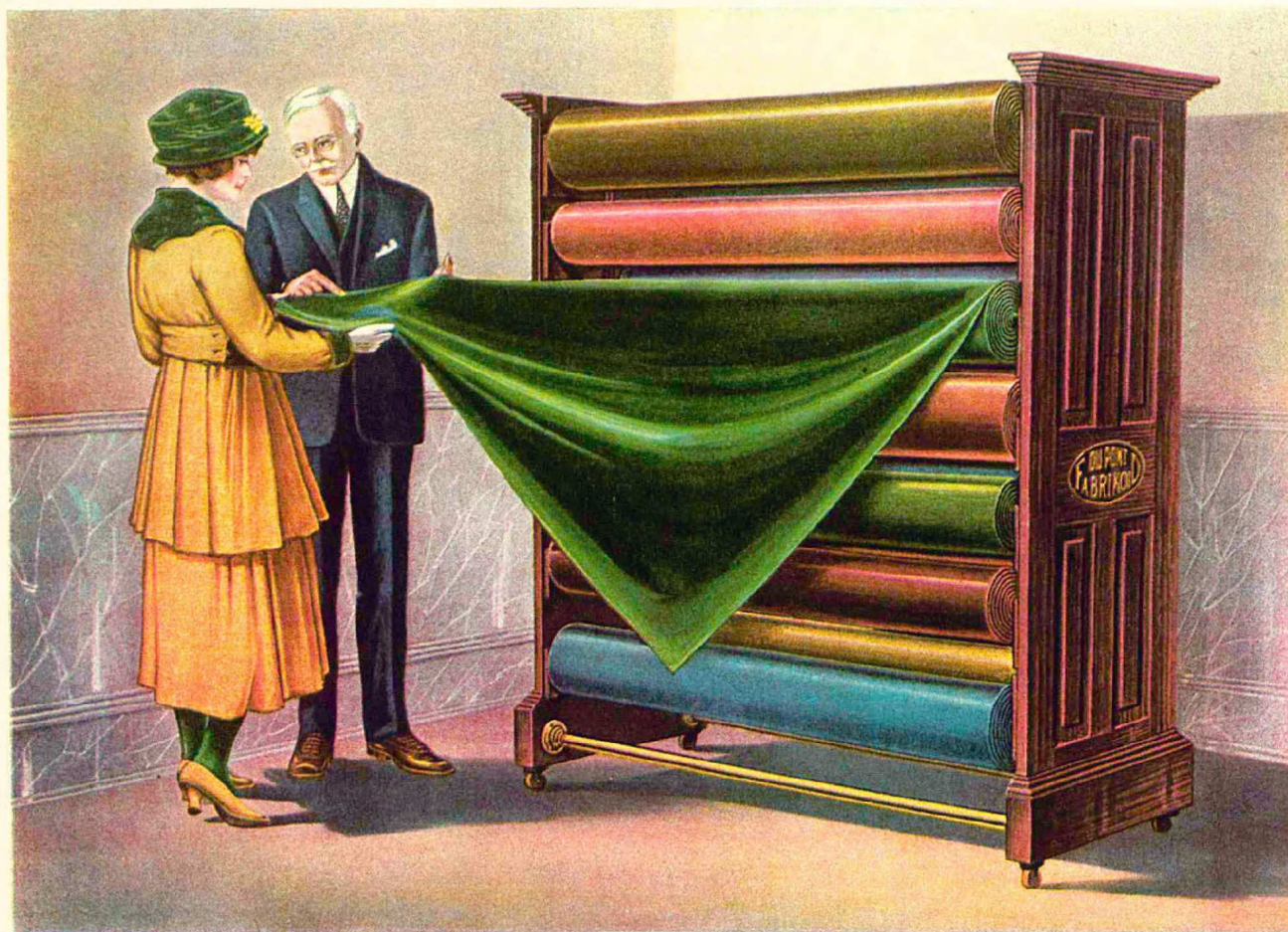


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DUPONT MAGAZINE





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DU PONT MAGAZINE

A REVIEW OF AMERICAN INDUSTRIAL PROGRESS

Published Monthly by E. I. du Pont de Nemours & Company

J. H. SQUIRES, Managing Editor

T. M. KNIGHT and ALEX. R. ABRAHAMS, Associate Editors

Volume IX

WILMINGTON, DELAWARE, AUGUST, 1918

Number 2

What the Chemist is Doing for Our Industries

Dr. Charles L. Reese, Chemical Director, E. I. du Pont de Nemours & Co.

Delivered at the Annual Joint Meeting of the National Association of Cotton Manufacturers and the American Cotton Manufacturers' Association, held at the Hotel Biltmore, New York

THERE has been a great deal written and said during the last three years with regard to what chemists have done for various chemical industries, but very little has been said with regard to how this has been accomplished, and my purpose in the few minutes I have at my command is to give some idea as to what a chemical organization should be, and also to show how the existence of a fairly complete organization has made it possible for this country to meet the extraordinary conditions brought about by the war, and, in particular, the one in which you are most interested, and that is, meeting the dye situation.

The early chemical industries of this country were started principally by men who were chemists themselves, or were men of experience in chemical industries in the old country.

These men were mostly very successful because their factories were small, the demand for their products comparatively large, and constantly growing, and the prices to be obtained left a handsome margin of profit.

It was also possible to give personal attention to all operations, as was the case in factory management in the spinning and weaving industries in the early days where the owners knew personally all of their operators and could overlook the operation and efficiency of each machine.

As the industries have grown and have been consolidated into larger units, this personal contact with the manufacture has become impossible on the part of the management, and organization has become necessary to meet these conditions. Competition has also become keen and profits per unit so small in comparison that ways and means have had to be devised to materially reduce manufacturing costs.

Owing to the growing complexity of business management, the management of most large corporations has come into the hands of men whose training has been mainly along business rather than technical lines.

A well-organized industry today should have its technical staff, including chemical, mechanical, as well

as legal and others; I mean staff in contradistinction from line as defined by Hines in his very good book on Organization. Now I wish to devote a few words to the function of the chemist in the organization.

There are a number of functions which chemists must perform. In the development of industries there is scarcely any which does not have some chemical problem. In fact, all industries must deal with some form of matter, and are dependent either upon the work of the chemist or on the previous work of the chemist. For instance, your own industry is the best illustration I can give of this. The growth of the cotton is a chemical problem. The manufacture of the fertilizer used is a chemical manufacture, and the preparation of the cotton either before or after spinning, and the dyeing and bleaching are all chemical problems which should come under the supervision of the chemist or have been worked out already by the aid of the chemist.

The various functions of the chemist may be classified as follows:

Analytical Chemist

The analytical chemist, that is, the ordinary chemist who works in works laboratories, comes under the management of the plant, who analyzes raw materials, intermediates and finished products, coals, oils and other materials. His functions are essentially routine and he repeats the same thing over and over again. His work should not be confused with research work, and research work should never be delegated to such a chemist. This class of chemists was the first class recognized in this country; probably first in the iron and steel industry, where his work was essential to the control of the quality of the finished product. In the cotton industry this man would probably look after the bleach, and could be used for determining the quality of the colors purchased and even the selection of the colors for use, unless the industry were sufficiently large to warrant the employment of a specialist in a staff capacity.

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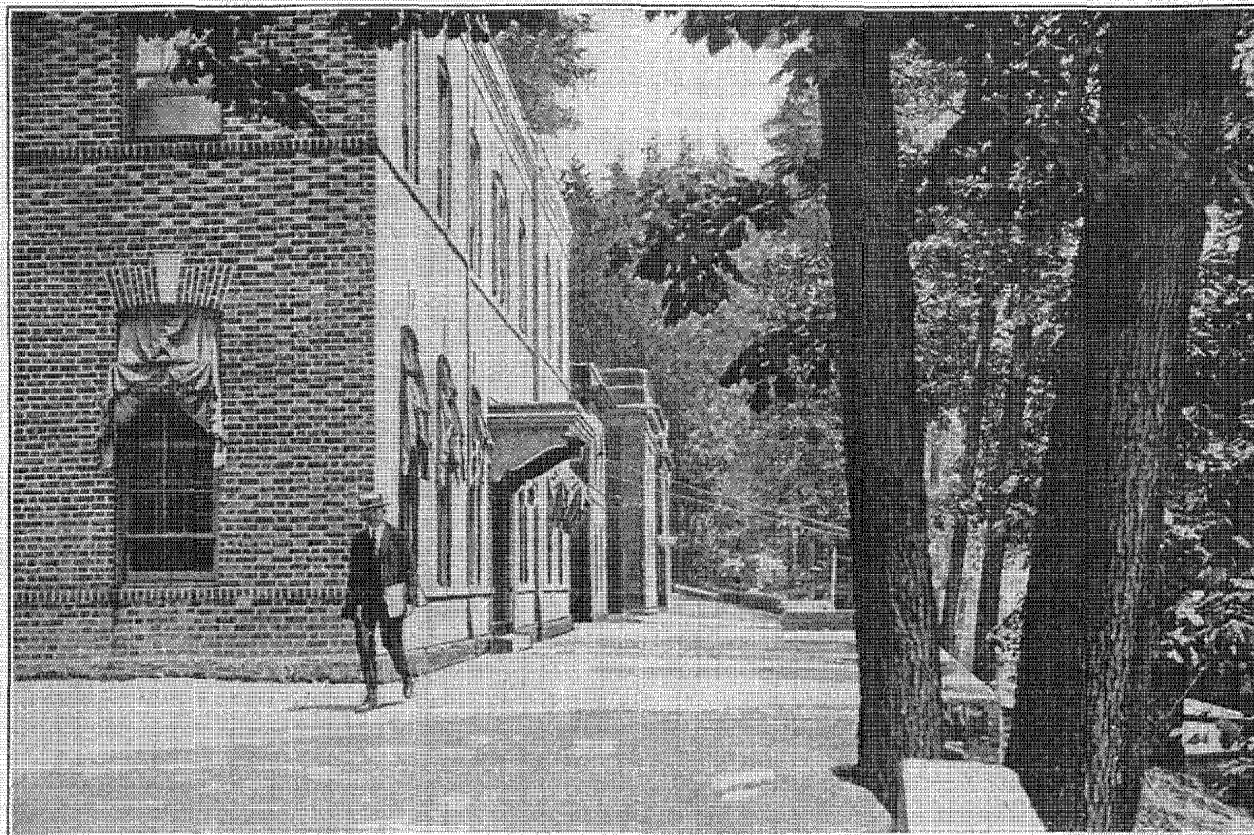
Research Chemist

The research chemist is the man who develops new products, new processes, finds means of utilizing by-products and works for the improvement of the existing processes and products. He also seeks for more economical raw materials. A large industry can afford to maintain special research laboratories, and if an industry is not sufficiently large, it would be advisable to create a co-operative research laboratory where a number of concerns interested in the same lines could maintain laboratories. This method is being fostered in England at the present day, the English Government having appropriated \$25,000,000 for this purpose. I might say the Du Pont Company will spend in the neighborhood of \$2,000,000 this year for work of this character, exclusive of capital expenditure for buildings and equipment, employing over 300 technically trained men, and a total of 866 men on this class of work. I use this illustration because I have not the means of knowing what other concerns are doing along these lines.

Besides the research chemist, every organization of sufficient magnitude should obtain a corps of chemical engineers under the direct control of a chemical executive, the research department also coming under the same control. Every chemical operation of a large organization should be supervised by a specialist in that line; for instance, in the Du Pont organization, besides the chemical director and assistant director, the manufacture of sulphuric acid, nitric acid, nitro-

glycerin, nitrocellulose, solvents, py-ra-lin, smokeless powder and high explosives are all supervised by specialists along these lines, and many of them have a number of assistants. Their function is largely to promote chemical efficiency in the operation of plants and may be classified along the same lines as Taylor's Functional Foreman in his system of shop management. Not only the works operations, but the works laboratories, come under the technical supervision of this staff organization. The importance of the staff organization above referred to is that the chemical director and his assistants become thoroughly familiar with all the phases of the business, not only from a manufacturing and cost, but also from a selling point of view. They become familiar with the requirements of the trade, and are able to assist the management in a consulting capacity from a very wide point of view. I consider this latter function as being of extreme importance in the development of the American industries. In fact, I am satisfied that the chemical engineer in the future will find his place in the governing boards of American industries—a point which was brought out very strongly by Lord Raleigh in his speech made in England at the time the British Dyes Limited was incorporated. He attributed the success of the German chemical industries as being largely due to the use of men with chemical training in the management of their companies.

You are all familiar, of course, with the effect the war had on the supply of dyes to the textile industries



Headquarters at the Du Pont Experimental Station

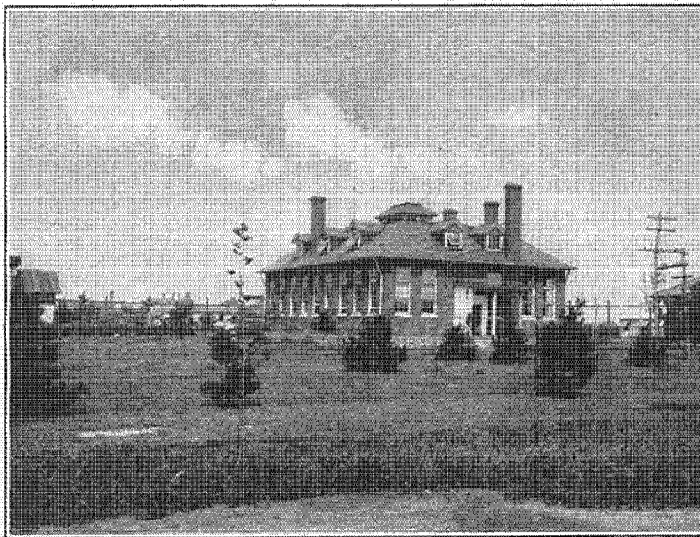
of this country, and also with the German propaganda in the many technical journals intended to discourage Americans from entering this great industry. The complexity of the industry was pointed out for their discouragement. There has also been much talk in the papers with regard to the wonderful advantage Germany had on account of her extensive dye industry, in that she could immediately turn all the great dye plants into munition factories. I do not consider the presence of the factories themselves was a matter of very great importance to the Germans. It might have been an important factor in a small war, but the requirements for this great war have been such that their mere existence must have been a very small factor. However, the real assistance which they obtained from the existence of these factories was the chemical organization which they maintained. As this war has become, in a sense, a chemical war, the chemical organization which they maintained has been able to assist them very materially in its prosecution. Now

what were the conditions in this country? There was no dye industry of any great magnitude, but there was a well-organized explosive industry with a well-organized chemical organization. I might say that at the beginning of the war the Du Pont Company had in the neighborhood of 400 chemists in their employ, many of whom were functioning along the lines above indicated. The first effect of the great war was to call upon this organization to meet problems which seemed to be almost unsolvable as those presented by the dye situation, since many of the raw materials necessary for the manufacture of munitions had been secured from Europe just as the dyes had been. This organization, however, was able to meet the situation in such a short time that there was not a day's delay in the production of powder for the want of these materials. One of these materials, diphenylamine, which is an intermediate in the manufacture of dyestuffs, was produced on a large scale, and three separate and distinct processes were developed for its production. Dimethylaniline, another dye intermediate, was necessary for the production of tetranitromethylaniline, commonly called tetryl, and had to be produced, and a satisfactory process for its production was developed in ample time, as well as for the production of tetryl. These accomplishments gave courage and confidence to the chemists of the Du Pont Company, and from the fact that this organization was manufacturing and

using all of the basic raw materials necessary for the manufacture of dyes, namely, sulphuric acid, nitric acid, benzol, toluol, xylol, naphthalene, nitro-benzol, aniline, and picric acid, it was perfectly natural to consider the possibility of entering into this great industry.

Chemists were put to work about two years ago to study some of the dye problems for the purpose of training them to determine their capacity along these lines, and it soon developed that the great bugaboo presented by the German propaganda was a myth. Consequently, this great munition concern, in spite of

their tremendous expansion, brought on by the requirements for large quantities of munitions, felt they were in a position to meet this critical situation which presented itself to the textile industries, and, after a thorough study of the situation, determined to enter this field. In December, 1916, this decision was reached, and in February, 1917, the work on the plans for a plant was started, and today, a little over a year, a plant which presents the appearance of a



The Executive Building at one of the Research Laboratories

small city, has been built, the idea being to first manufacture colors which are mostly needed in this country, regardless of the difficulty and cost of manufacture. It might have been an easier task to attack a line of colors which could have been produced at considerable profit, from intermediates purchasable on the market, but this would not have met the situation in a proper manner; this, because it was felt the only safe foundation for a color industry in this country, was in the manufacture of a comprehensive line of intermediates starting at the bottom with crudes on such a large scale as to make it economically sound. To illustrate this fact it is interesting to note that they are now manufacturing indigo on a very large scale of a quality unsurpassed by any German product, and all the intermediates necessary in this manufacture are produced from the simplest crudes in the works of the Company. This plant will be brought up to its maximum capacity in a very short time, and will doubtless supply all the needs of the United States and Canada with this important material. This is an achievement which, I feel, you will all recognize as one which the American chemist has the right to be proud of.

The program is to produce fine and fast colors irrespective of difficulty and cost of manufacture. It will not be long before the finest basic acid and direct

(Concluded on page 29.)

Science of Quarrying Rock with Explosives

ROCK is quarried for two purposes. Dimension stone, as it is known in the trade, may be described as stone taken out for building purposes, whether architectural or structural, in which the greatest proportion of the original strength of the stone is retained. This stone is shaped up and used for building of all kinds, foundations and trimming of buildings, as well as the main walls; bridges, masonry, piers, abutments, breakwaters, jetties and innumerable other purposes in which the original beauty of the stone and its original strength are retained.

The other class is where the rock is taken out without regard to its strength and beauty, where it is used after being crushed to about the size of stove coal for road construction, for making concrete, and mixed with sand and cement, and in "one man's" size stone or stone about the size which one man can conveniently carry. This is the size generally desired when limestone is blasted for burning to make chemical lime, finishing lime and plaster.

In the first class mentioned stone, high explosives are not used at all, and explosives of any kind, like black powder, only sparingly, as the shock of the explosion is liable to start minute cracks and seams in the rock, which impair its strength.

In the second class we have a quarrying operation where vast quantities of many kinds of high explosives are used. These blasts are made in a number of ways.

Sometimes the holes are put down vertically from the top by means of what is known as "well drills" to a distance of 100 feet or more and from five to six inches in diameter. Sometimes tripod drills run by steam or compressed air are used which make holes generally 16 to 20 feet deep, as a maximum, and tapering from $2\frac{1}{2}$ to 3 inches at the surface to perhaps $1\frac{1}{4}$ inches at the bottom of the hole. This same drilling may be used for putting in holes horizontally, or nearly so, at the point where the face of the quarry and the floor intersect. These holes are usually "sprung" or enlarged at the end so as to contain a much larger charge of

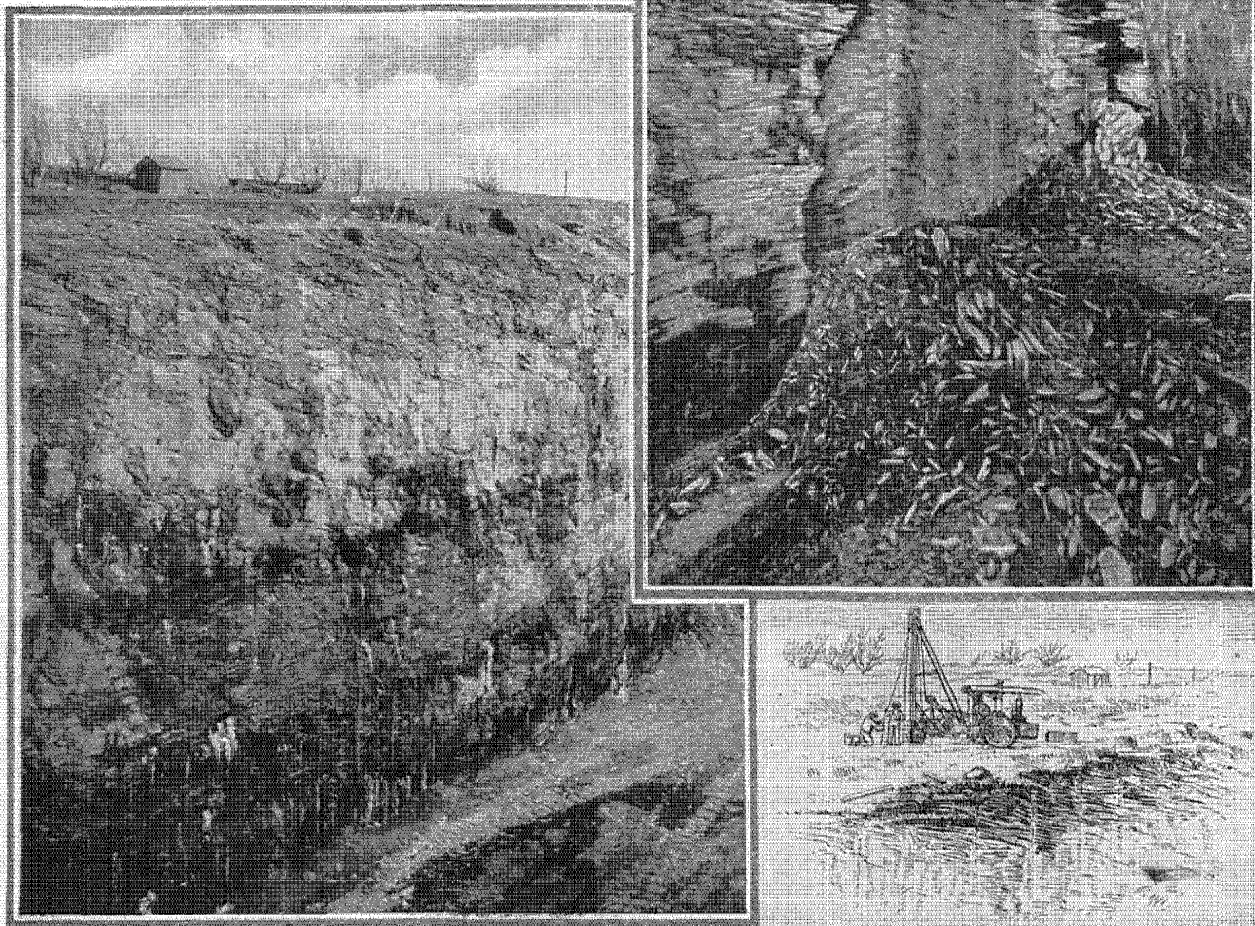


Fig. 3—Face of Quarry Before and After a Blast Loaded in Well Drill Holes

explosives than would be possible if this springing operation were not done.

There is also the hand drill, which is similar to the tripod drill, except it is held in the man's hand, and, while operated by compressed air, can drill holes in any direction, but usually downward so that the weight of the drill aids in the force of the blow struck by the drill bit. These drills are not often used for holes over 8 or 10 feet deep and usually not more than an inch in diameter, but they are very convenient as they consume almost no time in changing from one location to another, and very little time in changing from a shorter drill to a longer one. This hand drill, or hammer drill, as it is sometimes called, is also adapted for another kind of drilling, namely, a small tunnel, usually about 5 feet high and 3 feet wide, which is driven straight into the face of the quarry for a distance of 20 to 30 feet, at which point tunnels at right angles to the first tunnel are drilled in both directions. Sometimes the first tunnel is extended after the first cross cut is made and the second cross cut and sometimes a third is driven, and all of these tunnels loaded with large quantities of explosives and fired simultaneously, so that immense quantities of stone are brought down with one blast.

Figure 1 shows the beginning of a quarry before a definite working face has been developed. In this only the overlying earth has been taken off and possibly a few holes put in either by a one-man hand hammer and drill, or by some other equally primitive method, resulting in a considerable expense in drilling and no economy in explosives.

The face of a quarry is usually developed in such a way as to be at right angles to the tracks in which the stone is taken to the crusher, although as we will see later, with the improved machinery on a larger scale, this track may be parallel to the face.

Figure 2 shows a typical benching operation in a quarry where a condition somewhat similar to an enormous stairway is developed, each step, as it were, being blasted out by a line of holes drilled either with a tripod drill or a power-hammer drill. This requires no expen-

sive apparatus, is fairly economical with explosives, but has the disadvantage that only a rather limited amount of rock can be shot out at one time, and each bench must be carefully cleaned before the drilling operation can be started, otherwise too much valuable time is lost in moving the drill from one position to another. In this type of work the holes are usually drilled the entire height of the bench and from 8 to 12 feet back, the holes being spaced anywhere from 4 to 8 feet apart, depending on the nature of the material, the use to which it is put, and the explosives.

The benching method is only possible where the stratification of the rock admits of a nearly level surface on each bench; where the stratification pitches either way more than a few degrees, or especially if it pitches downward toward the floor of the quarry, the bench method is usually replaced by the "snakeholing" method in which the tripod drill works on the quarry floor and drills holes nearly horizontal, pitching downward somewhat, directly into the face of the rock. After these have been drilled from 20 to 24 feet deep, two or three cartridges of dynamite are exploded in the bottom of each hole. This is allowed to cool, and four or five cartridges are exploded, and successive increasing charges until the final pocket can be made to hold several hundred pounds of explosives. These, if the spacing is correct, will usually lift the entire face of the quarry up and throw it out on the floor. It is, however, an operation requiring considerable care, skill and experience to be done successfully.

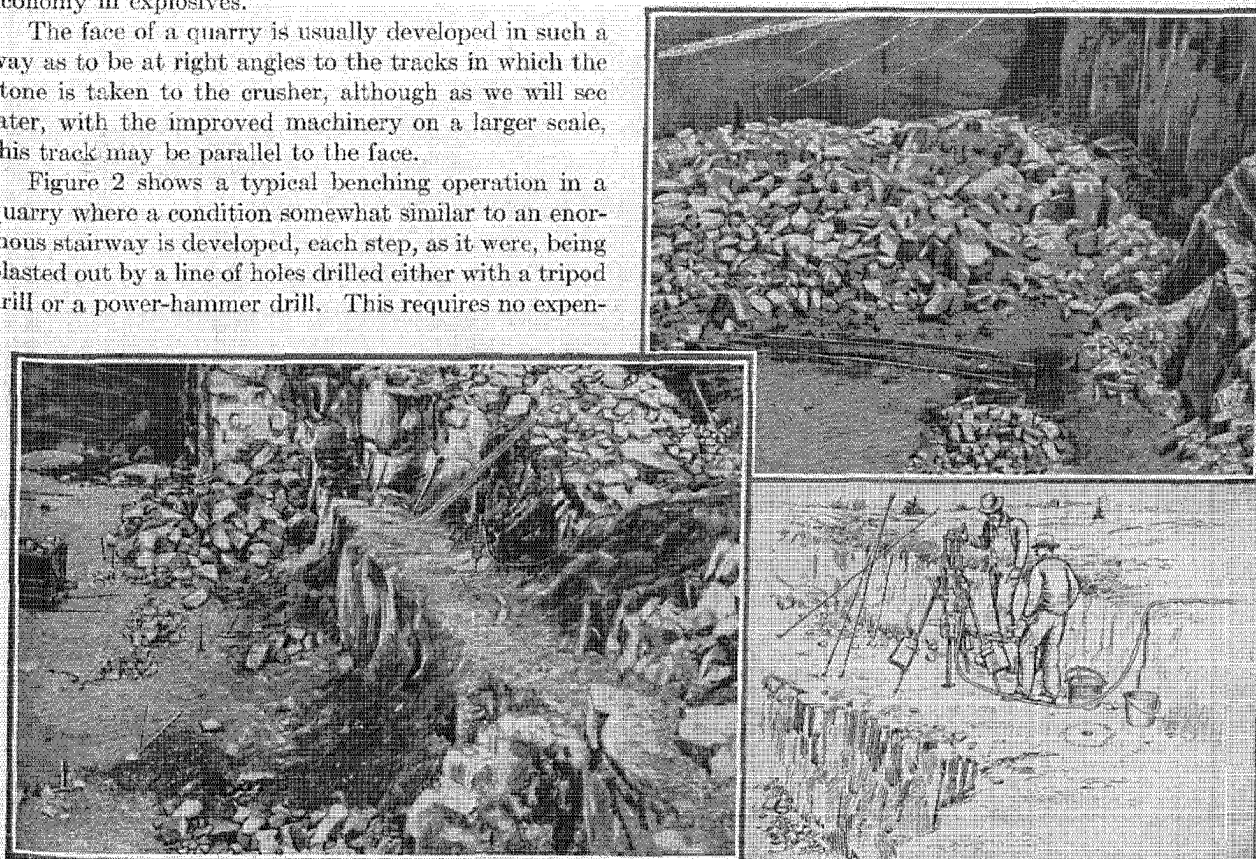


Fig. 2—Some of the Details of the Bench Method of Quarrying by the Brick Method, Using Tripod Drills

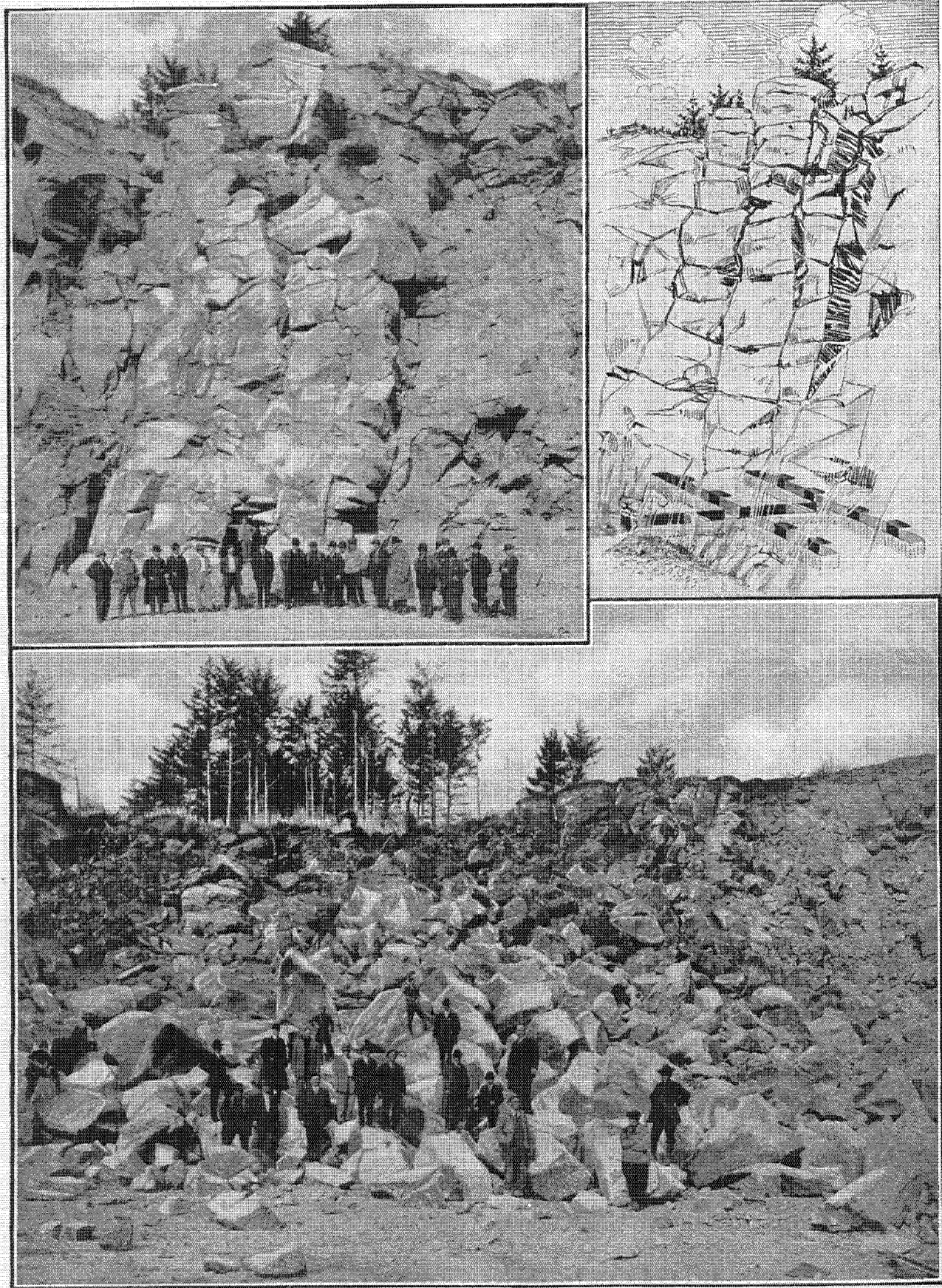


Fig. 4—A Large Quarry Before and After a Tunnel or Gopher Hole Shot. The Sketch Shows the Details of the Tunnel

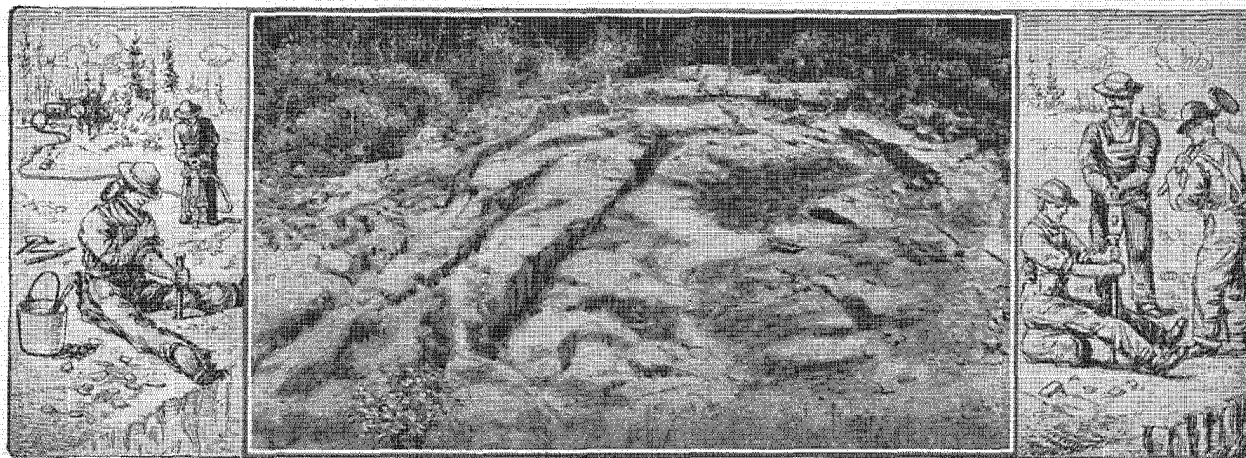


Fig. 1—A Poorly Developed Quarry where no System was Used in Drilling and Loading. The Sketches Show Hand and Mechanical Drills

The most usual method of blasting large quarries at the present time is known as the well-drill method, shown in Figure 3. By means of the well-drill adapted to this purpose, holes are drilled in the rock the entire depth of the face of the quarry. They are usually 15 to 30 feet back from the face, this distance being known as the burden, and are spaced about 15 to 20 feet apart, $5\frac{3}{8}$ inches in diameter being the most usual size. Any number of these holes can be fired by appropriate means at one time, but usually not more than 40 or 50 are attempted. By adapting the explosives used to the nature of the rock, it is possible to break it up in the size desired, and when properly spaced with the right burden, the broken rock is thrown out on the quarry floor without being scattered too far or without doing damage to buildings or other equipment unless some unseen weakness exists in the rock which cannot be guarded against. This is the most economical method of blasting rock for crushing at the present time, but requires a rather large and expensive equipment to handle it successfully. Although it is occasionally loaded by hand into the cars to go direct to the crusher, the more efficient way is by means of the steam shovel, by means of which broken stone is loaded into a train of cars, which are taken to the crusher by a locomotive.

One of the advantages of the well-drill system of blasting is that it admits of what is known as the "buffer" system of shooting. Figure 5 shows an example of this. It consists of throwing out a mass of broken rock in such a way that subsequent blasts can be fired before it is removed; that is, piling the debris up against the mass which has already been thrown out. In this way the rock from the first and second shots lies between the face and the steam shovel, so that the operation of the steam shovel is not suspended at any time. When this method is used, the steam shovel, and the cars which it fills, run on tracks parallel to the quarry face which is being blasted. The rock from each blast is simply piled up on top of and against previous blasts and is not thrown out on the quarry or on the tracks and equipment, so that the drilling and

blasting can go on almost continuously and the tracks and equipment are never disturbed.

The limit in depth for well drills is from about 30 feet to 130 feet. Holes shallower than 30 feet are not economical by the well-drill method, and holes deeper than 130 feet are not often drilled, on account of the numerous difficulties which such a deep hole would entail.

Where slips and seams are known to exist in the face of a quarry, it is possible to guard against accidents sometimes by reducing the load of explosives at the weak point; this can be done by breaking the charge, as it is called, which is simply loading sand or rock dust into the hole at the weak point.

Not all quarries lend themselves to the economic use of the well-drill method. While limestone quarries which have a fairly soft rock to drill can be handled in this way no matter what the angle of stratification, harder rocks, such as syenite, granite, diabase, cannot be successfully worked by this method unless the stratification is horizontal, or nearly so, as the bits are liable to jam in the crevices where the rock seams form an acute angle with the line of the bore hole.

In some cases of trap rock, especially of a columnar formation, much more economical blasting is done by the snakeholing method, which blows out the bottom of the face, whereupon the overburden drops down and is shattered by its own weight.

A tunnel method is one which is not used often in the eastern part of the United States, but quite frequently on the Pacific Coast. It is one which involves the drilling and blasting of a small tunnel by means of air-hammer drills and the loading of large charges of explosives in the ends and at intermittent points in the cross cuts of the tunnel. This method also depends on the broken-up stratification of the rock to fall down of its own weight when the tunnel charge throws out the underburden and allows the top or overburden to fall down of its own weight. In this method relatively slow-acting and weak explosives, either blasting powder or powder of the Du Pont R. R. P. type, are used with one or more 50-pound cases of dynamite, preferably a

quick-acting dynamite, as a priming or igniting charge. The "R. R. P." is usually stacked in the tunnels in the paper bags in which it is packed, and the cases of dynamite in the center of each charge of "R. R. P."

When Black Blasting Powder is used in tunnel charges, it is sometimes transferred into bags of burlap before being loaded in the tunnel, but equally good results are obtained by stacking up the powder in its original kegs, with the priming charge of several cases of straight dynamite in the center of the stack. The explosion of this ruptures the kegs, so that the black powder is exploded just as efficiently as if it were in bags or in bulk, besides giving the protection against the moisture which the steel kegs afford. These unit charges may be several thousand pounds of explosives, and are separated from each other in the cross cut



Fig. 5—A Buffer Shot; Broken Stone is Left in Place to Prevent Fragments Flying from the Next Blast

by filling materials, such as sand, rock, and sometimes timbers laid into the sides of the tunnel. These, of course, are all fired electrically. A whole carload or more of explosives may be used in one shot, and when it is successful, a considerable saving is effected over any other method.

The successful development of a modern quarry demands a close study, not only of the purpose for which the rock is

used, but also the nature of the rock, its stratifications, slips, seams and weaknesses, before the type of drilling best adapted can be decided upon. After this, close study is necessary to determine how the charge of explosive can be best placed to bring down the maximum amount of material, and the best explosive for the purpose must be selected out of several hundred kinds, brands and grades on the market. Each quarry presents, then, a distinct problem to be studied by the Explosives Engineer.

The Arlington Plant

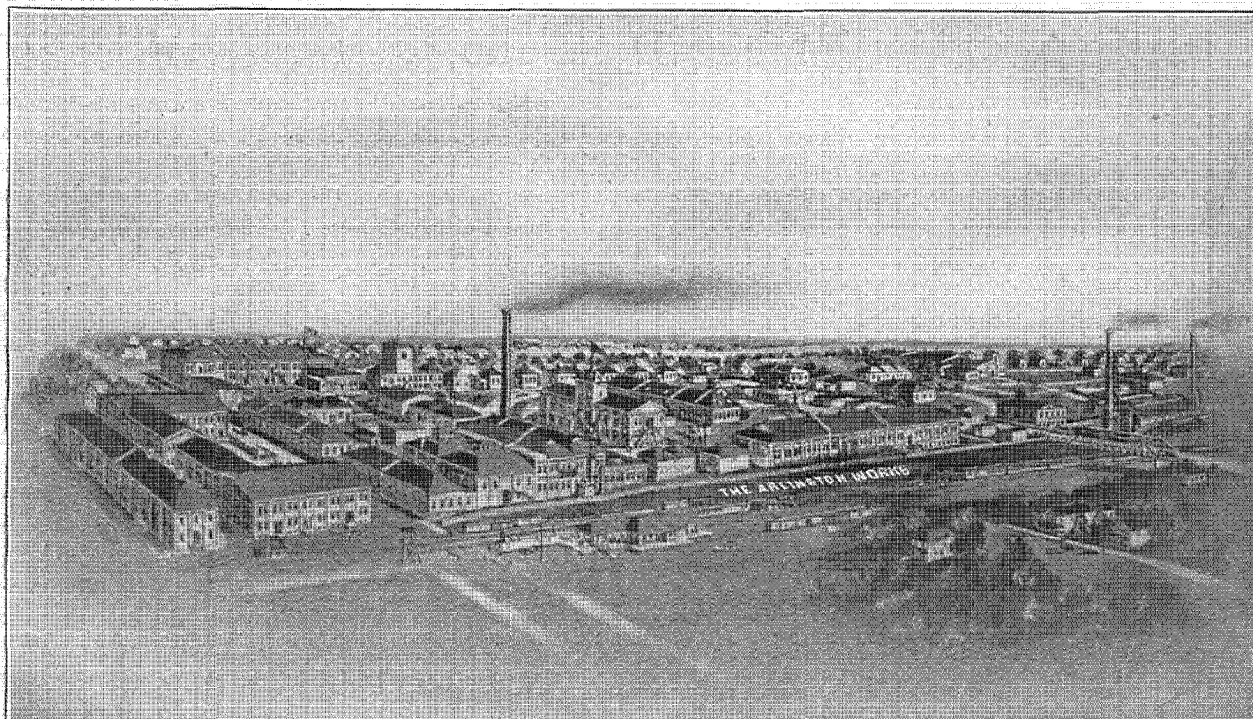
IN 1883 there first came into existence the beginning of what is today the Arlington Plant. Its exact location is somewhat shrouded in the mystery of the past, the best information being to the effect that about that date was brought about a combination of a small nitrocellulose plastic rolling mill in Newark with a nitrocellulose manufacturing plant located somewhere in Plainfield, New Jersey. The result of this combination was the bringing together of the two basic forces of pyroxylin plastic manufacture, which shortly settled upon the neutral ground of Arlington as its location of the first combined manufacturing plant. This was about 1886. The name of the Company went through several stages of evolution, beginning with the euphonic name of "Cellonite Manufacturing Company," "The Arlington Collar and Cuff Company," "The Arlington Manufacturing Company," and finally, "The Arlington Company."

In 1887 the Company's activities began on a manufacturing scale, and Py-ra-lin was produced for the first time in the small plant located at the corner of Forest Street and the Erie Railroad, at Arlington, New Jersey. The power house, nitrating department, roll, press and sheeter rooms, store houses, and office occupied a very

small area at this location, consisting of three unit buildings with temporary frame lean-tos and make-shift shelters, all of which have since been torn away to make place for the Company's rapid advancement. The Company in its first days of activity encountered manifold difficulties. The evolution of its nitrating methods from the nitration of raw cotton or linters, shredded cotton rags, and ultimately cotton fibre tissue, carried it through stages of poor product, financial distress, and operating difficulties that would have discouraged many less determined pioneers. For a period of about four years the Company struggled vainly with a product little known, and with a lack of skilled operators and chemical knowledge of the plastic made scarcely any headway whatever.

About 1891 with the addition to the plant forces of a number of skilled operators secured from a location in New England where a pyroxylin plastic plant had discontinued operations, the product of the plant assumed a more staple and standard character and began to develop rapidly.

The collar and cuff business was beginning to meet with approval throughout the country, and the Company went considerably into the development and man-



The Arlington Plant

ufacture of this line of goods. Financial embarrassment, however, was not overcome, and Mr. Henry S. Chapman, who had become financially interested in the Company, undertook the burden of establishing the Company's credit. In this he was successful, and in 1893 passed from the treasurership of the Company to the presidency, which he held until 1915, the date of the purchase of The Arlington Company by E. I. du Pont de Nemours & Company.

Associated with Mr. Chapman in these early days, and sharing with him the burdens of the Company to a more or less extent, were Messrs. R. H. Ensign, L. S. Ellsworth, Edwin N. Crane and Emmet Schultz. Throughout this period the growth of the Arlington plant was rapid. The Company's property along the Erie Railroad tracks was enlarged by the purchase of additional property. Throughout a period of about ten years after Mr. Chapman became the active head of the Company, its expansion covered with buildings most of this area, and with the beginning of 1903 the Company extended the plant construction west into the meadows. Over the period of the second ten years from that time the double plant idea was made an established fact, with the exception of the nitrating, dehydrating and mixing activities. Before these activities could be divided, the plant was purchased by the Du Pont Company, in December, 1915, at a period when the demand for Py-ra-lin products was beginning, on account of war conditions, to become more evident. The Du Pont Company immediately upon its purchase of this property laid plans for further expansion, and over the period of the two years of 1916 and 1917 tremendous strides were made in plant construction, plant development and plant organization.

Today the Arlington plant covers an area of approximately eighty acres. From a plant in 1901 of less than one hundred employees there is today at Arlington a plant employing thirty-five hundred employees. To take care of associated or supplementary lines of work additional plants are required.

The Poughkeepsie, New York, plant is a modern, up-to-date plant, in which at present there is manufactured the entire line of collars and cuffs and pressed combs.

The Toronto, Canada, plant, while in this division, is operated under the name of The Arlington Company of Canada, Ltd. It is engaged solely in the manufacture of Py-ra-lin articles, such as collars and cuffs, combs, martingale rings and loops, and employs approximately fifty employees.

Two paper mills for the production of the high-grade paper needed for manufacturing Py-ra-lin are located at Nutley, New Jersey, and Norwich, Connecticut, and an extensive camphor farm is operated at Waller, Florida.

Rats Costly Eaters

Experts have estimated that one rat will consume 40 to 50 pounds of food in a year. It has also been figured that it requires the continuous work of about 150,000 men with farms, agricultural implements, and other equipments to supply the foodstuffs destroyed annually by rats in the United States. In addition, rats destroy other property, mainly of agricultural origin, the production of which requires the work of about 50,000 men. This gives a total of 200,000 men whose economic output is devoted solely to feeding and otherwise providing for rats.

Making Dynamite

THE manufacture of dynamite was first undertaken on a small scale in 1863-65 by Alfred Nobel, a Swedish scientist. The first manufactured, while extremely crude and dangerous, was wonderfully effective when used under advantageous conditions. Its composition was of nitroglycerin and guhr, which latter is ordinarily described as an earthy material like Fuller's earth. It is in reality the shell remains of tiny animals, and might be described as the "fossiliferous skeletons of diatomaceous infusoria." Whatever its name, this fine material was used to absorb liquid nitroglycerin to form dynamite.

The early processes of manufacture were very crude, as all mixing and handling were done by hand. Both production and use were limited, as the blaster of that date preferred to use blasting powder, with which he was more familiar, and which he considered safer and more reliable.

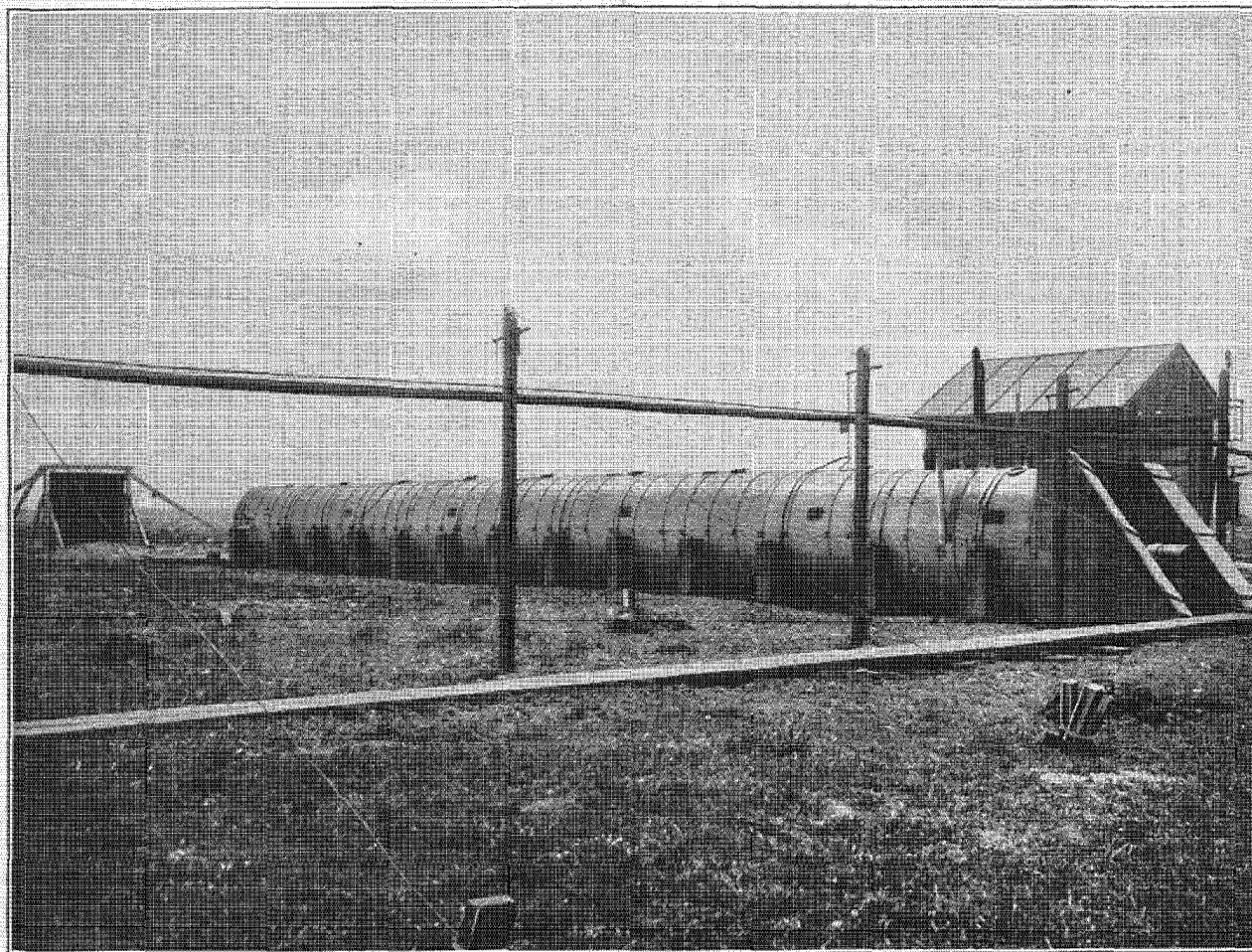
The principal objections to the dynamite of that day arose from the fact that the dynamite was extremely sensitive; the guhr did not absorb and hold the nitroglycerin securely, but allowed it to leak out, thereby causing many accidents and the inert or inactive nature of the guhr reduced the effective strength of the explosive.

The real value of the new explosive was soon demonstrated, and much experimental work was begun in an effort to overcome the objectionable features. Among the accomplishments in this connection have been the substitution of active dopes or absorbents for inactive guhr, which played no real part in the explosion. This introduced a variety of materials, the principal of which were wood pulp and nitrate of soda, both of which enter into combustion with the explosive material used and add greatly to the effectiveness of the explosive. The wood pulp absorbs the liquids and at the same time is consumed in the explosion, while the guhr which it replaces did not.

Further progress in the art of manufacture introduced nitrate of ammonia as an economical substitute for part of the nitroglycerin.

In comparatively recent years low freezing dynamites were developed, principally by the introduction of certain nitrated coal tar derivatives.

All these changes brought about many improvements in dynamite and made it better suited for various kinds of work. Today there is a class or type of dynamite suited for every kind of blasting, and the processes of manufacture have been perfected to a very high standard.



A Tunnel Where Mine Conditions Are Approximated for Testing Explosives for Use in Coal Mining

A dynamite plant differs absolutely from all other factories. There are no large or expansive single buildings, and practically every operation is conducted in small, isolated structures heavily barricaded in order to protect other parts of the plant in case of an explosion.

Two classes of materials—liquids and powders (solids)—are used in making dynamite, and many processes are required to properly prepare and mix them.

The non-explosive solids after being thoroughly tested and screened are transported to buildings known as "dope" houses, where they are weighed and mixed in the correct proportions and amounts. The normal mixing of dynamite is about 600 pounds, and only enough dope or absorbent is weighed at one time to make this amount.

Included with the absorbents are other materials, which act as a stabilizer to prevent chemical changes after the manufacture is completed.

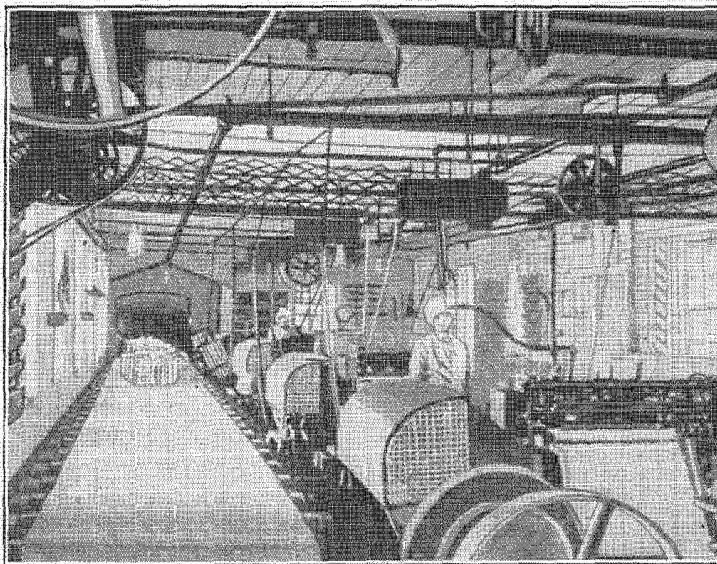
From the dope house the dope is taken to the mixing wheels, which are large rubber-shod wheels revolving in a wooden bowl. The dope is placed in the bowl, and the wheels run for a few revolutions to get it evenly distributed, when the nitroglycerin together with any other explosive materials of a liquid or a solid nature are added. The wheels are then set in motion and kept running until the materials are thoroughly mixed. The dynamite is now complete and ready to be packed into cartridges.

On another line or unit of the plant automatic machines have been busy cutting heavy paper from large rolls, printing the brand and strength of the dynamite on each piece and rolling it into shells or cartridges, each of which is coated inside and out with a thin film of paraffin.

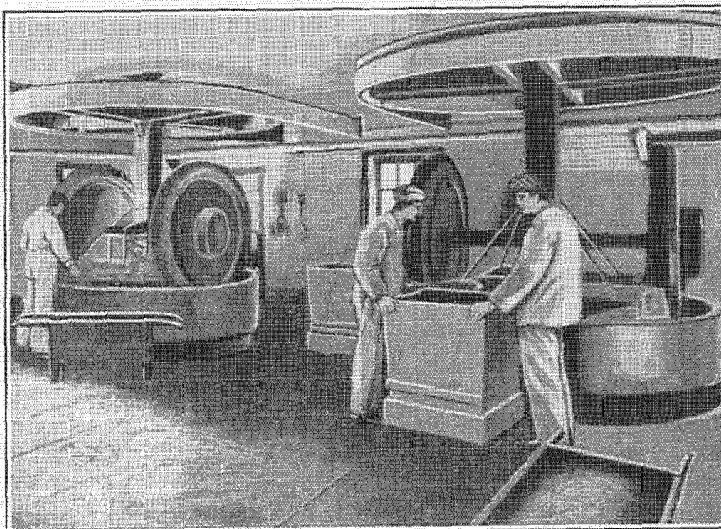
In the "punching" house these are placed in large machines that fill each with the proper amount of dynamite and crimp the open end securely. Each cartridge is then inspected.

The next step is into the packing house, where the finished cartridges are packed in strong paper-lined wooden boxes, each of which has been carefully marked beforehand. The dynamite is then sent direct to the outgoing cars or to the storage magazine for future shipment to various parts of the world to perform its mission in the industrial upbuilding of the world.

On a well-regulated plant every effort is made to keep each batch or mixing up to the highest standard of quality and uni-



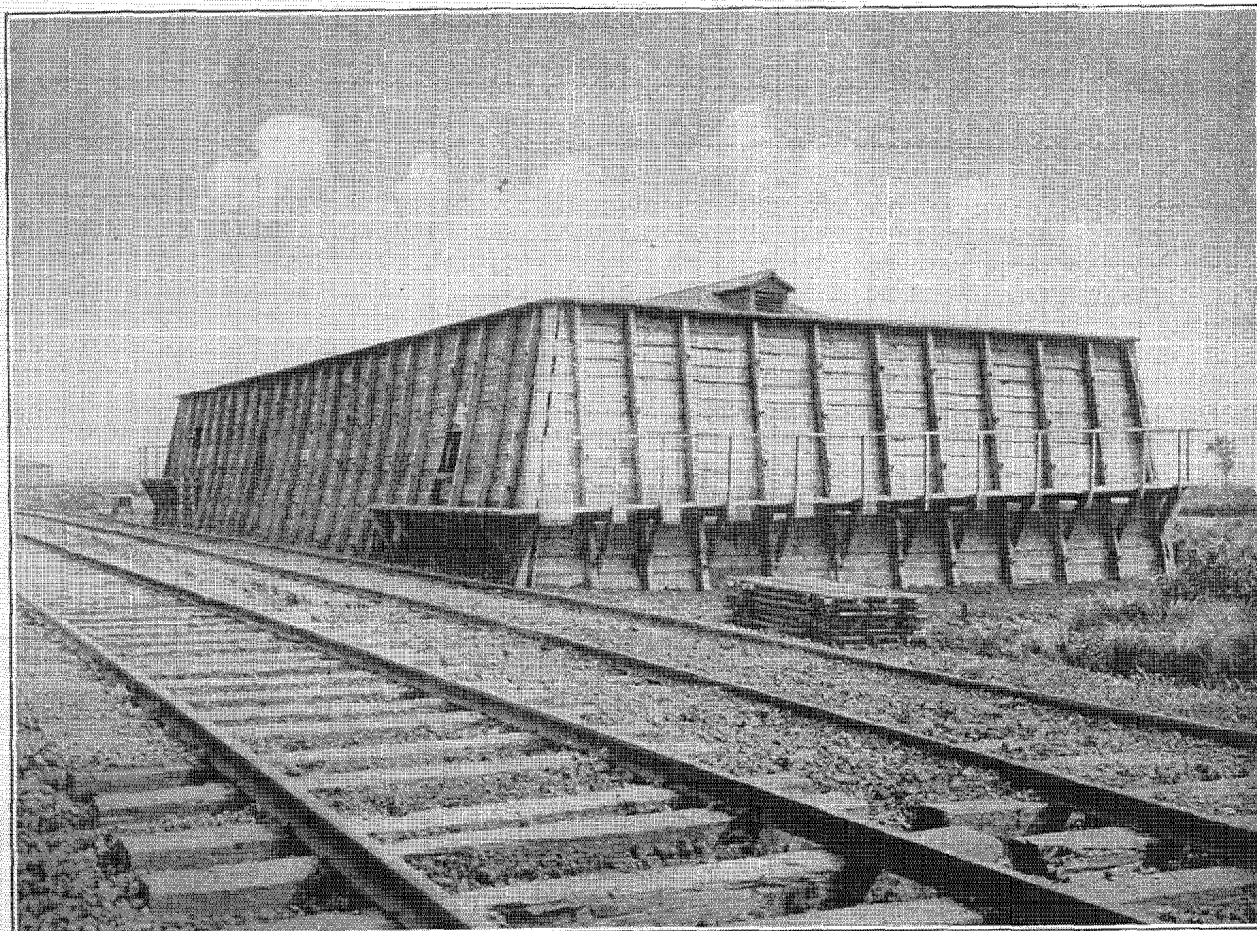
Machines Making the Paper Shells for Dynamite Cartridges



Mixing Wheels



Packing Dynamite in Boxes



A Large and Well-Protected Storage Magazine

form in every respect. To do this many unique and elaborate types of testing equipment are needed, and each lot of dynamite is required to pass the most exacting tests.

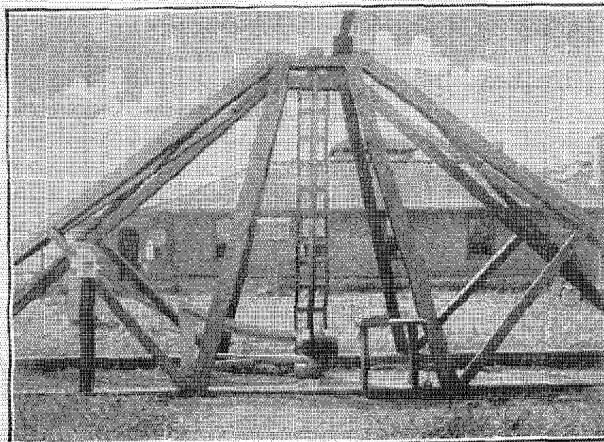
Mineral, vegetable and animal compounds find extensive use in dynamite, and many apparently trivial precautions are exercised in the manufacturing processes. All workmen are required to wear special "powder shoes" that expose no nail or metal parts that might drop off or strike a spark against metal or stone; only wooden and rubber tools are used in handling the finished dynamite; very small lots are handled in a building at one time; housekeeping is perfect, and no dust or trash is allowed to accumulate. So carefully are these rules enforced that the number of accidents on a well-regulated dynamite plant are far less than those on the average up-to-date plants manufacturing other classes of materials that are considered "safe."

Destroying Dynamite

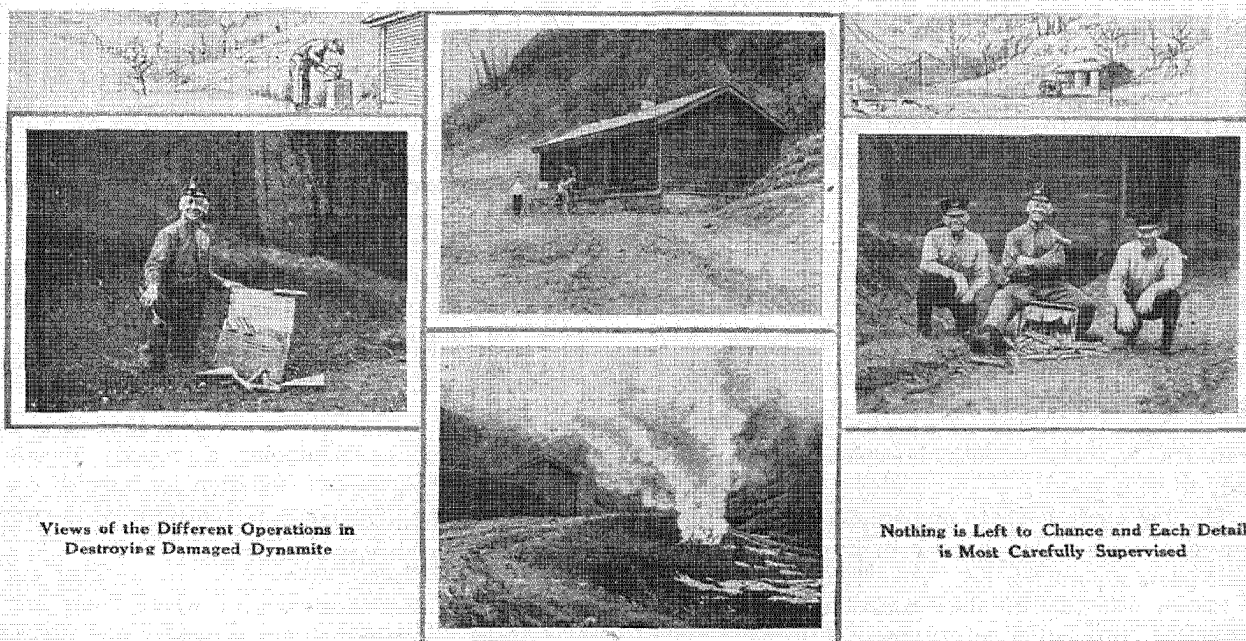
IT was discovered that the contents of an abandoned magazine in Pleasant Valley, near Sharpsburg, Pa., consisted of about twelve tons of various grades of dynamite and other high explosives. Someone connected with these explosives had tried to destroy it a short time before by burning part of it, but portions had exploded with such violence that the work was abandoned as too dangerous, and the neighbors had begun to exhibit a very noticeable fear.

The State police were called out to guard it night and day until some method of disposal could be perfected. The final solution of the vexing question was in turning the job over to Mr. S. C. Jones, a technical expert, who was assigned the task of bringing about the peaceful destruction of the 24,000 pounds of badly damaged explosives.

This was done at the



Ballistic Pendulum Used in Testing Dynamite



Views of the Different Operations in
Destroying Damaged Dynamite

Nothing is Left to Chance and Each Detail
is Most Carefully Supervised

request of the State authorities, which after taking charge of the Pleasant Valley "caches" were at a loss to know what to do with it.

Each box found was carefully opened and examined. In most cases it was possible to destroy the material by dumping it on the ground and saturating the mass with oil and then lighting it by applying the fire in such a manner as to allow sufficient time to get away before the flames actually reached the explosives—a safety precaution.

In some cases chemical treatment had to be used on account of the badly decomposed condition of the dynamite, causing the fire treatment to be too dangerous.

"Handling explosives is like many other things," said Mr. Jones. "The price of safety is vigilance and a thorough knowledge of their whims. Of the latter they have many, and while most of the scientific laws which apply to them are known to a certainty, others are not, and so when I am in doubt I take no chances."

Picking up a handful of dynamite sticks from a case which he had just opened with a wooden wedge and mallet, he continued:

"I might drop these from the top of a building to a stone sidewalk and they would not explode. On the other hand, under another set of conditions, a fall of a short distance would detonate them.

"Here is the dynamite creed," said Mr. Jones.

"Handle me as you would like to be handled and I will be your friend on land or sea. Abuse me and I will try to be as wicked as the kaiser.

"The golden rule applies to dynamite as well as people," he concluded.

The estimated value of the dynamite burned was \$6,000. After it was destroyed the glycerin saturated building was treated with chemicals to render it safe for any other use to which it might be put.

When a Man's a Man

You can learn more about a man in a week in the woods than in a year in the city.

The ideal man may be large or small, weak or strong, but if he is willing nothing else counts.

If he is all in but not a quitter, if he is able to joke when tired and wet, if he will do his share and then some, this is the man you want to go with on your next trip.

When you come in from a hard hike he has the wood cut, a hot meal ready for you, and never kicks as to whose turn it is to get the water or do the cooking.

If you can butt in on him while he is fishing a favorite pool and he will only smile, if he will wash the dishes when he is tired without a kick, if he is always cheerful even when luck is not coming his way—a real chum—hook up with him and stick.

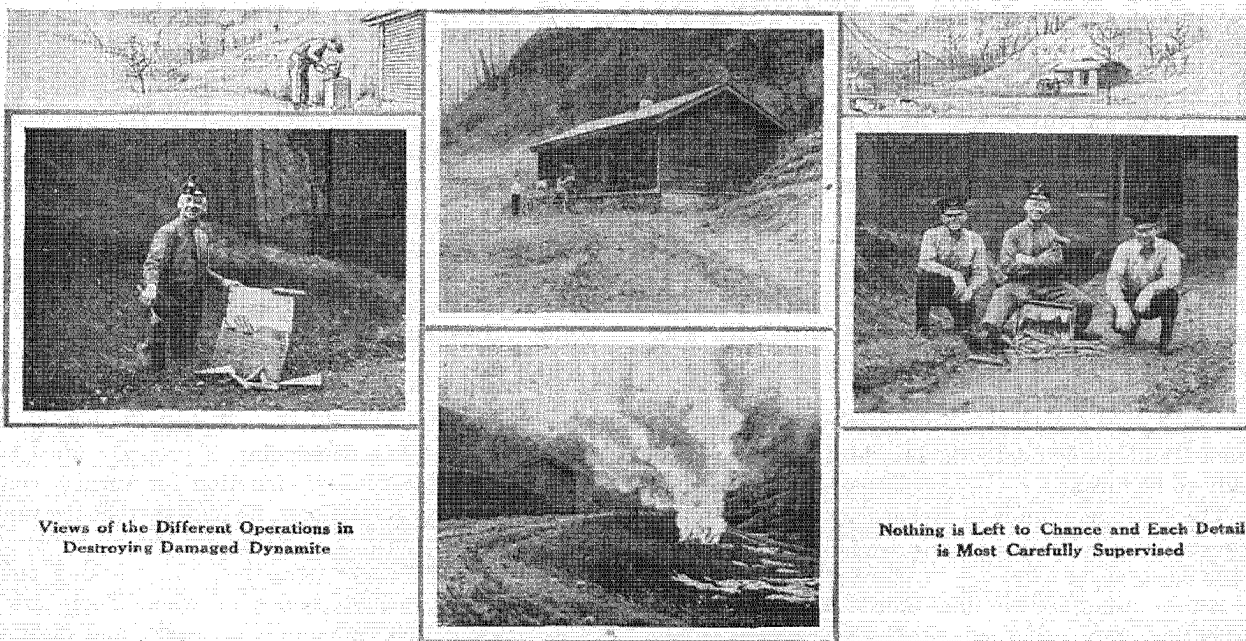
If you are shooting together he does not claim he made all the hits, he will help you get a shot if he is more lucky than you, does not grab the last piece of bacon in the pan, if he is hungry, without asking if you want it.

It does not matter so much if he is not an old-timer if he is willing to learn—in fact, it is just as much fun to teach a bright beginner as to go with an expert.

We know several ideal companions who will always carry a little more than their share, do a little more than they should, are always cheerful, and, believe us, one can have a better time with them on an unsuccessful trip than with others on a good one.—*Outdoor Life*.

Efficient Salesmanship

The question has often been asked "What is an efficient salesman?" and the best answer yet reported is: "An efficient salesman is an Irishman that buys something from a Jew and sells it to a Scotchman at a profit."



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The Finishing and Care of Hardwood Floors

George A. Toussaint

CONTRARY to general supposition, the correct finishing and care of floors is neither a burden nor an endless expense. The beauty of many an interior is greatly lessened through improperly finished or ill-cared-for floors, due to lack of knowledge on the part of the owner. Good materials, common sense and a few simple directions are the only essentials required, with which it is possible for anyone to possess floor surfaces that are in keeping with the rest of the well-regulated home interior.

Let us start from the very beginning—a new floor, scraped and sanded smooth, in which condition it is ready to be finished.

The first operation is to prepare a foundation in the pores of the wood for the finish by filling with a high-grade paste wood filler.

Before using, paste filler must be reduced with turpentine, turpentine substitute or benzine. Eight pounds of filler to the gallon of reducer will answer for average woods. A brush coat of this filler is applied to the floor, and as soon as it "sets," or becomes flat,

wipe off the surplus, rubbing across the grain, and leaving the surface clean. Too much surface must not be coated at one time, otherwise the filler will become too hard for easy rubbing.

Some difference of opinion exists as to the necessity for filling close-grained flooring, such as maple, beech, birch or pine, but using instead a coat of shellac before varnishing.

While this is practical, yet the less shellac that is used on a floor the better. From the economy standpoint, it costs less to fill than it does to shellac, and from the durability standpoint, a properly filled surface is always the best foundation for varnish coats. Therefore, paste fill all floors, no matter what the wood.

Natural, or unstained, floors are the most popular and by far the most attractive. In working out a particular decorative scheme, or where floors are of poor quality, it is sometimes necessary and desirable to stain, in which event the stain is applied before the filler. Where only light shades are desired, such as light antique, dark antique, or golden oak, use a tinted



Applying the Finish

for any other use to which

wood filler, which stains and fills in one operation. For darker shades, use either a penetrating or an acid stain, according to the type of wood and shade desired.

When a floor has been filled and allowed 24 hours to dry, it should be lightly sandpapered and dusted, when it is ready to receive the finish—either floor varnish or wax.

A Varnish Finish

Apply at least two coats of a high-grade floor varnish. Three very thin coats are better than two heavy ones. Lightly sandpaper between coats after allowing 48 hours for drying. Floor varnish will dry sufficiently over night to permit a judicious use of the floor the following morning, but two or three days are required for proper hardening.

Some people prefer a more subdued surface than that of the high-gloss varnish, in which event the final coat can be rubbed with pumice stone and oil.

If the materials have been selected wisely and well, the results will not only be attractive, but durable.

Care of a Varnished Floor

This is the bugaboo of many a possessor—how to keep varnished floors looking "spick and span." The answer is, protect them. A good floor varnish will stand hard wear, but not indefinitely. Again, it must be remembered that this wear is usually confined to certain places, such as the entrance to a room, or the main passageway through different rooms. The natural result is the surface wears away in a few months, affecting the appearance of the entire floor.

Keep the main avenues of traffic protected with rugs, and you will preserve the uniformity of the finish and avoid the necessity of frequent refinishing. A judicious use of rugs will not hide the beauty of floors, inasmuch as the entire surface need not be covered, only the parts that need protection.

Aside from surface protection, the only care a varnished floor requires is a "going-over" occasionally with a damp cloth or dustless mop, which removes the dust and dirt.

Once a month it is advisable to clean the floor with a good floor cleaner, renovator or brightener. This is in addition to the periodical dusting, and serves to brighten up the varnish and removes slight marks of wear. These floor preparations are very simple to use. A cloth moistened with the cleaner and rubbed over

the surface, being sure that no surplus is left on the floor, completes the operation.

After a floor has been varnished at least two weeks, a washing with clear, cold water is beneficial, as it has a tendency to harden the varnish. Do not scrub varnished floors with soap and water. They will resent it in a short while and become dull and dingy.

A Waxed Finish

Over the filled surface, apply three coats of a reliable floor wax, allowing several hours between each coat. Remember this about prepared floor wax: It is a combination of hard, imported wax and soft wax. Both are necessary, of course, but it is the hard wax that gives the durability and polish. Therefore, select your

floor wax judiciously, and make sure there is something on the label confirming the use of a good proportion of hard wax in the preparation.

Wax should be applied in even coats, and there is a little knack in doing it. Here is a suggestion that will help: Take a generous piece of clean cheesecloth, fold twice, then place in the center a piece of wax the size of an egg; fold again and go over the floor. The wax will be forced through the meshes of the cloth onto the floor in just the right proportion to insure an even coating.

In 15 minutes the floor is ready to polish, although if time is not an object, allow 30 minutes for drying. Use a soft cloth, rubbing the floor briskly, which will

bring up the polish. On large surfaces a weighted floor brush is best.

Where a finish with somewhat more body is desired, a very thin coat of half orange and half white shellac may be applied over the filler before waxing.

Care of a Waxed Floor

A waxed floor has many staunch admirers, because of its rich, velvety luster. Keep it rug-protected in the same manner as a varnished floor. It is well to have some means of fastening small rugs, inasmuch as a waxed floor and a small rug are liable to work havoc with the feelings and anatomy of anyone who does not exercise proper caution in his movements. The use of a dustless mop once or twice a week is the only care necessary. Do not attempt to wash a waxed floor.

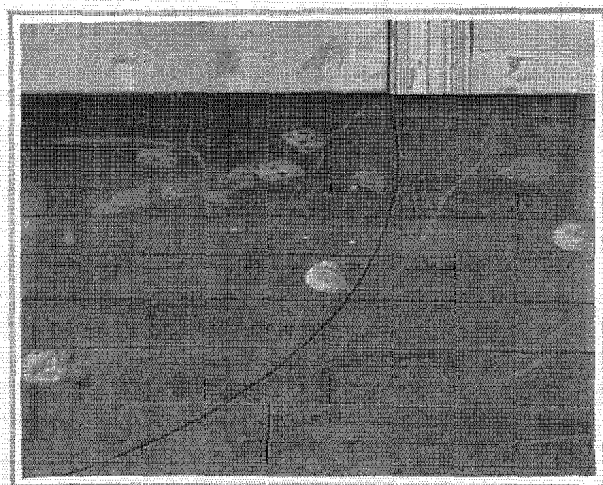
Under ordinary conditions, it is not necessary to re wax a floor more than two or three times a year unless subjected to considerable wear.



Before Finishing Used Floors Must be Carefully Cleaned

Many times a waxed floor that has become somewhat dingy can be revived by simply polishing with a weighted floor brush, thus eliminating a further coat of wax. When rewaxing is necessary, see that the floor is free from dust and apply an additional coat, polishing in the usual manner.

Parts which have become worn can be rewaxed without going over the entire floor. Parts so treated will not show patchy or different from the remainder of the surface.



The Untidy Appearance of an Unkept Floor

Finishing an Old Untreated Floor

Where it is desired to finish an old floor which has

not previously been treated, more care will have to be used in preparing the surface. Have the floor thoroughly scrubbed first, and when dry sandpaper smooth. Old floors will season and dry out, leaving conspicuous cracks, which fill with dust and become very unsanitary. Fill all such cracks with a floor crack filler, packing the crevices full and level off smooth with a putty knife. When dry, sandpaper, and then proceed the same as for new floors.

After all is said and done, the different steps in floor finishing are a smooth, clean surface; paste filling for a proper foundation, and then varnishing or waxing.

Make Friends with a Rifle

John S. Burrows

AN expression frequently heard, when conversation touches on marksmanship, is, "An American is a natural marksman".

To a certain extent that is true. It is one of the traces of the blood of the ancestors, this ability to use a firearm with accuracy and intelligence; but in these later years, with the influx of newer and other bloods, and the centralizing of life in great cities, the ability to shoot a firearm, yes, even the elementary knowledge of one, is lacking in the average American citizen. Here and there a man is found who at some time in his earlier years used to "go hunting," but a very large percentage of citizens, up to the time of the enrollment of the young men in the National Army, never fired a gun of any description.

This seems a sad state of affairs, inasmuch as the foundations of the American people were the hunter's rifle and the pioneer's ax. On that very account it would seem incumbent on the citizens of today to keep alive some knowledge of the two arts covering the use of these two instruments; but, as said before, our modern civilization has been too intense, and we have been afflicted with too many pacifists, who dreaded the thought of a gun, or any kind of a firearm; so one result has been a sentiment which has opposed the possession of even a pistol or revolver by a decent citizen, while the thug without regard to law avails himself of the situation and carries and uses the latest types of small arms. So he becomes efficient and deadly, while the self-respecting and would-be home-defending citizen cannot use a weapon without encountering a municipal statute or a local sentiment.

The whole situation is wrong, and one of the fruits is the lack of knowledge of firearms to the extent that

the "didn't know it was loaded" excuse is the last word after a fatal or damaging accident. Had the person mishandling the weapon known how to handle one, the accident probably never would have occurred.

For these reasons it is most desirable that every citizen of this country, man and woman, should know how to handle a firearm of any character, from the point of taking-down to assembling; and knowing how to clean and keep it. The more familiar one becomes with a firearm, the more one respects it, and recognizes its dangerous possibilities. And yet, a firearm can be as safe as a pair of scissors or a flat-iron, if it is understood.

Since the creation of firearms many and wonderful changes have occurred. The study of the evolution of arms, which has produced such a weapon as the United States Magazine Rifle, from the almost prehistoric "hand-cannon," is interesting and romantic. To think that the wonderful automatic pistols of the present are direct descendants of the mediæval "dags" is like the changes told in the fairy stories. To know more about the present form of firearms, and as much as possible about the former ones, should be a part of the general education of an American citizen, if this country is to keep its place in the world to which it is aspiring. Indeed, if the use of firearms was a part of the curriculum of educational institutions of the higher class for both men and women, valuable instruction would be imparted in psychology, hygiene, self-control; and the valuable traits desirable in human life would be developed.

Facilities for the use of the smaller calibred arms are common in all large cities, and would be more if there should be more local interest developed. Almost

every basement of the homes of the citizens could afford a short range where practice in the use of a rifle and pistol, which would fill up many dull evenings, and develop a keener eyesight, a steadier hand, a better controlled body; all conducive to good health and insuring peaceful rest that night. The fact that a householder was accustomed to the use of the pistol might become so spread that the crackman would avoid

Honey Uses in the Home

The sweetening qualities of honey as a substitute for sugar in foods is discussed in Farmers' Bulletin 653, issued by the Department of Agriculture. The food value, flavor, wholesomeness, and economical uses of honey are thoroughly discussed. The quantities to be used when honey is to take the place of sugar are practically the same, except that a cup full of honey carries

[illegible]

An Excellent Type of Card for Keeping a Record of Shooting when Studying Conditions and Scores Carefully

that house, for fear of his life, even though he did not fear the patrolman.

But the pleasure and stimulus of the indoor range is nothing compared to the enjoyment of the range in the field. There, under a pleasant sky flecked with passing clouds; where grasses and flowers give a fragrance to the breeze; where the warm and breathing earth is a comfortable couch, and where the smiling face of the target, with its one black eye, invites to try your skill with the long-range rifle, the delights of outdoors seem to be focused in full force.

Then and there is the time to become chummy with the rifle. Coax it by careful adjustment of the sight to the required range and wind; hold it caressingly with the fingers, while gripping it close to the shoulder and cheek with the hands: finger the trigger with a delicacy of touch that rivals the skill of the jeweler, and the result is a combination of conditions pleasing and promising.

With a clear eye, free lungs, an uncongested stomach and a mind at peace with all the world, the friendship of the human being with the graceful rifle is one that has no equal between animate and inanimate beings; and when the rifle is fed with well-made ammunition, it will speak with a positiveness of sound and action that will gratify in its effectiveness, and cause dismay to pass the face of the Cyclopean target.

Make friends with a rifle.

about one-fifth water, so that much less liquid should be used in mixtures.

This bulletin also has recipes for bran, brown bread, steamed brown bread, honey bread, honey and nut bran muffins, all of which are made without wheat flour. Recipes for a number of honey desserts and candies are given, as well as directions for using honey in preserving.

Digging Pole Holes With Dynamite

THE digging of pole holes with dynamite is a comparatively new practice, but it is fast supplanting the old-fashioned, tedious and costly hand work. This new method has been found to be so practical and economical that it is fast being adopted by companies and contractors in this line of work.

When dynamite is used, a smaller number of laborers is required, and in these days of labor shortage, this fact is most pertinent. Another advantage not to be overlooked, in connection with the use of dynamite and hand digging, is that the force of the explosion tends to pack the dirt (if wet) solidly around the walls of the hole, making a much firmer hole than possible to do by hand digging. In hard digging, where hand work is employed, the tendency is to make the holes shallow, which is quite natural, but in using explosives this danger is completely eliminated.

Leather Substitutes in Use

THE reasons for the immense diversity of uses for leather substitutes lie in the three dominating characteristics of these materials: appearance, durability and impermeability.

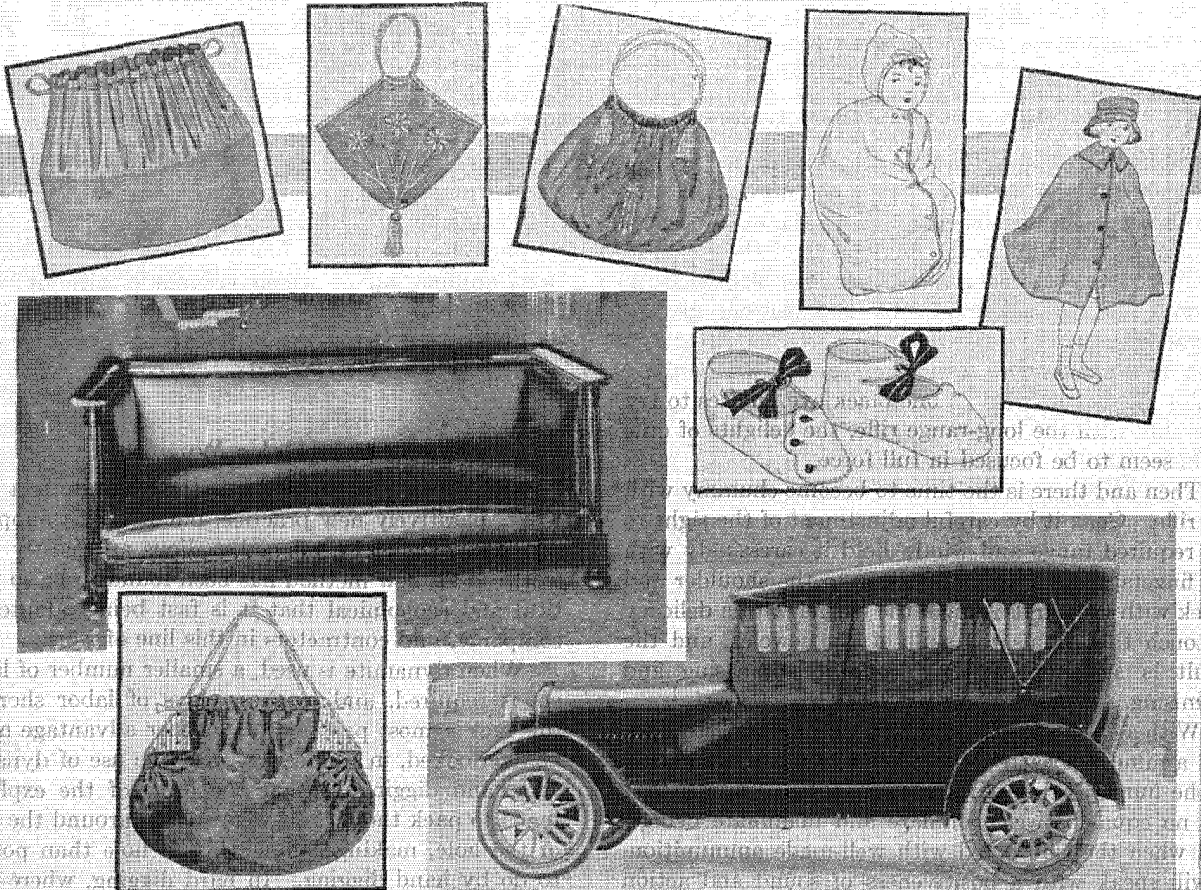
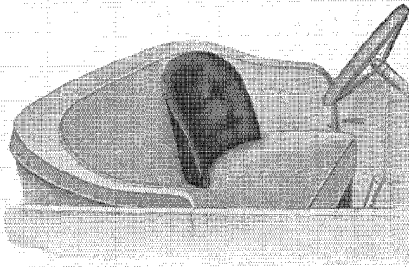
The appearance of any surface, whether flat or embossed, can be imitated perfectly by leather substitutes as to all elements of color, grain and finish. An infinite variety of pleasing effects is obtainable with standard materials, and where something entirely special is needed it is possible to produce it by comparatively simple adjustments during the process of manufacture of the leather substitute to be used. The sheen or lustre of the finished material can be varied through all gradations from very dull to very bright.

Leather substitutes can be and are made to stand almost any possible service requirement as to tensile strength, toughness and wear resistance. They vary in texture from very light-weight sheetings to the heaviest cotton goods, and special weaves are always possible for special requirements. The surface coating can also be varied in the number and thickness of applications,

so as to leave a very fine or very heavy protective film, or a film of any necessary degree of hardness or pliability.

On the impermeability of leather substitutes depends their utility for innumerable uses where a water-proof, grease-proof, sanitary and washable fabric is required. Any high-grade leather substitute is absolutely impervious to water, mineral oils and greases, dust and practically every foreign substance likely to come in contact with it in every-day use. It can be washed and thoroughly cleaned with soap and water. Pyroxylin coated leather substitutes are also mould and mildew-proof, unaffected by changes of climate and temperature and immune to germ and insect attacks.

It is not surprising therefore to find milady's knitting bag made of a light-weight leather substitute in just the shade to harmonize with her dress. Nor is it surprising that Uncle Sam is using heavier leather substitutes for upholstery on all his ships, wartrucks, ambulances and aeroplanes. These materials are affording relief from the shortage of leather and from the inferior service qualities of other materials which they replace.



Some of the Many Uses of Fabrikoid

Self-Expectation

by Leigh Mitchell Hodges

YOU expect the person you hire to do certain work and achieve certain results. If your expectations are reasonable, and this person knows their extent, they serve as a spur to satisfactory performance.

If you expect much you will get more than if you expect little. The mental attitude is as contagious as mumps. And the confidence implied by your expectation has a positive compelling power.

"England expects every man to do his duty," was Nelson's message before the battle of Trafalgar. The world knows what happened. And the world knows how different the result might have been if the great admiral had said, "England looks for little this day."

Doubt always chills the desire to do well. By the same sign, dependence encourages.

Every business man and every housewife knows the truth of this—or should.

And all of us should apply this truth inwardly.

How much do you expect of yourself?

This is a big, vital question. Perhaps half our failures are caused by expecting too little of self. This leads to demanding too little of self; to excusing self too much. It lessens confidence in self and weakens initiative.

As a man expecteth, so shall he achieve.

"I myself am good fortune," shouted old Walt Whitman, of Camden, down the halls of Time.

"I will demand more of myself than of anyone else," says the wise man or woman who has a goal and the will to gain it.

But—"I can do so little," "My ability is so limited," "If I only had so-and-so's brain"—these and others like them constantly are standing in the way of what we might expect—and obtain—from self.

Suppose little Belgium had offered no resistance to the Teuton tides on the ground that she was too small to hinder such a giant! Where would France and freedom be today?

Expect much of yourself. Ask—of yourself—and ye shall receive—from yourself.

This means you must dare. It means you must be willing to take chances. Above all, it means you must depend less on others and more on self. Otherwise you join the human tacks that keep puncturing the tires of progress.

With a right measure of self-expectation these might be sitting at the steering wheels heading up and on.

Are YOU in the dust or driving?



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Leigh Mitchell Hodges
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The Bobwhite's Friend

Joseph Kalbfus, Secretary Pennsylvania Game Commission

DURING the session of our last Legislature a bill was introduced through which it was proposed to take our Virginia partridge, otherwise known as Bobwhite or Quail, from our list of game birds in Pennsylvania and give it perpetual protection as a song or insectivorous bird.

The sportsmen of this State, including members of the Game Commission, opposed this proposition and contended that for various reasons this should not be done. First, that the quail was not migratory as were the majority of our song and insectivorous birds; that they remained with us during the winter time, and were compelled, therefore, to meet the rigors of the northern winter during which time they needed friends. We contended that the presence of game of various kinds was the incentive to hunting, and that hunting was a national necessity through which those engaged in its pleasure secured a better understanding of our country's flora, her fauna, her topography, her streams and mineral wealth, and her people, than could be secured in any other way, and aside from better health, and, therefore, better citizenship; secured through hunting a training in the use of guns, in the ability to camp, and to go as necessity required by day or by night through our forests or over waters that fitted each one the more readily through drill and discipline to become our competent defender in time of war; just such conditions as we are called upon to face today.

We contended that sportsmen were not destroyers, but instead were our only true conservators and were Nature's Noblemen, willing to divide with their fellow sportsmen, and ready at all times to make sacrifices in behalf of our wild life. We asserted that there were few in this State,

at least unless they were sportsmen, who had ever contributed one cent of their money or one minute of their time in helping to get laws upon our books, securing to either game or wild birds that protection absolutely necessary to their existence, and that individuals were scarce indeed, unless they were sportsmen, who, when winter came and birds, especially quail, needed friends and food, would face the storms to locate Bob and his little family and place food day after day as the storms came, and that if this interest of sportsmen was taken from the quail as would be done by this Act, then indeed would the winter be at hand for them and their end be in sight.

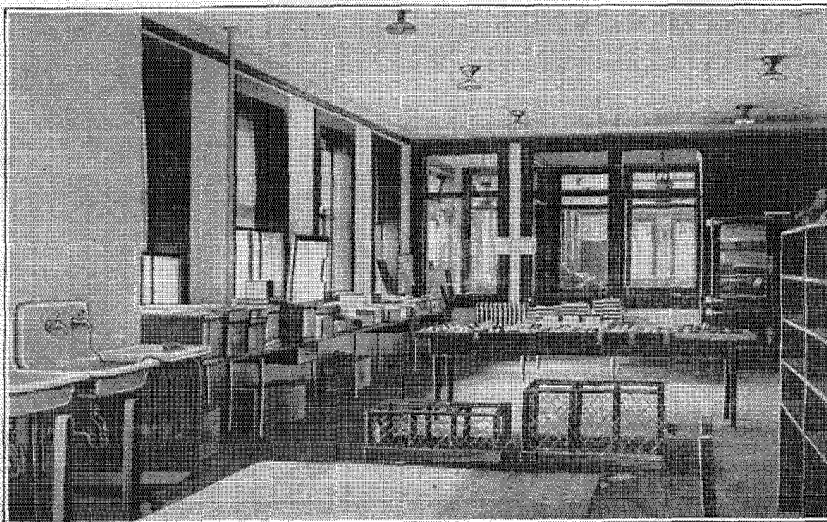
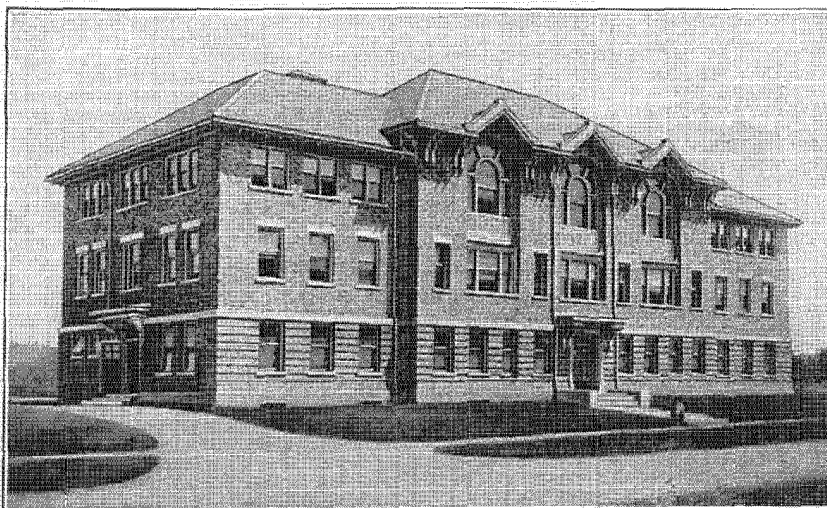
We contended that there were but few in this State, who, unless they were sportsmen, had in the past or would in the future go down in their pockets to buy quail to be released for propagating purposes,

as has been done by hundreds of sportsmen in this Commonwealth.

We contended that through the shooting off of a certain number of quail in each covey, better results were secured than could be attained through permitting the bunch to run together year after year. Personal observation extending through a period of many years, together with data collected from many directions, satisfies us that when a large number of quail are permitted to run together, two or more of the hen birds will lay their eggs in one nest; the cock birds fight over them and no hatching results.

Our opponents asserted that all this was nonsense, that hunting was a waste of time, and was engaged in only by loafers and bums; that no benefit was secured by any one through this waste; that hunters were upsetting the balance of Nature and should be suppressed; that the farmer was the true friend of our wild life, that he fed the game (meaning thereby, I presume, that he did not waste time in an attempt to drive the game off his premises), and that, therefore, the game belonged to the landowner upon whose property it might be found and do with it as he chose.

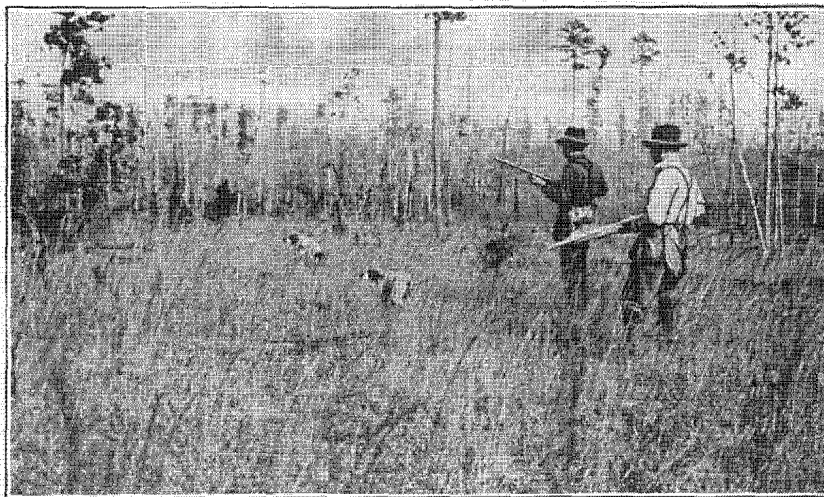
Well, the battle was fought and the bill to give quail perpetual protection in this State failed to become law. Our sportsmen were encouraged to befriend the birds as they had been in the habit of doing. The summer of 1917 passed and the winter came, with the deepest snows and most continued cold weather in the memory of our oldest inhabitants. Our quail needed friends badly and the Game Commission through its officers, the sportsmen through organization and as individuals, together with the Boy Scouts in almost every part of this Commonwealth,



Building and Laboratory at Cornell University Where Game Protection is Studied and Taught

got on the job. Corn on the cob for the wild turkeys, smaller grain for our grouse and quail, were placed and replaced as necessity demanded, with the result that thousands of our turkeys have been saved and tens of thousands of our quail preserved that must surely have perished without this help. Our turkeys and grouse and quail have been brought through the winter in a strength that will guarantee reproduction early and to the limit. This is no

guesswork upon our part. We are now receiving from our Game Protectors detailed reports of the work done in this direction. The name of the man with his home address who fed the covey of quail or took care of a bunch of turkeys being given, the number of birds he started to feed, the number remaining when the snows had gone, and the reason in his opinion why various birds were lost. These reports, when compiled, I am sure will make very interesting reading, and



For the Preservation of Field Shooting as a Sport the Greatest Care Must be Given All Types of Game

satisfy many who perhaps before doubted what sportsmen were really doing.

All this has been done by sportsmen through the use of moneys paid into our fund under the provisions of the Hunters' Licenses Acts, both resident and non-resident. The ordinary taxpayer has not contributed one farthing for this purpose or to any purpose connected with our work. Even the farmer, the one who derives the most value from the live work of birds, has not contributed one cent to

help his best friends, unless he chose to secure a resident hunters' license, as the one under our law who lives upon and cultivates land is permitted to hunt upon that land and lands adjacent thereto without securing a license.

In many sections of our State where, for various reasons, quail were not fed and cared for, they were starved and are gone, and the call of Bobwhite will not be heard for years to come, if ever again, a condition to be

deplored and sad indeed, as compared with conditions existing in sections where sportsmen were found, but illustrating beyond question the value of work and a true understanding of conditions as compared with theory and professions. We are proud of our work and of the sportsmen in this Commonwealth.

The excellent work so well begun in the rearing and protecting of certain game and insectivorous birds should be enlarged and increased until it is both law and habit



A Most Remarkable Picture of Shooting. Miss Mary Chambers, of Kansas, making a Double on White Tailed Jack Rabbits

Vermont Volunteer Militia

WHEN the National Guard was sworn in for Government service most states were left without any organized protection against local disorders or disturbances. Vermont was one of the first states to meet this emergency by organizing promptly a Volunteer Militia on a military basis which allows for indefinite expansion should the need arise.

The First Regiment comprises twelve companies of approximately fifty men each. They are distributed as follows: Co. A, Bennington; Co. B, Rutland; Co. C, Brandon; Co. D, Vergennes; Co. E, St. Albans; Co. F, Morrisville; Co. G, St. Johnsbury; Co. H, Newport; Co. I, Montpelier; Co. K, Bradford; Co. L, Springfield, and Co. M, Bellows Falls.

The men have uniforms and drill regularly each week. Strict military discipline is maintained. On short notice any part or all of the militia can be rushed to any point in the state where their services may be needed.

In order to enable the militia to become proficient in the general use of firearms, and of riot guns in particular, an expert trap has been installed for each company and the men receive regularly instruction in trapshooting. The instruction was first along the "safety first" idea, coaching both officers and men individually as to the proper method of loading, handling, aiming and firing a gun. While proficiency in trapshooting is not the prime object of the regiment, yet the element of sport tends to increase their company spirit and to

interest the men in the gun itself. And the more familiar they are with guns, the more effective they will be if called into service.

When they started, about 95% of the men knew nothing at all about trapshooting. That the average for the men of all twelve companies for the first day's shooting was better than 36% certainly is a credit to the work of the Inspector of Small Arms Practice, Captain Geo. B. Walton, who acted as instructor and who has been active in developing this feature of the work.

Two from each company were detailed to attend in uniform the Vermont State Shoot at Morrisville on July 17-18 and to shoot through the program. The benefit of the experience gained by these officers and men at the tournament was passed along to the other men on their return. Furthermore, everyone who attended the State Shoot was impressed with this evidence of the activity and progressiveness of the Vermont Volunteer Militia.

The Hun Invades Nursery Rime

There was a little Hun,
And he had a little gun,
And his bullets were all dumdum, dumdum;
He shinned up a tree
To snipe what he could see,
But now he is in kingdom come-come-come!

R. M. Eassie, "Odes to Trifles."

Removing a Robber

NEAR the middle of a garden there stood a large pear tree whose roots extended about in all directions to the detriment of preparing and cultivating the soil and of handling the crops. This tree absorbed considerable moisture to the injury of the growing crops, and during last summer leaf blight affected the tree so badly that it was cut down to prevent the spread of the disease to young trees.

The stump was left in the ground until after the garden had all been gathered, when it was decided to remove it. Using an inch and a half crowbar a hole was made, the bottom of which extended well below the crown of the stump. Into this was loaded two sticks of 20% dynamite.

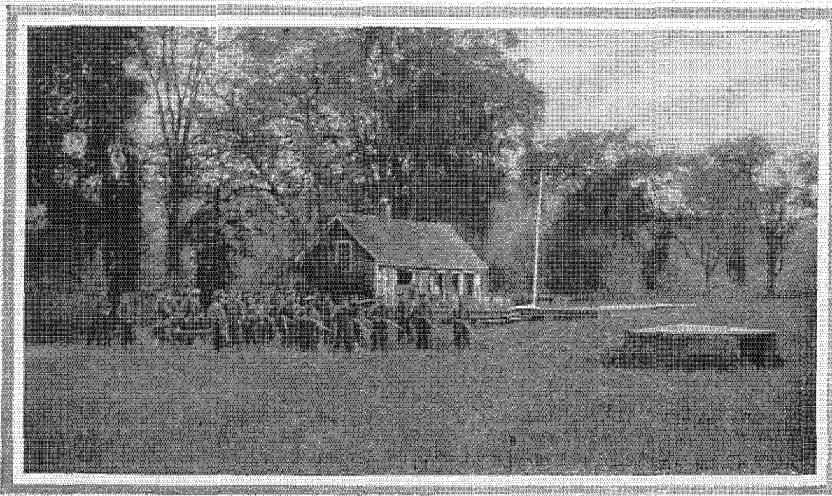
This stump was quite near the house, so a number of heavy burlap sacks were sewed together and the stump and ground for a short distance around it were covered with several thicknesses, placing leafy branches on next and weighing both down with a few small logs. The light charge used did the work and did it well, loosening and splitting the stump so that it was removed with but little trouble.

No additional growth of crop was expected the next year and the stump had been almost forgotten, until from the first it was noticed the vegetables grew much better near and where the shot had been made than in other places of the garden, and throughout the season the growth was greener and more plentiful while the plants stood the drought better.

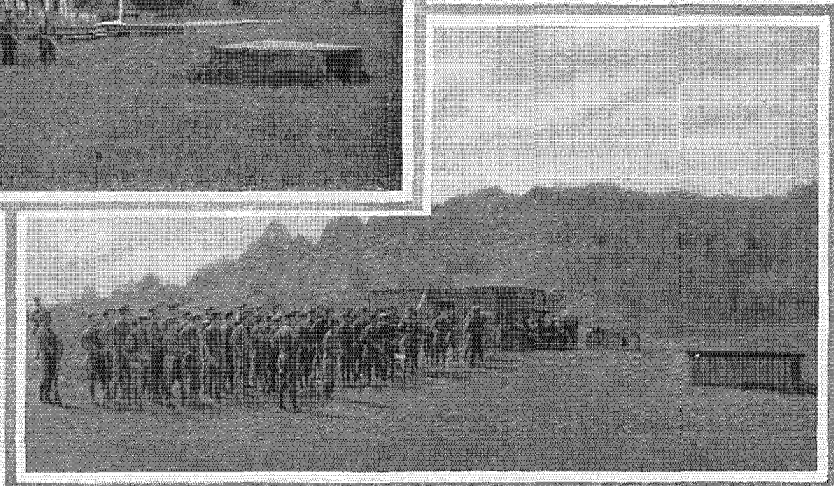
The soil was underlaid with hardpan and the dynamite shattered it sufficiently to allow the plants to obtain more moisture and gave better drainage. The results from shooting out this stump show the value of subsoiling where there is hardpan, especially if it is close to the surface.—*J. R. Lucas.*

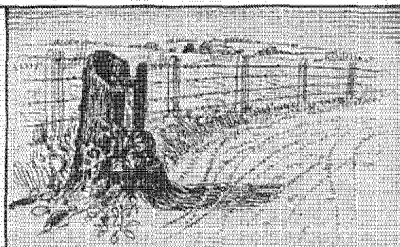
HE—"I feel like thirty cents."

SHE—"How things have gone up since the war."—*Purple Cow.*



Company I, Montpelier, and Company L, Springfield, being trained in the use of the shotgun.





A Youthful Road Builder

THE accompanying pictures show the small son of a farmer who resides on the gravel road that is now being constructed near Brookhaven, Mississippi, learning how to get rid of stumps.

The stump in the first picture is at the side of the road on top of a bank that is about six feet high. It is of the long leaf pine variety and has a "bad" tap root. The soil is sandy loam. The contractors have just started the grading for the new road. The specifications call for a wider road than the old one. To get this additional width, several methods were tried. The one in use at first was by plowing down the bank and then using scrapers to carry the dirt up to the center of the road.

On account of the high steep bank, this plowing was very hard on the four mules pulling the plow and it was noticed that a valuable mule team was being badly scratched and that the work was going very slowly. Along this bank there were occasional stumps. A dynamite expert was called to the job to give the contractor some advice as to getting rid of these stumps and also to devise a better means for loosening the bank for the scrapers.

The illustrations show a medium sized pine stump right at the edge of the grade line. This stump was loaded with two cartridges of 20% dynamite or one pound. Two holes were made down the sides of the tap root and one cartridge placed in each hole, and the two charges fired at the same time with the electric blasting machine shown in the second picture. Our small friend asked to be allowed to

fire the shot and the picture shows him in the act.

The third picture shows the same stump blown entirely out and just down the bank into the old road, where it was shortly afterwards loaded into a wagon belonging to the boy's father and taken to the house for wood. In blowing the stump the bank, for about a radius of four feet around the stump, was thoroughly loosened to the depth of the grade and will require no plowing. This stump was loaded accurately and was just turned down the bank without any large report or waste of powder. The boy's father stated that he intended to blow every one of his stumps in the adjoining field and the road contractor became an ardent advocate of the use of explosives.

Before this shot, this boy's father had refused to blast his stumps, saying it cost too much, judging from the way the road men had been loading. When he saw the proper loading, he found that the method was not expensive and determined to blast his stumps out and at the same time get a winter's supply of fine fat pine wood.—Guy G. Means.

A woman's heart is a suppressed newspaper which circulates secretly.

A Demonstration of Modern Methods of Road Building Being Closely Studied by a Road Enthusiast and Future Builder

Reclaiming Waste Land

THERE are many ways by which this reclaiming can be done. Much depends, of course, upon the nature of the land, whether it requires a small or a large amount of work.

Where erosion to a small extent is present, reclaiming may be done by a small amount of hand labor, or hand labor and team work combined. The ordinary road scoop or drag is largely used for moving the earth to the gullies after it has first been loosened by a large turn plow.

If the gullies are five or more feet in depth, dynamite properly used will greatly aid in the work. The charges should be placed from 4 to 6 feet apart and from 1 to 6 feet from the edges of the bank and placed to a depth within two feet of the entire depth of bank. A 1½-inch auger with 3 feet extension handle is used for drilling the holes. A slow acting dynamite is best for this class of work. They are cheaper than the higher priced explosives and do better work.

Electrical firing is cheaper because the firing of several charges at the same time gives better results.

Gullies and washouts cannot be completely filled by blasting as some imagine, but much earth can be shot into them



A Good Example of Gullying in Advanced Stage. This Waste of Land can be Stopped

from the edges and what is not rolled down from the steep banks is so loosened that it is then easily moved by hand or by team work. Sometime ago I blasted a large gully about 12 feet deep, using the electrical firing by placing charges on both sides.

After the blast two hands shoveled dirt about three minutes and a team was driven across and the scooping was started and done with much greater progress and ease on men and teams.

Many fields that have been abandoned on account of careless and indifferent farming can be brought back to a profitable state of cultivation, or for pasture land by a reasonable amount of labor and a little capital.

Continual increasing population, high land values, and high prices for practically all kinds of farm produce demand that these waste acres be converted into more profitable ones. By the aid of modern things, such as dynamite, electricity and others, why should it not be done now?—*A. H. Harris.*

Spoken English

Co-ed—I want to get a skirt.

Clerk—How long do you want it?

Co-ed—I don't want to rent it; I want to buy it.

A Pussy-Footer

Little Joey Jesso was entertaining his sister's nervous admirer, and, after making his usual juvenile remarks on marbles and tops, he suddenly announced:

"Ethel told Ma, yesterday, you was a born politician."

The young man was delighted, and wishing to know more, asked:

"That so? Why does she think that?"

"That's just what Ma wanted to know, and Ethel said it's because you can do so much talking without committin' yourself."—*London Answers.*



This slow, tedious detail of battering down a concrete wall by hand with high-priced labor could have been avoided by the use of a few small charges of dynamite. Any danger to adjoining buildings can be avoided by careful loading and the use of blasting mats or timbers.

The Great Wall of China

An examination of the bricks and mortar in the Great Wall of China was recently made at Shanhaikwan by Mr. J. C. Witt, a chemist attached to the Bureau of Science, Manila. Mr. Witt reports that the bricks are so weak that pieces may be easily broken off with the fingers. They are much larger than ordinary building bricks, gray in color, and resemble pumice somewhat in structure. The mortar, which is pure white under the exposed surface, is much stronger than the bricks. The tradition that the bricks were dried in the sun only was confirmed by laboratory tests. If they had been dried in a kiln the appearance of the wall would have been considerably different and its strength and durability would have been much greater. The general appearance and analysis of the mortar indicate that no sand was mixed with the lime.—*Scientific American*.

Keeping Up the Game

"Smith is a great golf bug, isn't he?" said Brown.

"Yes," replied Jones. "He kept his hand in all winter and had practice every day."

"But how could he practice in winter when the links are closed?" asked Brown.

"We walked downtown every morning, and every two hundred yards he would swing at an imaginary ball with his cane," replied Jones. "Then he would cuss a blue streak and when he got downtown he would drink a Scotch high-ball."—*Milwaukee Sentinel*.

A Protective Policy

A colored recruit said he intended to take out the full limit of Government insurance, \$10,000. On being told by a fellow soldier that he would be foolish to pay on so much when he was likely to be shot in the trenches, he replied: "Huh! I reckon I knows what I's doin'. You-all don't s'pose Uncle Sam is gwine to put a \$10,000 man in the first-line trenches, do you?"—*Boston Transcript*.

Accommodating Stone

It is interesting to know that there is one place on earth where explosives in getting out stone and laying foundations for buildings are not only unnecessary, but where their use would be positively disastrous. In the islands of Bermuda, beloved of Mark Twain, where all the builder has to do to obtain stone for a house is to go to a quarry, anywhere on the islands, and saw out the slabs of the soft, creamy limestone of which these favored islands are built, in convenient sized blocks, like cakes of ice. The limestone cuts almost like cheese, and is quite soft and crumbly, but after being piled up and exposed to the air it becomes hard and flint-like, and is then ready to be used in building. The houses built of this stone last for many years.

It is positively uncanny to watch the workers sawing this stone out of the ground. The black men look blacker than ever among their white surroundings, which may be one of the reasons they so strenuously object to being photographed. If they see a camera they immediately lay down their tools and retire.

All the islands of Bermuda, and there are a great many of them, big and little, are of coral formation, and all the houses on the islands are built of this native limestone, quarried in this way. A stone quarry can be started almost anywhere, even in the backyard of the lot where one proposes to build.

Blasting Hole for Septic Tank

By Ben S. Mooney, Ga.

A year or two ago the city of Statesboro, Georgia, decided to put in a large septic tank. The location for this tank was on clay ground which was very wet and sometimes covered with water. The ground was in this condition when the contractors found themselves forced to put in the tank in a very few days and with a limited labor supply. The greatest difficulty was to get the hole for the tank. This hole had to be thirty-two feet in diameter and twenty-two feet deep.

In blasting out this hole the following system of loading was used: A circle thirty-two feet in diameter was marked off. In the center a three-inch hole was drilled to a depth of ten feet, into this was placed thirty pounds of 100% gelatin dynamite primed with an electric blasting cap. Around the center hole were placed three circles of holes four feet apart, the outer circle coming to within four feet of the outside of the hole laid out. Into these outside holes were loaded ten sticks each of 60% straight nitroglycerin dynamite. The inner circle holes were six feet deep and those in the outer circle about four feet deep. The total number of holes was thirty, each being primed with an electric blasting cap. The whole charge was fired with a thirty-shot blasting machine.

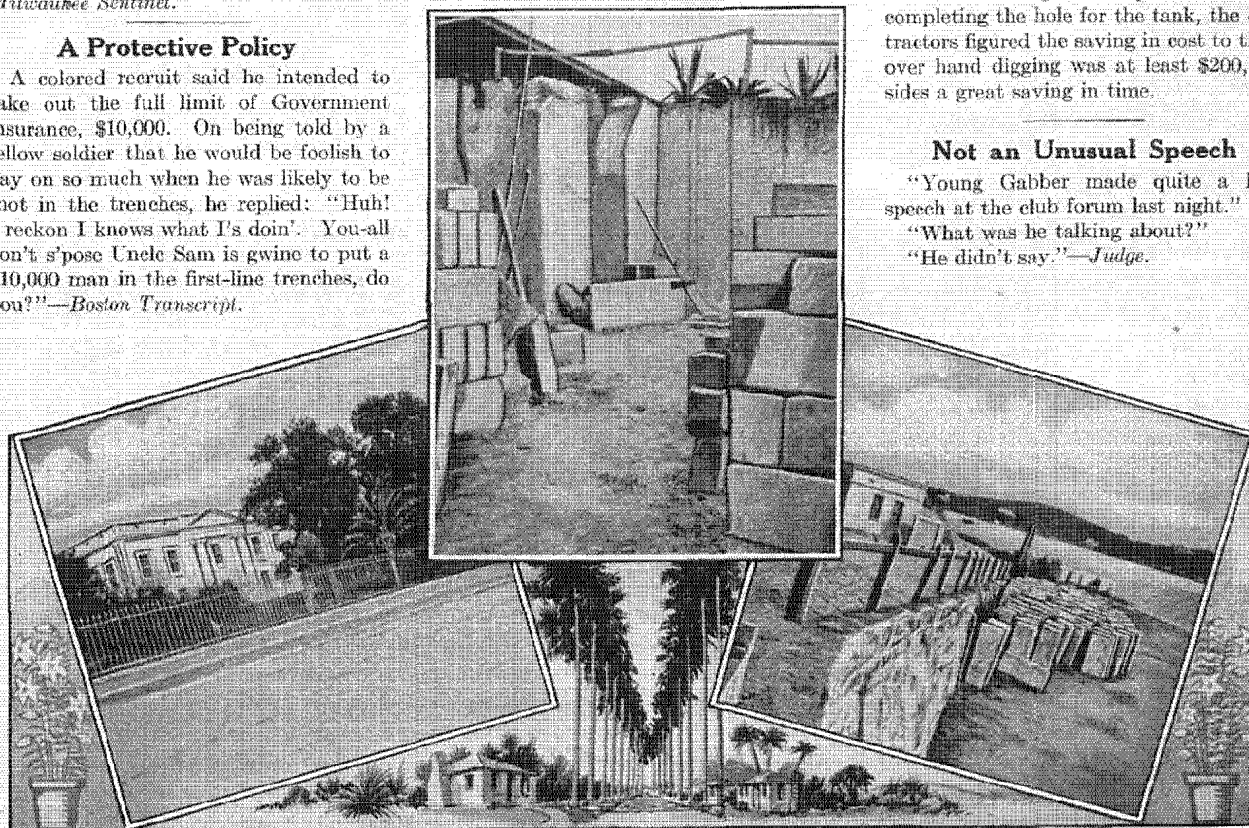
The result of the shot was a hole thirty-two feet in diameter and about eleven feet deep. The bottom of the hole was loosened to a much greater depth. While not completing the hole for the tank, the contractors figured the saving in cost to them over hand digging was at least \$200, besides a great saving in time.

Not an Unusual Speech

"Young Gabber made quite a long speech at the club forum last night."

"What was he talking about?"

"He didn't say."—*Judge*.

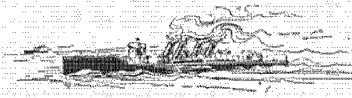


Quarrying and Ageing the Stone and a House Built After the Stone Had Hardened



Our Honor Roll

5736 Strong



Following is a list of employees of Du Pont American Industries who have entered the Army and Navy in the defense of Democracy. 4889 names have already been reported; this list includes 852 names; there have been 5 additional rejections, leaving a total of 5736. The Du Pont Company and their fellow employees are glad to honor them. On their return to civil life, after their duties as soldiers have been performed, a hearty welcome will await them, and every effort will be made to place them in as good or better positions than they have left.

"Over the top with the best of luck—and give them Hell."

SALARY ROLL

Bridgeport Works PAINT AND WOOD FINISH- ING PRODUCTS

Bailey, Otto
Chambers, George
Cless, George
Hallock, W. M.
Hoppen, C. R.
Mygatt, Andrew
Smith, Edgar
Stack, T. M., Jr.
Tynan, John

Deepwater Point COAL-TAR DISTILLERY

Horton, Jas. S.
Trutt, Richard S.
Wahl, J. J.

Sales Department
Bennet, L. A.
Bostick, H. G.
Burnstead, Dale
Byrnes, S. J.
Caulk, C. L.
Cogan, W. M.
Davis, Guy V.
Friend, R. A.
Gallagher, Leo
Harrington, Benjamin R.
Hill, W. J.
Hopper, J. G.
Kolseth, Hilmer
MacDonald, John J.
Murray, Frank A.
Parham, K. W.
Pulsifer, Chas. C.
Reimringer, Edw. M.
Richards, R. C., Jr.
Strough, E. T.
Susser, S. S.
Watson, S. L. R.
Walpi, J. M.

Explosives Manufacturing Department

Shields, William B.

Development Department PROTECTION

Furness, John S.

Experimental Station

Hock, H. W.
Walsh, John J.

Arlington Works PY-RA-LIN

Kruger, William
Marta, Harvey S.
Smith, Sidney
Stevens, W. A., Jr.
Welch, F. P.

Miscellaneous Manufac- turing Department

DYE WORKS

MacMullin, Robert B.

Harrison Works PAINTS AND CHEMICALS

McGonigle, J. B.

Carney's Point SMOKELESS POWDER

Brown, Arlie D.
Ewell, Nathaniel M.
Pay, D. E.
Gill, Chas. C.
Gosley, John W.
Hudson, L. P.
Krustel, F. W.
Landis, Howard K.
Mercer, Winifred S.
Steers, Alfred E.
Stiles, Edwin P.

Hopewell GUN COTTON PLANT

Anderson, Raymond D.
Cooper, Roy
Graves, Kenneth B.
Hailey, Wert H.

Heatherly, George
Jamison, George W.
Morgau, Marion A.
Oliver, Henry E.
Pendleton, Virginius T.
Steele, William I.
Thompson, Clovis
Walker, Cyril L.

Della Laboratory

Cowgill, C. P.
Pickering, H. B.
Reid, G. B.

Engineering Department
Berry, Walter L.
Graves, Cecil C.
Harris, Earl C.
Harris, Samuel C.
Koser, Edmund J.
Nixon, William A.
Roberts, E. Wesley
Showmann, Donald C.
Watts, Theodore F.
Witherington, Aubrey M.

Accounting Department

Gerstenberg, John

**Parlin
SMOKELESS POWDER
PLANT**
Babbitt, Walter H.

Eastern Laboratory

Seaton, S. G.

PAY ROLL

Arlington Works PY-RA-LIN

Allen, Stanley
Amon, Frank
Anderson, Pete
Apel, Fred C.
Berghaan, Abraham
Bocket, William
Canova, Anthony
Caparo, Carlo
Caputi, Anthony
Cardinoli, Rossi
Connolly, Martin
Coyne, Edward
Dicato, Charles
DiCraic, Luciano
Dobkoki, Alex.
Doolittle, Howard
Endersley, Thomas
Ermy, Edward Emi
Foster, James
Frauma, Frank
Frasallo, Domonick
Gagliardi, Jerry
Garrippo, Gianni
Greco, Tony
Griffin, Frank
Gross, Charles
Gustafson, Ivan
Gwigio, Ross
Hagan, Frank E.
Hall, George
Harris, Grover Cleveland
Hart, John
Hedding, Harry
Johnson, Carl C. J.
Jordan, Arthur
Jordan, Howard
Kaukiskas, Frank
Kelly, John
Kelly, Thomas James
Kibbero, Umberto
Kussinski, Peter
Korejino, John
Lackey, James
Larsen, Nels
Martin, Paul
Morose, Donato
Morrison, Irving
Muggeroso, Philip
Murray, William
Nolan, William
Patterson, Hugh
Petrick, Paul
Powell, Raymond C.

Rinn, Thos.
Rossi, Mossino
Ryerson, Clarence
Selvage, Frank Jos.
Sergess, James
Sawyer, Willard G.
Semma, Tony
Strakes, Henry
Stuona, Engelo
Szat, Tony
Wanaski, James
Ward, Samuel
Zielinsky, Sigmunt

**Carney's Point
SMOKELESS POWDER
PLANT**
Almed, Harush
Alston, Thomas J.
Andrae, Harry
Augustin, Guiseppe

Crawford, W. G.
Dalbow, Howard P.
Davidson, Russell
DeEgidio, Alfonso
Denton, Daniel
Donahue, Leroy R.
Drumheller, C. L.
Dudo, Robert
Dudley, Ollie
Durland, Edgar E.
Eder, C.
Enrice, Vagetti
Ertz, Thomas B.
Fanning, George S.
Faulkner, Harry C.
Fleenor, J. Leroy
Flippen, James
Flynn, W. P.
Fox, Harry T.
Fraser, Donald
Gillingham, Edward J.
Grennon, Clarence

Martin, Frank B.
Matthews, John
Meziane, Bankra
Middleton, William
Murphy, Frank
Nicholson, John R.
Nilson, Frank J.
O'Brien, Dan
O'Conner, Edw. M.
O'Neill, Edward M.
O'Neill, Joseph P.
Olivo, Munzio
Page, Carter
Parento, Angelo
Parker, Frederick T.
Pompe, Jean
Powers, James W.
Quinn, Edler
Ragino, Luigi
Reardon, Chas.
Robbins, B. D.
Robinson, Benjamin
Russell, Peter
Ryan, A. C.
Santamario, Gasparo
Schaller, R. V.
Sealey, Francis
Shaprun, George
Shields, William
Shipley, Bradley
Silver, Edw.
Smith, Lockheart B.
Snell, Henry
Spence, Isaac
Stafford, John D.
Stephens, William
Sterling, Jacob K.
Stevens, Paul
Strober, Alfred
Stull, Harry
Sullivan, Thos. J.
Sutton, John
Sweeney, William
Thompson, Lawrence
Tiroutis, Nick
Trollinger, S. DeField
Ware, W. C.
Westcott, Norman
Whittaker, Wm. J.
Williams, Sam
Willoughby, Harry O.
Young, Frank

Hopewell GUN COTTON PLANT

Akers, Isaac
Anderson, Arnt
Anderson, Cecil
Ashley, Harvey
Banther, Andrew
Barnes, Ed
Battle, Anthony
Batts, Willard
Beard, Willie
Beasley, Zebulon
Becker, Frederick
Berna, Andrew
Betancourt, Diego
Boets, Alton
Biggood, Earnest
Biggs, Arthur
Bigman, Arnold
Black, Colton
Bodie, Comoe
Book, Eugene
Booker, Alex.
Boothe, Hugh
Rowles, Eugene
Bowman, Arlie
Bridges, Lemuel
Bridgman, Bernard
Bromleigh, Everett
Broughton, Sidney
Brown, Jacob
Browning, James
Bryant, John
Bryant, Rneben
Burruss, William
Butcher, Galeima
Byrd, Daniel
Campbell, Dempsey
Carrow, Lucy
Carr, Robert
Carroll, Theodore
Cawthorn, Edward
Clarke, Edwin
Coleman, Affard

Collins, Arthur
Connell, Alfred
Cooper, John
Counts, John
Cox, George
Crosby, Paul
Crough, Arthur
Culberth, Ralph
Daniel, Thomas
Davis, Louis
DeBerry, Early
DeBerry, Walter
Dean, Ernest
Deavor, Amon
Deyerle, Clarence
Deyerle, John
Devilbiss, John
Dickerson, Daniel
Dillon, Arthur
Doss, George
Downey, Walter
Drawdy, Ester
Drumheller, Arthur
Dukes, Major
East, John
Easterling, James
Edmunds, Moton
Edwards, Charles
Edwards, Lawrence
Edwards, Luther
Edwards, Robert
Elliott, James
Ezell, Clarence
Faison, Eidon
Ferguson, Walter
Fields, Harris
Firesheets, Norman W.
Floyd, Jarvis
Forbes, Arthur
Foreman, Robert
Foster, Charles
Foster, Ernest
Foster, Floyd
Foster, John
Garrison, Horace
Gast, Frank
Gatson, Charlie
Gay, Samuel
Gibson, Lewis
Giles, William
Goode, David
Green, Jonnie
Griffin, Robert
Hagin, Joseph
Hall, Charley
Hall, Edward
Hall, Otis
Hallyburton, John
Hargett, Frank
Harrelson, Bryan
Harrington, Elliott
Harrington, Paul
Harris, Alex.
Harris, Percy
Harris, Robert
Harvey, Ben
Hatcher, Ella
Hawks, Jody
Herring, Eugene
Hill, Willie
Hough, Jimmie
Howell, Frank
Hubbard, Frank
Ingram, John
Jackson, Ed
James, Henry
Jameson, James
Jefferson, Robert
Jernigan, Mack
Johns, Will
Johnson, George
Johnson, Richard
Johnson, Samuel
Johnson, William
Jones, Ed
Jones, George
Jones, John
Jones, Wallis
Kelly, Bernard
Kennedy, Willie
Kildron, Joe
King, Herbert
Lanier, John
Lash, Lewis
Laud, Frank
Lawrence, Bernard
Ledbetter, Norman
Lee, Cletur



Hopewell—Continued

Legney, Edward
Lewis, Vernon
Lewis, William
Liles, Royall
Littles, John
Lundy, Herbert
McClumb, Robert
McCoy, William
McDonald, Archie
McIntyre, Lee
McLain, John
McLaurin, Dannie
McSwain, McBride
Mailoff, Eryant
Mann, Ralph
Manning, Thomas
Marlette, Nigel
Martin, Benjamin
Martin, Joe
Martin, Walter
Mason, Fred
Merritt, Robert
Milloyway, John
Minnie, James
Mitchell, Richard
Moore, Frank
Moore, Jerrie
Moore, Kelly
Morris, Byard
Murdock, Letcher
Neal, John
Neville, Herbert
Nicol, Jesse
Onal, Ed
Osborn, Robert
Padden, Harold
Parish, George
Parrott, Rufus
Payne, James
Payton, Edward
Pepper, Thomas
Perego, Henry
Pettigrew, Moses
Pickard, James
Pillow, Henry
Pitt, Hillard
Pollard, Clarence
Powell, Henry
Preston, Herbert
Prevatt, Lawrence
Price, William
Pruden, James
Pulley, Griver
Rattle, John
Ray, Chester
Raynor, Dexter
Rhodes, Charlie
Richardson, Dock
Rick, Tonie
Riley, Watson
Rogers, Samuel
Rowe, Elmer
Royal, Thomas
Rudd, David
Rudd, Dudley
Rudder, Willie
Ruffian, Willie
Russ, Joseph
Russell, Richard
Sandwick, Christopher
Sannabear, Elrad
Scott, Norman
Seay, Emmet
Seiss, Richard
Self, Julian
Sigman, Oscar
Simmons, Bill
Simmons, Sidney
Smith, Marvin
Spencer, Reuleen
Spivey, Lloyd
Starling, Thomas
Starling, Troy
Staton, Bruner
Stedman, Vanees
Stevens, John
Strouder, Alex
Styron, Joseph
Sweet, Oscar
Tatum, Floyd
Taylor, Oscar
Taylor, William
Theiling, Robert
Thompson, Thomas
Thompson, Van
Tetracos, John
Tuck, Ammon
Tucker, Bennett
Tyson, Thomas
Vranopoulos, George
Wallace, Henry
Wallace, Herbert
Waters, Arthur
Watkins, Joe
Weaver, Andrew
Weddle, George
Weeks, Donnie
West, Clarence
Wetherston, Henry
Wetlington, John
Wheeler, George
White, Howard
White, John
Wilder, Arthur
Williams, Arthur
Williams, Charles
Williams, Marons
Williams, Ned

Williams, Robert
Wilson, Charley
Witherspoon, Gus
Wood, Tim
Wright, Charlie
Wright, Lucius
Young, Charles
Young, Clarence
Young, Redman
Younger, Samuel

Bridgeport Works

PAINT AND WOOD FINISHING PRODUCTS

Crawford, Earl
Dixon, Arthur
Fomuk, Kuzma
Holmes, Harold
Sabol, Peter
Wischart, George

Ramsay

HIGH EXPLOSIVE PLANT

Andreas, Charles
Berry, Cyrus G.
Elderkin, Clair
Hatt, Glenn
Hedman, Anders O.
Mott, Martin V. B.
Regan, Thomas
Remmison, Spencer
Ryan, Thomas M.
Silvius, Frank A.
York, Thomas S.

Brandywine Shops

MACHINE

Boyd, Charles H.
Carter, William H.
Frampton, George W.
Gartland, Patrick
Heterington, Norman R.
Keating, Ralph
Lally, Joseph F.
Long, Joseph
McGinnis, Joe
Pollitt, Doyle
Skinner, Dudley M.
Smith, Chester
Sutton, John

Brandywine Mill

BLASTING POWDER PLANT

Asquith, Nelson
Carey, Francis S.
Perry, Herman A.
Underdoffer, Harry

Deepwater Point

COAL-TAR DISTILLERY

Daly, Joseph
Donato, Raffael
Duffy, John E.
Hill, Charles R.
Horton, Steele
Pambo, George
Sanford, Gordon T.
Straughn, Joseph

Fairfield

RUBBER

Bradley, James
Merrill, Deane C.

Newburgh

FABRIKOID PLANT

Aldrich, William S.
Atkinson, Willis R.
Berry, Frederick J.
Cassidy, Frank
Creveling, Raymond W.
Davidson, David R.
Dillon, Thomas A.
Elison, Victor E.
Hollberg, Fred W.
Howden, Chester
Jackson, George W.
Lord, Edward
McDonald, Roy
Martin, Edward A.
Moffett, Lancelot
Raven, Frank H.
Rose, George, Jr.
Williams, Lewis
Williams, Theodore S.

Lauriers

HIGH EXPLOSIVE PLANT

Lamont, Alfred H.
McCarthy, James
Simpson, Gene C.
Stewart, Frank Oliver

Barksdale

HIGH EXPLOSIVE PLANT

Laflame, Joseph
Quin, James A.

Grayling

WOOD DISTILLATION PLANT

Convent, Nolan
Graham, Ed
Johnson, Arthur
Krage, William

Haskell

SMOKELESS POWDER PLANT

Allen, John W.
Basile, Fred
Beckhold, George
Beyers, Charles G.
Black, Andrew J.
Buchanan, William C.
Capro, Louis
Caywood, Martin
Chamberlain, Charles
Conklin, Warren
Crafton, George A.
Daily, Leo
Danforth, Leonard J.
Day, Richard
Denkier, Frank
Dolan, Grant
Fischer, Gus
Gare, John
Grady, Harry H.
Hilko, Vasile
Jacobson, Herbert
Jones, Lad
Kopple, Wm.
Kessley, John
Kowal, Sam
Latta, Isaac B.
Liberty, Charles
McAlphin, James C.
Mitchell, Clarence
Mitchell, Robert
Montanari, Mariano
Morrall, Thos.
Oldsen, Charles
Perkins, Thomas
Rembe, Raymond
Reynolds, Matthew A.
Rose, Anthony G., Jr.
Rowe, Frank
Ryan, Michael
Siebert, Harry

Gilbert, Henry
Giles, Andrew
Godshofsky, Tony
Gorach, Gebok
Gowelski, Andrew
Gracki, Stanislaw
Gregory, George
Green, Robert
Grover, William
Guodiski, Adolph
Gusko, Mike
Halfner, William
Hansen, George
Hanson, Alex.
Henry, Michael
Herr, Frank
Hodgkiss, Albert A.
Holton, Nicholas J.
Kachuck, John
Kavel, Ignatz
Kenny, Alfred
Kent, Charles
Kinder, Maik
Kirk, James
Klotz, Albert
Korakowski, Will
Kostelan, Steve
Kosakovic, Konstanty
Kuchlosky, Otto
Kuntine, Joseph
Lain, Walter
LaMone, Jean T.
Lamoski, Konstanty
Lasley, Carl T.
Lochs, Paul T.
Lockwood, Walter
Lyons, Daniel A.
McCarthy, Michael J.
McCarthy, Patrick
McLaughlin, James
Macan, Harry
MacHale, William
Makoski, Wladyslaw
Manetas, George V.

Wayne

BLACK SPORTING POWDER FUSE POWDER

Degutis, Joseph
Dunlap, Thomas
Hall, Hiram
Jones, Roscoe
Lester, Jack
Lindly, Henry B.
Slingerland, Clarence

Paulshora

Christiansen, Jacob
Pierman, Martin

Moor

BLASTING POWDER
McAndrew, Dan
Montgomery, Sidney J.
Peterson, Martin
Schenk, Leo L.
Watzmuer, Henry

Bay City

WOOD DISTILLATION
Harvey, James
Strzeszynski, Leo

Du Pont

BLASTING POWDER
FUSE POWDER
Sjogren, Abel

Penniman

HIGH EXPLOSIVES
Binn, Ambrose W.
Kivett, Chas. A.

Fuze Works

Carpenter, Thos. R.

Cap Works

Carr, Daniel E.
Deak, Bernard
Fields, Jos. F.

Heller, William
Hoffman, Hermand
Mumford, John C.
Peaty, Wm. V.
Wilgate, Roy E.

Georgetown

ALCOHOL DISTILLERY
Piano, Clifford
Thomas, George
Wigfall, John

Jackson Laboratory

Snapp, Joseph

Repains

HIGH EXPLOSIVE PLANT
Dalbow, Howard F.
Havens, J. J.
McShane, James
Monaro, Vincenzo
Murphy, Frank
Sheward, Derma

U. S. Box Repair Shop

Kelly, Sam
Nepa, Vito

Pools Shops

MACHINE
Giordano, Donato
Szafranski, Francis E.

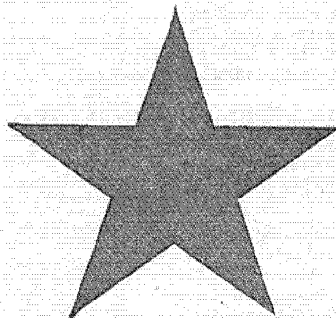
Harrison Works

PAINTS AND CHEMICALS
Eckeboim, Holger
Hollywood, Thomas
Patton, Samuel E.

Connable

BLASTING POWDER PLANT
Wilson, Tom

(Corrected to June 24, 1918.)



An effort is being made to place DU PONT MAGAZINE on the reading tables in every reading room in the camps at home and abroad. It will be sent to every man who left the employ of the company to enter the service, whose correct address is supplied by either himself or friends. Any omission of names is unintentional, and will be corrected if called to the attention of the editors.

Letters giving newsy items are requested from the boys who have gone into military service. Good pictures can also be used to advantage. These must show no military details.

Too Bad He Couldn't March

United States Senator Howard Sutherland, of West Virginia, tells a story about a mountain youth who visited a recruiting office in the Senator's State for the purpose of enlisting in the regular army. The examining physician found the young man as sound as a dollar, but that he had flat feet.

"I'm sorry," said the physician, "but I'll have to turn you down. You've got flat feet."

The mountaineer looked sorrowful. "No way for me to git in it, then?" he inquired.

"I guess not. With those flat feet of yours you wouldn't be able to march even five miles."

The youth from the mountains studied a moment. Finally he said: "I'll tell you why I hate this so darned bad. You see, I walked nigh on to one hundred and fifteen miles over the mountains to git here, and gosh, how I hate to walk back!"—*Everybody's Magazine.*

Siggins, Walter N.
Stetz, John
Stevens, Harry
Strada, Frank
Suscha, Wasi
Sutton, John J.
Van Ness, Harry
Van Nimmegan, Andrew
White, Owen W.
Whittemore, Beverly
Woodring, Charles F.
Young, Ernest J.
Zacino, Sam

Parlin

SMOKELESS POWDER

Anderson, Eric
Atkinson, John
Bailey, Jos., Jr.
Banzky, Thadous
Bass, Herman
Blazliski, Yusuf
Bogue, Charles O.
Boshko, Wasi
Bounds, Grover C.
Bozko, Sam
Brady, Edward
Brandle, Benjamin F.
Bykowski, John
Byrne, James
Cantlon, James H.
Carey, Burton
Chapman, Thos. J.
Coleman, Frank, Jr.
Donels, John
Donnell, Warren N.
Dunlay, Warren D.
Dzomicki, John
Eberle, William
Emetz, Stephen
Fabis, Alek
Falkowski, Mike
Funk, J. A.
Galley, Frank
Garboski, Pete
Gerson, Saul

Meadle, Walter
Michalowski, Lukas
Miller, James A.
Morton, Charles S.
Mullaki, Julius
Narozanick, John
Nanovich, Leon
Nolan, John E.
Nordling, Victor
Nowak, Paul
Padgett, Harley
Pascavage, William
Parafish, Stanislaw
Poulson, Ralph L.
Proctor, Albert
Ramanych, Joe
Ramutowski, Felix
Raney, George G.
Reilly, Joseph
Riddle, Alexander
Roman, Tony
Ryder, Frank C.
Sandles, William F.
Senbo, Stanley
Smith, William
Sozon, George
Stark, Frank
Steneavage, F.
Stetsky, Alex.
Szydlowski, Jacob
Ubrig, William
Ussher, Thos. F.
Van Hagen, Edward
Wasik, Alek
Yapienski, Jane
Yochis, Frank
Zaleski, Ben
Zenox, Felix
Zerman, Joseph
Zibroske, William L.
Ziobio, Wladyslaw
Zoncorovich, Peter

Nemours

BLASTING POWDER
Hawley, Nathan R.

\$500 For Photographs

To Increase the Interest in Du Pont Products and to Secure Suitable Photographs to Illustrate the Advertising and Publicity of Our Various Companies, the Du Pont American Industries Offer \$500 in Prizes for the FIFTY Best Photographs, Illustrating the Following Subjects, Submitted before September 1, 1918

PRIZES:

First Prize, \$100. Second Prize, \$50. 2 Third Prizes, \$25 Each
14 Fourth Prizes, \$10 Each. 32 Fifth Prizes, \$5 Each

SUBJECTS:

Agricultural Uses of Explosives.—Blasting stumps, boulders, ditches, wells, ice jams, log jams. Draining swamps and wet spots. Planting trees, shrubbery and hedges. Splitting logs, blasting post holes, blasting down masonry walls, breaking up steel castings. Blasting fish ponds and reservoirs, cleaning out mill races, straightening streams, terracing hilly land to prevent erosion, exterminating gophers and burrowing animals. Miscellaneous agricultural uses of explosives.

Industrial Uses of Explosives.—Road building—especially clearing, straightening and draining roads and improving grades, showing work before and after. Railroad construction. Excavations and trenches of all sorts. Miscellaneous industrial uses of explosives. Quarry blasting. Mining.

Fabrikoid Leather Substitute.—Automobiles or motor trucks, with upholstery or tops, especially in hard service, or in exposure to rainstorms and extreme sunshine. Motorboats, in use, showing tops or upholstery. Fabrikoid luggage in use. Views in plants using artificial leather for manufacturing articles.

Miscellaneous uses of Fabrikoid—table-covers, bookbinding, bags, sofa cushions, furniture, upholstery and similar uses.

Painting.—Well-painted exteriors, large or small, of city, suburban or country homes, farm houses and other buildings. Artistic interiors of living-rooms, bedrooms, bathrooms and kitchens, showing painted or tinted walls or well-finished floors and woodwork. Well-painted factory, hospital, hotel, store and public building interiors and exteriors. Automobiles, boats, ships, bridges or other structures being painted. Under this head special consideration will also be given to photographs which show any improved conditions due to painting inside or out.

Trapshooting and Hunting.—Important trapshooting events. Squads of shooters in action. Trapshooting celebrities. Exteriors and interiors of trapshooting club houses. Using the hand trap at gun clubs, homes, camps, summer resorts and outings, ashore and afloat. Unusual stunts with the hand trap. Interesting trapshooting and hunting scenes.

Miscellaneous.—Ivory Py-ra-lin (Artificial Ivory) in use. Challenge Cleanable Collars in use. Removing tar from automobiles with Pontoklene. Using household cement, lacquers or enamels. Any subjects illustrating the use of any Du Pont Products, whether or not included in this list, will be given equal consideration.

To Win A Prize

Run over the list of subjects suggested above and note the photographs you have or can get that would illustrate the subjects. Probably in the home, or elsewhere in the neighborhood is a good chance to get a prize-winning photograph.

A photograph to win must have good contrast, and be clear and sharp and in focus. It must be at least 3x5 inches in size.

Make a black and white, glossy finish print and write a complete description of the photograph and your name and address on the back.

Send the print, with the negative and entry blank, to the Advertising Division, Du Pont Company, Wilmington, Del. Be sure and mark it "Photograph Contest."

Don't try too hard to get an "unusual effect." This is not an art contest. These photographs are to be used for advertising purposes and if they show clearly and effectively what they are supposed to represent and will reproduce well they will have a good chance of winning a prize.

Note.—If any individuals show prominently in the photograph we must have their written consent to its use in advertising. "Release Blanks" will be supplied on request.

CONDITIONS OF AWARD

1. No employees of the Du Pont American Industries are eligible in this contest.

2. Each photograph to be eligible for a prize, must be accompanied by the negative, film or plate, carefully packed for shipment.

3. On the back of each photograph submitted must be plainly written the name and address of the contestant, the subject illustrated, the time and place where the photograph was taken, the name of the Du Pont Product illustrated, if any, and any other helpful data.

4. The number of photographs that can be submitted by any one contestant is unlimited, nor is there any limit to the number of prizes that can be won by any contestant.

5. All photographs submitted, whether or not awarded prizes, are to become the property of E. I. du Pont de Nemours & Co., with all publishing rights.

6. Except in the cases especially mentioned above, the subjects photographed need not be Du Pont Products. If, however, Du Pont Products are used, it must be stated on the reverse of the photograph what products are illustrated.

7. All photographs submitted will be judged by a committee to be appointed by the Director of Advertising of the Du Pont American Industries. Prizes will be awarded not later than September 15, 1918.

8. The Du Pont Photograph Contest will close on September 1, 1918. No photographs postmarked at Wilmington, Delaware, later than September 1, 1918, will be accepted in this contest.

9. Each contestant must fill out and mail the attached entry blank to Advertising Division, Du Pont Company, Wilmington, Delaware, with the first photograph submitted or the photographs will not be accepted in the contest.

10. All photographs entered in this contest must be plainly marked "Photograph Contest" and mailed to the Advertising Division, Du Pont Company, Wilmington, Delaware, full postage prepaid.

MAIL THIS ENTRY FORM

To Advertising Division, E. I. du Pont de Nemours & Co., Wilmington, Delaware

I wish to enter the Du Pont Photograph Contest. I hereby assign to E. I. du Pont de Nemours & Co. full title to any and all photographs which I submit in this contest.

NAME _____

ADDRESS _____

PLACE _____ STATE _____

DATE _____

Du Pont Mag., August, 1918

What the Chemist is Doing for Our Industries

(Concluded from page 3.)

colors will be produced, and somewhat later Alizarine colors and their mostly needed derivatives, the Vat colors. Sulphur colors, and chrome colors will also be produced in a comparatively short time, and while it is not possible at the present time to make a prognostication as to dates, the construction of the plants is progressing rapidly, and while there is considerable difficulty in securing machinery and raw materials, there seems to be no doubt that this undertaking will result in being a very large factor in making this country independent in the dyestuff industry.

The True Economy of Road Building

THE two natural laws of road building, as to results, are: Every road brings more population to the sections served, and the better the roads, the greater the benefit conferred upon every person affected. Distance, these times, is a secondary question; no man dreads the distance if the roads are good.

In the Southwest, where the rainfall is slight and the best natural roads in the world are the rule, too little attention is paid to the matter of drainage. A single example will be given to illustrate this most important matter.

What is locally known as "The Big Hill," on the Hondo River, is 45 miles west of Roswell, N. M. In the old days of thirty years ago and up to the time of its proper construction, this Big Hill had a reputation in New Mexico second only to that of "Billy the Kid," the notorious outlaw. People moving into the country from the Texas border would hear of it before they got to New Mexico. At that time Lincoln county covered all south-east New Mexico. With the creation of Chaves county and the location of the county seat at Roswell, in 1890, came the demand for "working down the Big Hill" in order to secure the "mountain trade."

In 1894 the first work was done by hand and a little plowing and scraper work and the hill was made possible for the time, although the grade was very steep. Many wagons went to pieces on it and freighters always traveled in trains so that they could "double team" at the Big Hill. The lack of drainage was soon apparent. The occasional rains washed away the plowed soil and exposed rocks sometimes of large size.

The road gradually ascends the foothills from Roswell until it reaches the Hondo canyon at the Big Hill, 45 miles west. The hills are some 1200 feet in altitude on both sides and the road down into the canyon is made along the slope of a cross

Belber TRAVELING GOODS

THE BELBER TRUNK & BAG CO. - Philadelphia, Pa.

Write for FREE Explosives Sales Record Book

We will mail, free, to any dealer in explosives a book for keeping records of sales of explosives, as required by the Federal law.

The form used will be that approved by the United States Bureau of Mines.

Dealers in dynamite, sporting powder, blasting supplies and blasting powder may get the record book by mailing request to

E. I. du Pont de Nemours & Co.
Wilmington, Delaware

OR ANY BRANCH OFFICE:

Birmingham, Buffalo, Chicago, Columbus, O., Denver, Duluth, Huntington, Joplin, Kansas City, Mo.; New York, Portland, Ore.; Pittsburgh, Pa.; St. Louis, San Francisco, Seattle, Scranton, Spokane, Springfield, Ill.; Juneau, Alaska.

canyon, thus reducing the altitude to about 800 feet. The old hill road was some 2500 feet in length with a grade of over 30%. The grade was less in places, thus making "taverns" on the hillside.

In 1907, expert road engineers were employed. They made high explosives the basis of construction. The first thought was drainage. Ditches were blasted, often in solid rock, along the sides of the road, and at intervals made to run under the road and down the canyon wall. "Resting places" were made by leveling broader places at intervals, so that teams might easily pass on the hill. Other hills on the approach to the Big One were also graded and ditched. Dirt was hauled and spread over the solid rock places, and over this was spread a layer of gravel or broken rock. The length of the ascent was increased to 3000 feet, thus decreasing the grade.

The Big Hill is never mentioned to the traveler now. Autos ascend it on "intermediate" and often a more powerful car will ascend on "high." The writer has climbed this Big Hill after a heavy shower, when water was pouring off the hillsides and the ditches along the roadway were full of water. This caused no inconvenience and there has been very little

Outwear Travel

Made in genuine grain leather and DU PONT FABRIKOID—Craftsman Quality. At all good dealers.

ASK FOR BOOKLETS

CANADIAN BRANCHES OF THE



American Industries

E. I. du Pont de Nemours & Co.

Ed. G. White, Representative
Sporting Powder Division
OTTAWA, ONTARIO

Du Pont Fabrikoid Co.

LEATHER SUBSTITUTES
FAIRFIELD RUBBER CLOTH
W. A. Cotton, Manager
NEW TORONTO, ONTARIO

Du Pont Chemical Works

PYROXYLIN and COAL TAR
CHEMICALS
W. A. Cotton, Sales Representative
NEW TORONTO, ONTARIO

The Arlington Co.

IVORY PY-RALIN and CLEANABLE
COLLARS

J. A. Chantler, Sales Manager
TORONTO, ONTARIO
Branches: WINNIPEG and MONTREAL

Inquiries invited relative to descriptive
booklets and prices

work done on the Seylla part of the Hill since it was built.

The value to the several communities served, not to mention its value to the traveling public, cannot be estimated. More than two million pounds of wool are hauled over this road each year, Roswell being the principal market. Auto trucks now haul the mountain apples and other products to market. The law of road building having proven true—more roads bring more people, better roads return more direct benefits, and the connecting roads are always improved to match the most advertised section of the system.

True economy of road building, then, is to build for the sake of permanency, and drainage is the first essential.—"Honey Jim" Mullens.

Send for Hoover

Mrs. Crimsonbeak—"Thought you were going to give up a lot of things during the war?"

Mr. Crimsonbeak—"That's my idea."

"Don't you suppose I can notice your breath?"

"What's the matter with my breath?"

"Matter with it? Smells as if you'd been hoarding cloves!"—*Yonkers Statesman*.

DU PONT AMERICAN INDUSTRIES

Increased Service to Du Pont Customers

Old friends are best!

In the expansion of our business along diversified lines we naturally seek all the *new, desirable* connections possible.

But old customers have and always will have our first consideration.

If you are now buying a product of one Du Pont American Industry, is it not possible that one or more other of our industries make something you can use to our mutual advantage?

You know from experience that the Du Pont Sales Policy is based on fairness and every effort on our part to give every customer the best we can in goods and service.

Our success depends on yours.

Let us help you in your business by furnishing more Du Pont Products of dependable quality.

We want to strengthen our reciprocal relations.

If any of our industries can use anything you make or sell, we want to know about it, and on comparable terms, buy from our manufacturing customers, and be of any possible assistance in extending their sales to others. We try to be good friends to our friends.

The Trade Inquiry Form on page 31 shows our chief lines. If any of them interest you, please advise us, and we shall take special pleasure in giving your letter full attention.

E. I. du Pont de Nemours & Co. Wilmington, Delaware

NOTE—When in Atlantic City, visit the Du Pont Products Store, Boardwalk and Pennsylvania Avenue, and Du Pont Shooting School on the Ocean End Young's Million Dollar Pier

THE DU PONT AMERICAN INDUSTRIES ARE:

E. I. du Pont de Nemours & Co., Wilmington, Delaware.....	Explosives
Du Pont Chemical Works, New York.....	Pyroxylin and Coal Tar Chemicals
Du Pont Fabnkoid Co., Wilmington, Delaware.....	Leather Substitutes
The Arlington Works, 725 Broadway, New York.....	Ivory PY-RA-LIN and Cleanable Collars
Harrison Works, Philadelphia, Pa.....	Paints, Pigments, Acids and Chemicals
Du Pont Dye Works, Wilmington, Delaware.....	Dyes and Dye Bases



DU PONT AMERICAN INDUSTRIES

For the convenience of buyers considering the purchase of any Du Pont product, and desiring specific information, this coupon is printed. Upon receipt, it will be forwarded immediately to the proper office for attention.

Fill in, Cut Out and Mail This Coupon

(Du Pont Magazine, August, '18)

Sales Promotion Division
E. I. du Pont de Nemours & Co.
Wilmington, Delaware

Date.....

EXPLOSIVES

- ☐ Blasting Powder
- ☐ Blasting Supplies
- ☐ Charcoal
- ☐ Clay Mining
- ☐ Farm Explosives
- ☐ Industrial Dynamites
- ☐ Land Clearing
- ☐ Permissible Explosives
- ☐ Refined Nitrate of Soda
- ☐ Road Building
- ☐ Saltpetre
- ☐ Tree Planting
- ☐ Wood Pulp

PAINTS

- ☐ Antoxide Iron Paint
- ☐ Auto Finish
- ☐ Auto Paints and Enamels
- ☐ Barn Paint
- ☐ Bridgeport Standard Paint
- ☐ Bridgeport Wood Finishes
- ☐ Colors in Oil
- ☐ Concrete Paint
- ☐ Decorative Stains
- ☐ Dulite for Mills
- ☐ Enamels
- ☐ Ferro-Keep (Metal Paint)
- ☐ Floor Paints
- ☐ Floor Varnishes
- ☐ Flowkote Enamel
- ☐ Industrial Paints
- ☐ Japans
- ☐ Marine Paints
- ☐ Railway Paints
- ☐ Red Lead
- ☐ Sanitary Wall Finish
- ☐ Shellac
- ☐ Shingle Stain
- ☐ Smokestack Paint
- ☐ Town and Country Paint
- ☐ Varnishes
- ☐ Vitrolac Stain Finish
- ☐ Vitrolac Varnish
- ☐ Wagon and Carriage Paint
- ☐ Wheeler's Wood Filler
- ☐ Wire Screen Paint

SPORTING POWDERS

- ☐ Black Sporting Powder
- ☐ Hand Trap
- ☐ Hunting
- ☐ Pistol Smokeless Powder
- ☐ Resort Shooting
- ☐ Rifle Smokeless Powder
- ☐ Shooting in Colleges
- ☐ Shooting on Boats
- ☐ Smokeless Powder
- ☐ Trapshooting

CHEMICALS

- ☐ Acids
- ☐ Alums
- ☐ Barium Chloride
- ☐ Belt Cement
- ☐ Benzol Products
- ☐ Blanc Fixe
- ☐ Bronze Powder
- ☐ Bronzing Liquids
- ☐ Carpolene (Wood Preservative)
- ☐ Carpo (Metal Paint)
- ☐ Coke
- ☐ Creosote
- ☐ Dead Oil
- ☐ Distilled Water
- ☐ Dry Colors
- ☐ Ether
- ☐ Heavy Chemicals
- ☐ Household Cement
- ☐ Leather Renovators
- ☐ Leather Substitute Solutions
- ☐ Litharge
- ☐ Lithopone
- ☐ Mantle Dips
- ☐ Metal Lacquer
- ☐ Nitre Cake
- ☐ Parlodion
- ☐ Patent Leather Solutions
- ☐ Pegamoid Aluminum Paint
- ☐ Pitch
- ☐ Pontar
- ☐ Pontoklene
- ☐ Pulp Colors
- ☐ Py-ra-lin Enamel

- ☐ Pyroxylin Solutions
- ☐ Rubber Makers White
- ☐ Salt Cake
- ☐ Shingle Oil
- ☐ Solvents
- ☐ Split Leather Solutions
- ☐ Waterproof Cement
- ☐ White Lead
- ☐ Wood Lacquer
- ☐ Wood Oil

PY-RA-LIN

- ☐ Brushes
- ☐ Challenge Cleanable Collars
- ☐ Colored Sheeting
- ☐ Combs
- ☐ Desk Sets
- ☐ Manicure Sets
- ☐ Mirrors
- ☐ Novelty Sheeting
- ☐ Py-ra-lin Pipe Bits
- ☐ Py-ra-lin Rods and Tubes
- ☐ Py-ra-lin Specialties
- ☐ Py-ra-lin Toilet Goods
- ☐ Toilet Sets
- ☐ Transparent Sheeting

COATED TEXTILES

- ☐ Auto Truck Special Fabrikoid
- ☐ Book-Finish Fabrikoid
- ☐ Buggy Aprons
- ☐ Craftsman Fabrikoid
- ☐ Fabrikoid for Baggage
- ☐ Fabrikoid for Home Uses
- ☐ Fabrikoid for Railway Upholstery and Vestibule Curtains
- ☐ Fabrikoid for Upholstering
- ☐ Fabrikoid Sheeting
- ☐ Fairfield Rubber Coated Cloth
- ☐ Hat Sweat Material
- ☐ Marine Special (U. S. Standard) Fabrikoid
- ☐ Motor Fabrikoid
- ☐ Rayntite Fabrikoid Auto Top Material
- ☐ Rug Anchor
- ☐ Shoe Fabrikoid

Name..... Position.....

Your Address (If Personal).....

Name of Concern (If Company).....

Address of Company.....

BUSINESS: ☐ Manufacturer; ☐ Producer; ☐ Jobber; ☐ Dealer;
☐ Consumer. (Check which)

What Du Pont products do you sell?.....

If a user, for what purpose does the product checked, or that which you now use, interest you?.....

Specific Questions Should Be Asked In An Accompanying Letter

DU PONT

The Patriotic Picnic Pastime

WITH the arrival of the sultry days of summer the idea of a picnic out in the woods or along the river is to most people irresistible. An entire neighborhood or other social group goes for an outing on Saturdays and holidays. For the children it is all one grand adventure; the women knit and talk; but the men, unless there are enough to choose up sides for a ball game, are apt to wander around rather aimlessly and smoke more than is good for them.

The increasingly popular solution is to take out with the lunch baskets a hand-trap and some clay targets and to notify the men in advance to oil up their shot-guns and bring them along. Men to whom the idea of a picnic appeals love to shoot. The trap and targets are light and easy to carry and furnish splendid sport and keen competition. Target shooting with a 22 rifle or revolver may well be offered as an added attraction. Shooting clay targets is good practice for field shooting.

Nor are the women and children excluded from the enjoyment of this part of the outing. In these uncertain times every girl or woman, as well as every man, should know how to shoot and how to handle a gun with safety to herself and others. Just as every boy should learn how to swim, so should he learn to shoot. The informal picnic gathering offers an excellent oppor-

tunity for the women and the youngsters to become familiar with the use of fire-arms under the watchful instruction of experienced shooters.

On an outing like this a 410 gauge shot-gun with a corresponding load lends itself admirably to the use of beginners, particularly the women. It is a light gun and a light load. A girl can handle it with ease and she will not be discouraged from further shooting on account of a black and blue arm. Yet the 410 is not a toy by any means and will break the targets within a reasonable distance if pointed accurately. After a few times the woman or boy will

gain confidence and learn to hold the gun correctly in getting accustomed to the 20 or 12 gauge gun.

BONDS for Investments

SHORT TERM NOTES
POWDER SECURITIES

LAIRD & COMPANY

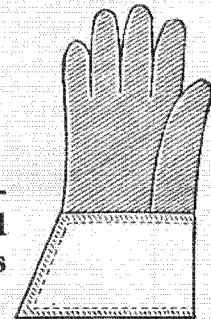
Du Pont Building
Wilmington, Del.

Schramm Compressors Drilling Rock



Something New In Gloves for Workmen

Wear Gloves Made from FABRIKOID—Water-proof and Grease-proof—a Leather-like Material Which Outwears Leather Made for Glove-Makers



MR. DEALER:

Fabrikoid Gloves replace both canvas and leather-faced palms. Soak Fabrikoid Gloves all night in water, yet they will dry soft and pliable without damage to the material.

Made in three styles—ONE-FINGER, MITTS and GLOVES. Made large and roomy for mechanics and laborers in general. The mitt is the best harvesting proposition on the market.

SCHEDULE OF PRICES

Three Styles	
Gauntlet, Band-Top and Knit Wrist	
Gloves	\$6.00 per doz. delivered
One-Finger Mitt	\$6.00 per doz. delivered

Send check today for an assortment—see schedule. Be the first in your town to introduce Fabrikoid gloves.

On receipt of gloves, if not satisfied, return and your money will be refunded. Order now before we are compelled to withdraw this offer.

ALL-WEAR GLOVE CO.
FAIRPORT, N. Y.



THE GIANT LABORER

This is the title of our 150-page booklet that tells what has been done and what can be done with Du Pont Explosives, especially in Land Clearing, Ditching, Subsoiling, Tree Planting, Orchard Cultivation, etc. Send for a free copy as a first step toward Better Farming.

Let No Stump Stand on Fertile Land

WHILE you are spending good money every year before planting, and you work to get all you can from the ground, removing stumps will increase your acreage enough to pay fertilizing costs for the entire farm. Every stump is a drone that stands in the way of plowing and planting.

Good head work dictates the use of RED CROSS FARM POWDER or RED CROSS STUMPING POWDER to clear fields for bigger yields. These two explosives are especially designed for this work—the quickest and cheapest method of increasing acreage.

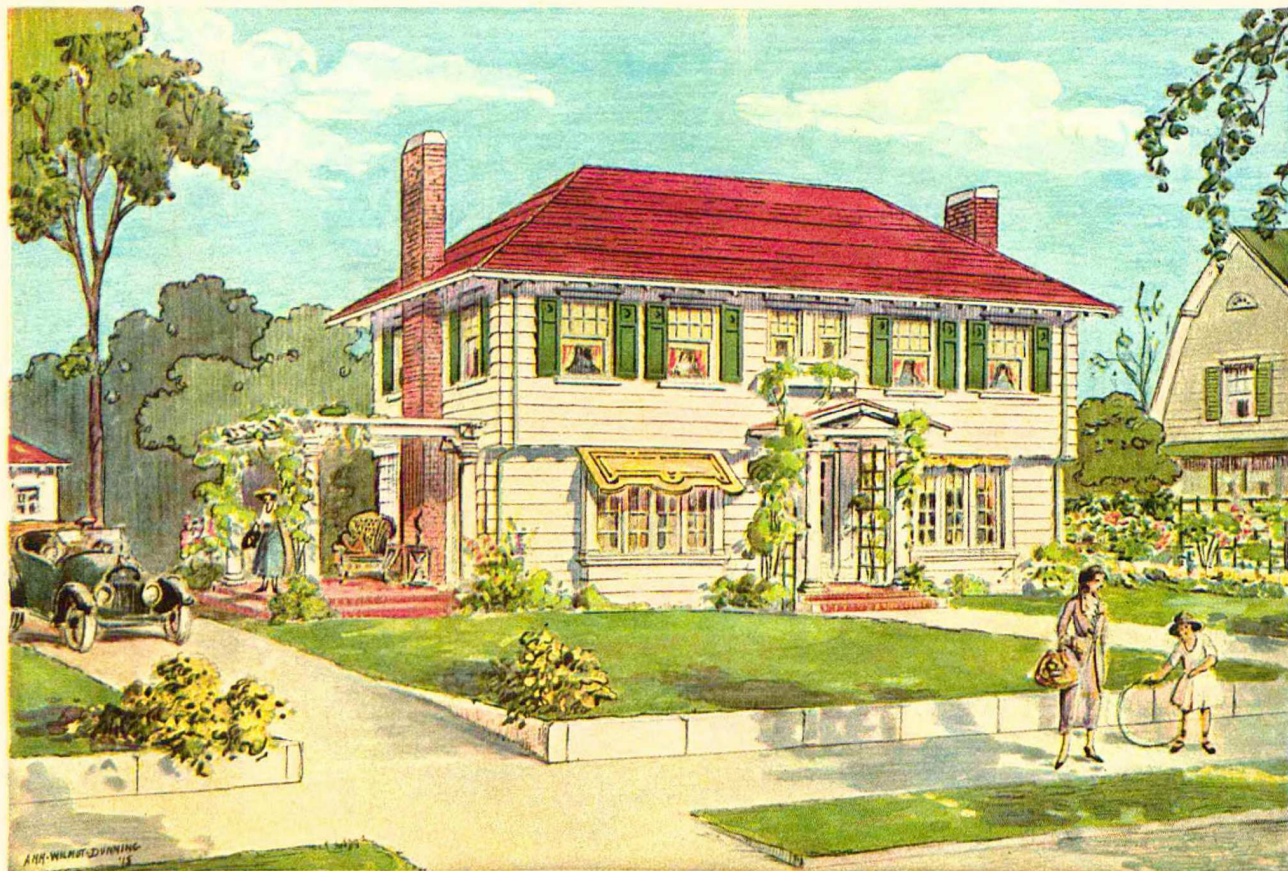
E. I. du Pont de Nemours & Co.

POWDER MAKERS SINCE 1802

Wilmington, Delaware

NOTE.—When in Atlantic City, Visit the Du Pont Products Store, Boardwalk and Pennsylvania Avenue, and Du Pont Shooting School on the Ocean End of Young's Million Dollar Pier.

DU PONT



Be Thrifty and Paint Now

Many property owners feel that painting is an "expense"—something that they can get along without. But every painted surface needs renewing, for the same reason that a person needs new clothes—both clothes and paint get shabby.

Painting at regular intervals forestalls repairs. Neglect of painting means *both* a repair bill and a paint bill later, because the repaired work must be painted.

**BRIDGEPORT
STANDARD**

PREPARED PAINT

keeps down the high maintenance cost that results from painting neglect. It is also most economical in first cost, because it is always uniform—works out easily—covers a given area with the least number of gallons—far outlasts cheap, adulterated paint and hand-mixed lead and oil.

Every Bridgeport dealer can show attractive color combinations and give you some advice about painting that will save money for home-owners. Write us if you do not know the Bridgeport agent in your community.

Bridgeport Wood Finishing Works

Owned and Operated by

E. I. du Pont de Nemours & Company
Wilmington, Delaware

Boston

New York

Philadelphia

Chicago

Minneapolis

Kansas City

DU PONT