

VOLUME II: Over 600 pages and hundreds of photographs on exercises and their use. Tells how to develop every portion of the body. Has many chapters devoted to gymnastic drills and to full instructions for the playing of all sorts of athletic games; attaining womanly beauty and attractiveness (including care of the hair, teeth and entire body).

VOLUME III: A full exposition of the possibilities and application of fasting—complete instructions for water treatments in health and disease—illustrations and full description of every aspect of mechanical curative measures. An important chapter on First Aid. Scores of régimes applicable to various physical derangements.

VOLUME IV: Plain and thoroughly illustrated instructions for diagnosing and treating at home almost every form of acute and chronic disease. A description of the cause, symptoms and effects of these, alphabetically arranged for ready reference.

VOLUME V: Complete anatomy and physiology of the sexual organs—cause, symptoms and treatment of sexual diseases and weaknesses—the laws of sex—rules for happy marriage and parenthood—how to insure safe childbirth, and healthy, robust children.

These five volumes of Macfadden's Encyclopedia of Physical Culture are in an unusually attractive binding of full red Fabrikoid, adopted because of its wear-resisting, non-deteriorating character as the most practical binding for books of such permanent value as these. Bold gold titles are stamped on the book backs in smooth panels, set off by raised bands from contrasting panels in a leather grain, giving a mass effect in the bookcase which is most impressive. An embossed medallion of Bernarr Macfadden on the front cover of each volume is an appropriate distinguishing touch. Our readers know that these Fabrikoid bindings are non-scuffing, stain-proof and cleanable—beauty-keeping to the highest degree.

Macfadden Publications, Incorporated, 1926 Broadway, New York City, will be glad to send this Encyclopedia to anyone for free examination and study during a ten-day period, after which it can be bought, if desired, at a price and on terms that anyone really interested in the big job of living can easily afford. With every sale of the Encyclopedia a full year's subscription to *Physical Culture Magazine* is included. We suggest that you write Macfadden Publications, Incorporated, for some very interesting literature describing this work.

Highway Painting

AN interesting test of Du Pont Traffic White Paint was recently made at Knoxville, Tennessee. Four-inch lines were laid down at an average rate of 200 lineal feet per minute, with paint consumption at the rate of 7.6 gallons per mile.

The material was applied as a first coat to a new concrete surface. At a temperature of 48 degrees Fahrenheit, the paint was sufficiently dry to be track-proof in twenty-seven minutes.

In putting down the material it was found that no adjustments to the machine were necessary either to change the pressure or to regulate the feeding device.

THE
DU PONT
MAGAZINE

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E. I. DU PONT DE NEMOURS & COMPANY, Inc.

Subscription, 50 cents the year

E. R. MANCHESTER.....*Editor*

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Vol. XIX FEBRUARY, 1925 No. 2

Just Wondering . . .

THE day before the night when everybody helped usher in the New Year, I was rounding up copy for this number, and had occasion to call on E. R. Galvin, sales director of the Sporting Powder Division, in his office.

I found him busy reading over the morning's mail, with a great stack of letters piled high on the table before him. After stating my mission there was a momentary pause—and then he dug into the pile, pulled out a letter and asked me to read it. The writer was identified as the manager of a seed farm in Louisiana. The letter itself was a request for the name and address of a dealer who could supply him with two stated brands of du Pont powder. This hand-written postscript followed:

"For three generations I have shot your powder; 35 years on my own account."

The Chief thrust another letter in my hand. The stationery used was of extra-fine quality, with the writer's name and a Texas address imprinted or engraved at the top; it was his personal letterhead. The text contained a request for more ballistic data on Du Pont Oval Powder, reviewed the writer's experience with various duck loads and revealed his confidence in Dupont and Ballistite powders. And then this comment:

"Changing powder carries even greater thought and careful consideration with me than even changing my bank account or considering matrimony. For 40 years, nearly, I have used Dupont for field shooting and small game, and for a long time I have resorted to Ballistite for heavier loads. I even enjoy the aroma of Dupont both fired and unfired . . . . *Me for old Dupont to the end of the chapter.*"

"Thirty-five years! Forty years!" exclaimed the Chief. "Any product that is good enough to inspire such testimonials as you have just read, must be superlatively good." Then he added, "I wonder who holds the long-time record as a consumer of du Pont sporting powders."

"Let's raise the question in the magazine," I suggested.

"Go to it!" was his reply.

And so, readers, we invite your reminiscences. How many years have you or the members of your family used du Pont sporting powders? Please address your letters to the Sporting Powder Division, E. I. du Pont de Nemours & Company, Inc., Room 5056, Du Pont Building, Wilmington, Delaware.

Still Good After 40 Years

UNDER the caption "Still Good After 35 Years" we referred in a previous number to the discovery of some du Pont sporting powder which had been pilfered from a powder magazine at Yankton, South Dakota, in 1888. Some village lads stole the powder and hid it in a barn. Fourth of July was approaching, but the lad who hid the powder soon moved with his parents to another state. Returning to the old home town last summer for the first time in thirty-five years, he recalled the youthful episode, looked for the powder—and found it untouched in the original cans which bore the date 1859. The powder was just as good as the day it was packed. Tests proved this beyond question.

The publication of this news item has brought forth another interesting comment from Mr. P. H. Donnelly, a du Pont representative in the Chicago district. He informs us that in the Springfield, Illinois, office of the company can be seen some du Pont blasting powder which was made about forty years ago at the Mooar, Iowa, mill—and it is just as good today as it ever was.

Reclaiming a Sunken Engine

LAST summer in Charleston, South Carolina, when a large engine of the Atlantic Coast Line Railroad Company "ran away" from the round house and jumped into the Cooper River, dynamite added one more to its interesting and unusual uses.

This 140-ton engine, in the round house for repairs, had been "fired up" and left standing with no one near by. Without human control, it started to move. The switch happened to be turned so that it ran toward the wharf near Charleston instead of up the track. Traveling at a speed of 40 miles an hour, it reached the wharf and jumped clear into about 40 feet of water. Then came the problem of lifting it out.

C. T. Nelson, supervisor of bridge construction for the Atlantic Coast Line Company, who had charge of reclaiming the engine, found that it was necessary to blast it free from the tender before it could be lifted. A marine diver of the Sanford & Brooks Company made the preparations for the shot. Du Pont 60 per cent straight dynamite was used.

After the engine was freed, it was lifted out of the water between two 500-ton barges which floated it to shore. By this time it is probably back in service.

The Verdict on the Crow*

FOR the past 48 years the mail of The Farm Journal has never been free from letters complaining of damage from the crow. When we say crow, we refer to the American Crow, as the damage done by the fish crow is limited to the eastern coast.

Neither reports from ornithologists nor from the Department of Agriculture helped us answer these letters—in fact, it was apparent that no study of the economic standing of the crow had ever been made on a scale large enough to give a reliable result. Our usual answer was to advise against any general campaign of extermination, but to recommend that the crow be reduced in numbers wherever the farm damage was extremely heavy.

When the crow-shooting contests promoted by manufacturers of explosives began about a year ago, our crow mail took another jump. It was then decided, at an Editorial meeting, to secure an accurate and full survey of the damage or good done by the crow on the farm lands of the United States.

We went about the task with our minds absolutely open, having at heart the interests of farming, and a special concern for the welfare and protection of essential bird life. It might be interesting to mention here that 900,555 (December 1, 1924) men, women and children have signed the pledge of The Liberty Bell Bird Club, which is conducted by The Farm Journal.

We printed the following questionnaire in The Farm Journal:

Name. Address in full.
Occupation.
If farmer, how many acres in farm?
Do crows destroy your farm crops?
Do crows destroy your poultry?
Do crows destroy your young animals?
Do crows injure your song birds?
Do crows injure your game birds?
Do crows injure your insectivorous birds?
What good have you seen the crow do? State specific instances to show the damage or good done by crows.
How many crows do you have about your farm? Many? Some? Very few?
Have you killed any crows during the last year? How many? How?

In The Farm Journal, emphasis was placed on the point that we wanted facts and not guesses, nor opinions received from others.

There were many professional writers who sent in reports. Some of these copied word for word from Department of Agriculture Bulletins. After weeding out copied reports, and many others which were of no value for one reason or another, we had 9,731 reports from farm folks. Naturally all the farmers did not answer every question, as we wanted only known facts. Reports were received from every state in the Union, and also from Canada, Portugal and the Philippine Islands.

The total United States acreage represented amounted to 1,285,586 acres—by far the largest area ever covered by a survey of this kind. The area in Canada and foreign countries amounted to 71,033 acres. Of the 9,731 reports

1,801 were for the crow.
7,829 were against the crow
18.7 per cent for; 81.3 per cent against.
101 reports were neither for nor against the crow.

The Verdict of Our Folks.

7,829 reports were against the crow.
1,801 reports were in favor of the crow.
81.3% of total number of reports were against the crow and 18.7% were in favor.
101 reports were neither for nor against the crow



Saint—

Saint or Sinner?

Of the total, 4,979 reports, or over 50 per cent, said the crow did no good at all; 7,573 reports stated the crows destroy crops; 6,937 reports stated the crows destroyed poultry; 4,112 reports stated the crows destroyed animals (these animals were young pigs, young sheep, young calves and rabbits); 6,796 reports stated the crows destroyed song birds; 6,493 reports stated the crows destroyed game birds; 6,259 reports stated the crows destroyed insectivorous birds; 1,801 reports stated the crows did no damage, or very little damage whatever, and that they destroyed cutworms, grubworms, wireworms, grasshoppers, meadow-mice, angleworms, May beetles, young Colorado beetles, gipsy-moths, and they drove away hawks and acted as scavengers. Most of the reports in favor of the crow failed to give specific instances of the good they did, but simply stated they did no harm.

Thirty-five per cent of the reports in favor of the crow were sent in by women, the majority of whom lived in places where the crow was not abundant. The following are typical instances of damage done by crows, taken from the reports:

The Damage to Song and Insectivorous Birds

Sixty-nine per cent of the total number of reports received stated that the crows destroyed the birds—in fact, the only birds mentioned as not destroyed by crows were Orioles and Kingfishers. The birds noted in the reports as being special sufferers from crows were meadow-larks, thrushes, robins and cedar waxwings.

It is interesting to note here how letters from hard-headed ranchers in New Mexico and other Southwestern states stated "We must save the birds and we can't unless we destroy the crows." Many farmers call the birds their little woodland pals. Reports stated that the greatest damage to the birds was done by the crows in the early morning.

The Damage to Game Birds

Reports stated that crows were almost exterminating, in many localities, prairie chickens, grouse, and quail, the great destruction being in the destroying of the eggs and young. The eggs and young of pheasants and partridges were also destroyed. Reports from the Virginia coast said both the common crow and fish crow destroyed the wild ducks.

The Damage to Crops

Pulling up young corn; destroying corn in the milk stage; destroying corn, oats and wheat in shocks; destroying apples on the tree; destroying the lettuce fields; ruining the watermelons and muskmelons; eating cherries; destroying peanuts in the drying stacks; destroying seed potatoes—these were the reports on crop damage.

The Damage to Animals

Thousands of cases reported where the eyes were picked out of young pigs and young lambs; and a few cases where young calves were destroyed. Many reports on damage done to rabbits.

The Damage to Poultry

The eggs and young of chickens, turkeys and guineas were destroyed, the damage being as high as $200 on a single farm.

The Damage by Carrying Diseases

Reports stated that hog cholera and poultry diseases, especially feather-mite, were carried by crows.

The Specific Good Done by Crows

A report from Missouri (400 acres) stated, in 1914, two crow stomachs were opened. In one, ten cutworms, but only two grains of corn, were found. In the other, only cutworms were found. The number of crows on this farm was not given.

A Montana report (160 acres) stated that crows destroyed great numbers of grasshoppers in 1919 and 1922. In the same report, it stated crows ate many meadow-mice in 1923. The number of crows on this place was:

March and April—few; May—two to six; June and July—six to 18; August and September—20 to 60; October—few to rare.

A Massachusetts report (68 acres) stated a crow's stomach was found to contain only one kernel of sprouted corn, but many cutworms, May beetles, and white grubs. Number of crows on farm, not stated. Other reports stated that the crows did not destroy the farm crops, animals or birds; but that they ate wireworms, gipsy-moths and young potato beetles, and also drove away hawks and acted as scavengers.

In forming a judgment on these reports, due weight must be given to the fact that they were invited and received by mail. It is natural, therefore, that farmers who had suffered severe damage from crows would be apt to write and record their disapproval, whereas those who had suffered little or no damage would take a less lively interest in the subject. The

Continued on page 16



or Sinner?

* From The Farm Journal, Jan. 1925; reprinted by permission

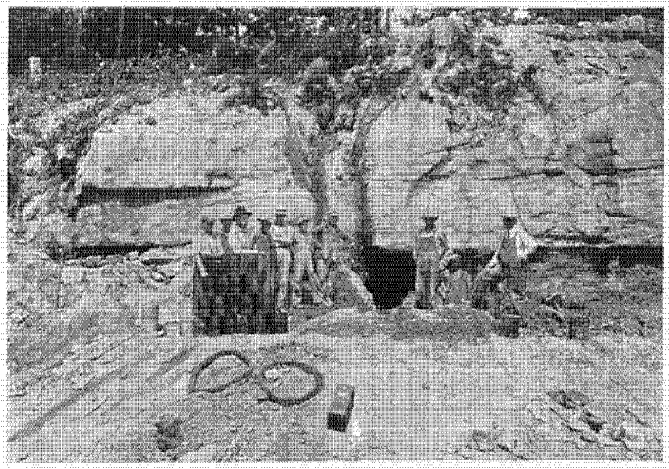
The Coyote Tunnel Method of Blasting

It was the best way to shoot off the point of a rocky hill that interfered with road-building work in southern Indiana

By H. M. HAMILTON

BUILDING state roads in southern Indiana is no easy task. That section of the state is very rugged, having an abundance of steep, rocky hills and many deep and heavily wooded gorges. Because of these characteristics, it is sometimes called the "Switzerland of Indiana." It is a region where grading contractors frequently encounter perplexing problems — the kind that require the best engineering knowledge and experience to solve.

Indiana has about 4000 miles of excellent state roads, and when those now under construction are finished, many more miles of beautiful scenic roads will be released to traffic.



At the tunnel entrance while loading operations were under way. Note the powder kegs in the foreground

Explosives play an important part in the construction of Indiana's highways. For example, in excavating for State Road No. 5, Federal Aid Project No. 60, between West Baden, Indiana, and Washington, Indiana, Mr. George W. Gist, the contractor, was required to widen a dangerous curve which involved cutting off the point of a rocky hill that projected out in the right of way.

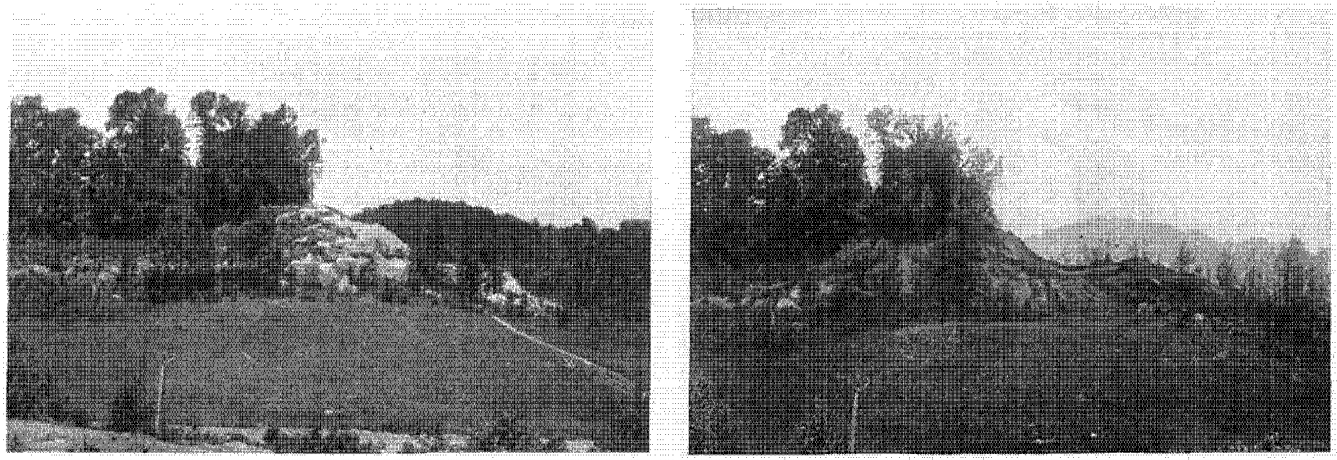
The contour of the ground and surroundings made it impracticable to load the material in wagons and haul it away, and to use the well-drill method of shooting was not considered feasible.

Mr. Gist and his superintendent, George H. Griffin, finally decided that the best way to get rid of this rocky obstruction would be to make use of the coyote tunnel method of blasting. Their objective was to shoot as much of the material as possible over the bank in order to waste it. Mr. Dudley Abernathy of St. Louis, an experienced blaster, was placed in charge of driving the coyote tunnel and loading the shot.

The point to be moved consisted of a soapstone, limestone and sandstone formation, 37 feet high, 51 feet wide at the center, tapering to 32 feet and 37 feet respectively at the ends. The tunnel—two feet by three feet — was driven lengthwise into the hill for a distance of 119 feet. It was 51 feet from the face at the center.

Small pockets were driven off the main tunnel at intervals of about every 15 feet, and in these the explosives were loaded. There were eight loading pockets provided in order to properly distribute the explosive charge.

Du Pont No. 57 black blasting powder was used, and

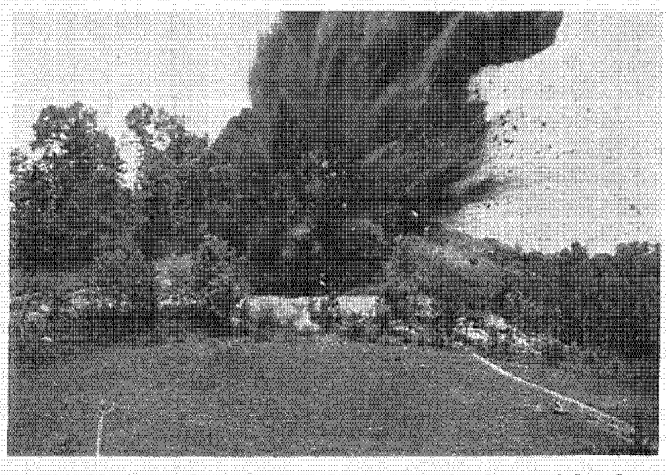


Left—A view of the cliff just before the blast cut off the point projecting out into the right of way. Right—The same spot after the shot was fired. You'll notice that the explosives did their work well

fifty pounds of Red Cross Extra 40 per cent dynamite were used as a primer for the black powder.

Cordeau-Bickford fuse was used as the detonator as well as du Pont No. 6 electric blasting caps—both methods of ignition being employed as an extra precaution.

The pockets or loading places at both the top and bottom were wet, so some protection was needed to keep the powder from becoming damaged through the absorption of moisture. Rubberoid roofing material was used to line the pockets at the sides, top and bottom; potato sacks and heavy carton paper were also used as additional protection.



This blast moved approximately 7000 yards of material and threw most of it clear of the right of way

Because the tunnel was so very small, the task of getting the powder and tamping material back into it was slow. It was found that the quickest way of getting these materials in place was to station men in the tunnel about six feet apart and pass the powder and tamping material from one to the other.

The powder was removed from the kegs and placed loose in the pockets in order to confine the charge in as small space as possible and also to facilitate tamping. After the loading and tamping work was done—and this included the filling of the main tunnel with clay—one du Pont No. 6 electric blasting cap was attached to the Cordeau-Bickford fuse, and the cap was then connected in series with other du Pont No. 6 electric blasting caps that had been placed in the several charges. The shot was then fired with a du Pont No. 4 blasting machine, and the accompanying illustrations tell their own story.

Approximately 7000 yards of material were moved. It was estimated that the 80 per cent of the rock and earth was thrown over the bank clear of the right of way, thus relieving the contractor of the expense of rehandling.

Mr. Gist used du Pont explosives and blasting accessories exclusively on this road-building job.

Ditch Blasting Within City Limits

(*Continued from page 2*)

was necessary only to dress down the banks where pieces of material had been loosened and only partially dislodged. In the clay section large chunks up to a cubic foot in size were thrown clear of the ditch. Thus despite the variable soil conditions, the ditch was satisfactorily opened and deepened, as the illustrations on page 2 show.

For the most part the work was done in open territory and mats or other protection were unnecessary. The only "casualty" was one window pane in a farm house. The concussion of a blast shattered it.

The City Engineering Department undertakes practically all public improvement work in Flint. This ditch blasting job, including the work of cleaning up the banks, was accomplished by six employees of the department who finished the task in approximately three weeks' time. Eleven thousand ½-pound sticks of du Pont 50 per cent straight dynamite were used. The total cost of cleaning 7500 linear feet of ditch was approximately $3100, which included department overhead charges in addition to construction items.

Another Million Dollar Highway

(*Continued from page 9*)

the natural colorings a traveler has seen before, he will gaze at the vermilion mass of Red Mountain as something unreal when he sees it the first time.

Ironton Park ahead is the location of the old mining town of Ironton, now almost deserted but still reminiscent of the once active days when it was one of the busy and prosperous ore-mining centers of the state. Approaching the town, the highway follows a straight course, almost through the center of the park, instead of following the winding trail at the foot of the mountain as it formerly did. Passing through Ironton and still continuing upward through another almost deserted town, the road eventually crosses the Divide at an elevation of exactly eleven thousand feet.

In descending from this high point, the highway winds around the mountains at an easy grade all the way down to the thriving town of Silverton.

No tourist who follows this north-south highway from Ouray to Silverton is likely ever to forget it. He will remember it not only as a wonderful piece of engineering and highway construction, but also as one of America's most beautiful scenic roads.

Ditching Through Rock

(*Continued from page 5*)

Pont gelatin dynamite and fired electrically. The blasts shattered the rock down to grade so that it could easily be removed by the dredge. A big American dredge with a specially designed 2-yard dipper of manganese steel was employed. The photograph on page 5 where the dredge is working shows what excellent breakage of the rock was effected by the blasting. In all, 121,000 cubic yards of rock were removed.

Through a part of its length the ditch followed an old natural stream, and drilling and blasting had to be done under 6 feet or more of water. On these sections a drill boat was used which had been designed by the contractors with the assistance of their superintendent on this work, W. N. Hancock of Monon, Indiana. The dynamite was loaded through a pipe and fired with waterproof electric blasting caps. As gelatin dynamite is highly waterproof it can be loaded under water and left as long as necessary to connect and fire the shot without any risk of lessening its sensitiveness and efficiency.

Where there was no rock, the excavation was done entirely by the dredge. The finished ditch is 14 feet wide at the bottom and 40 to 60 feet wide at the top with a depth of from 10 to 22 feet. The size of this channel, together with the fact that the major portion of the ditch is through bed rock, assures adequate drainage for the adjacent lands for many years to come.

The Verdict on the Crow

(*Continued from page 13*)

fact that 18.7 per cent of the reports were favorable, therefore, indicates a more widespread feeling that the crow is beneficial than the actual percentage figures would justify.

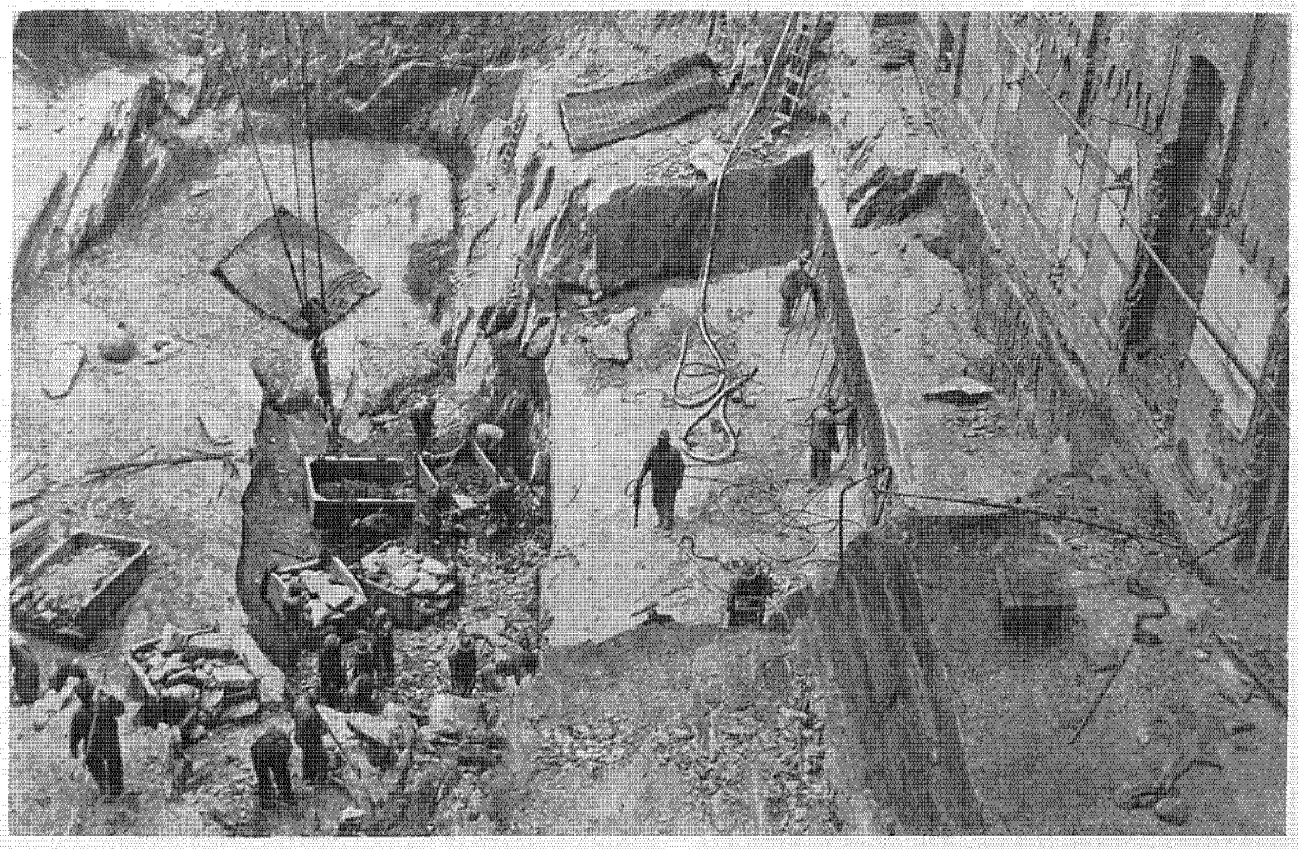
Taking all the factors into consideration, after thorough analysis of the reports, we believe the following statement to be as accurate and conclusive as can be secured:

First: The crow, *wherever found in large numbers,* is injurious to farmers from March to December inclusive.

Second: Wherever crows are numerous, they should be reduced in numbers, and this should be done under, and with, the active cooperation of the state or national agricultural authorities. *The crow need not be exterminated.*

Third: The good crows do by eating insects does not compensate for the damage done by eating eggs and young of other insectivorous birds.

Fourth: In acting as scavengers, crows carry disease; farmers should bury or burn, at once, all dead animals.



© Underwood & Underwood

No, this is not a photograph of a New York stone quarry. But it is the excavation for the sub-cellar of the towering office building that will soon be erected at 33d Street and Fourth Avenue, New York City. These "hard stone men" are boring and blasting their way down to bed rock, to secure the firm foundations required for the building

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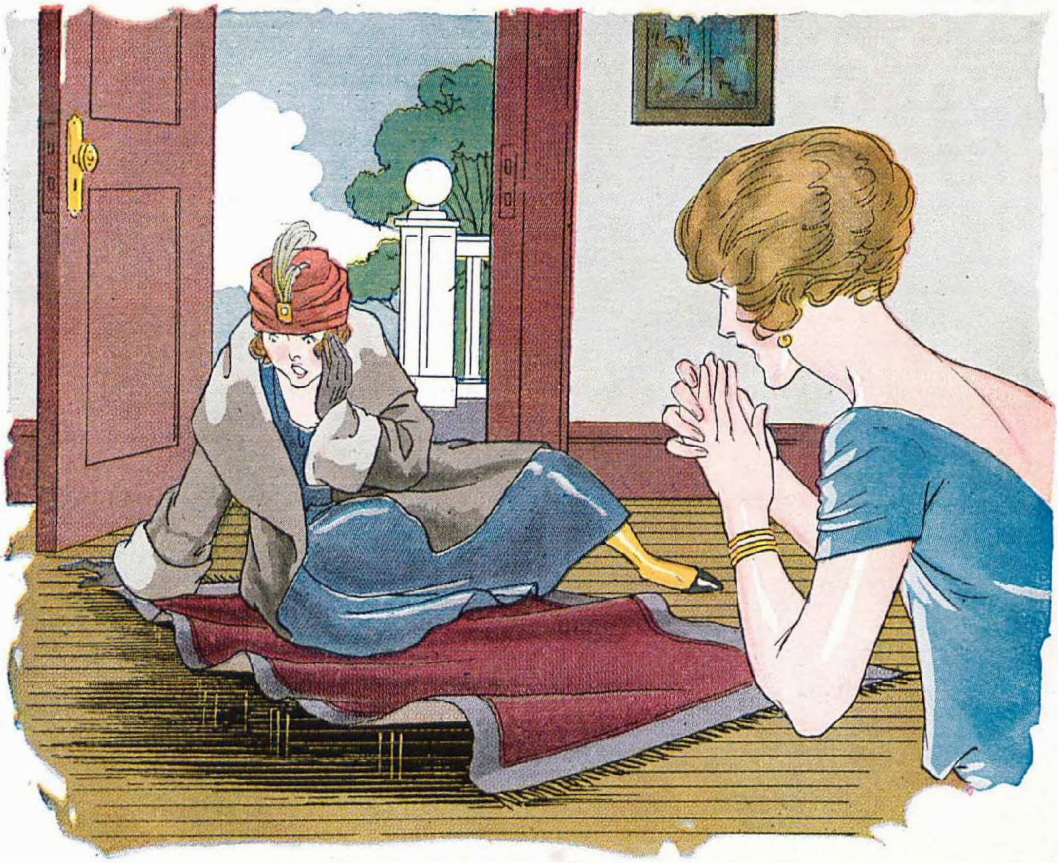

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