The DuPont Magazine

February 1921 Vol. 14 No. 2

DU PONT FABRIKOID

Play-proof Upholstery

TINY feet will not harm upholstery of Craftsman Fabrikoid, for it is scuff-proof.

Grease and sweets will not mar its beauty—for all stains wash right off with soap and water.

And Fabrikoid is as long-wearing as it is lastingly beautiful, for it is tough and rugged, will not peel or crack, and never looks "clothy."

It is pliant and comfortable. Made in many different grains and colors, all of them fast and fade-proof.

These are features which furniture buyers are quick to appreciate. Fabrikoid gives many added selling arguments for fine furniture. Take advantage of them.

Write for details and samples.

E. I. du Pont de Nemours & Co., Inc.

Sales Dept.: **Fabrikoid Division**

Wilmington, Delaware

Branch Offices:

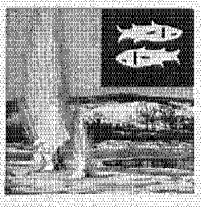
Harvey Building	Boston, Mass.
McCormick Building	Chicago, Ill.
Gugle Building	Columbus, Ohio
Dime Bank Building	Detroit, Mich.
Merchants Bank Building	Indianapolis, Ind.
21 East 40th Street	New York City
Chronicle Building	San Francisco, Cal.

Plant: Newburgh, N. Y.

Fabrikoid is water-proof, stain-proof, scuff-proof, non-fading and cleanable. Available in many weights, in many beautiful colors and grains, it makes high-grade, long-lasting upholstery at a moderate price.

FABRIKOID

THE
DU PONT
MAGAZINE



Vol. XIV FEBRUARY, 1921 No. 2

THE PRICE DECLINE

How high did prices go and how great has been their fall?

By F. LESLIE HAYFORD
Economic Statistician
E. I. du Pont de Nemours & Co., Inc.

NEARLY a year ago an article on the price situation was printed in this magazine, accompanied by two graphs showing the movements of the wholesale prices of certain groups of commodities since 1913.* Since that time we have witnessed one of the most precipitate price declines in history. A brief review of the present price situation, and a bringing of the two graphs more nearly down to date, may therefore be of interest.

Wholesale prices in general apparently reached their peak in the spring of 1920, after rising pretty steadily for more than four years. In April or May, 1920, they turned downward and have been falling ever since. How high did they rise and how much have they fallen from that high point?

Of course, various commodities moved differently, and all that will be attempted in the present article will be an examination of the general, or average, wholesale price level, and the changes in various commodity groups. In estimating the changes that have taken place in the general average of wholesale prices, several compilations are available. Of these, the two most commonly referred to and used are the index numbers of Bradstreet and of the United States Bureau of Labor Statistics.

In compiling Bradstreet's index number, prices on the first of each month are used and fluctuations during the month are disregarded. The number of commodities whose prices are averaged is 96, largely raw materials. The method employed in arriving at the average is not free from criticism—consisting of nothing more than adding together the price in dollars and cents of one pound of each of the 96 various articles—but the index number appears to respond quickly to changes in business conditions and thus to be a fairly good indicator of what is taking place.

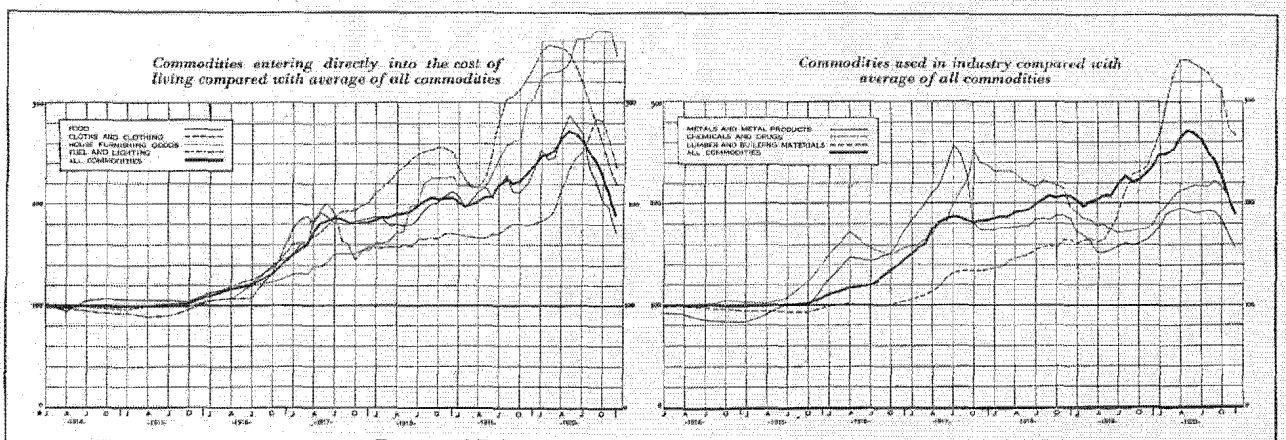
According to Bradstreet's index, average wholesale prices had risen on February 1, 1920, to 127 per cent above what they were in the year 1913. From February 1 to May 1 almost no change was recorded, but by June 1 a noticeable downward movement had appeared, which continued, increasing in rapidity toward the end of the year. The result was that on December 1 Bradstreet's index number for all commodities combined had fallen 35 per cent from the level of February 1. The greatest declines occurred in textiles and naval stores, the former dropping 54 per cent and the latter 49 per cent between February 1 and December 1. The percentage declines between these two dates in various commodity groups entering into Bradstreet's index were are follows:

Foods	15 per cent
Textiles	54 " "
Hides and leather	33 " "
Metals	33 " "
Oils	34 " "
Naval stores	49 " "
Building materials	8 " "
Chemicals and drugs	5 " "
All commodities	35 " "

Probably a better index of general wholesale prices than Bradstreet's is the index of the United States Bureau of Labor Statistics. Average monthly prices are obtained for each of 327 commodities, covering a wide range of raw and manufactured products. In computing the index numbers the average monthly price of each article is multiplied by the estimated quantity of that article marketed in the census year 1909, in order to give to each article an influence on the result proportionate to its importance in the country's markets. The results are then added up, the total giving the approximate value of the combined commodities for the month in question. It is like taking the same bill of goods each month at that month's prices and comparing the cost of this bill of goods at different times. To facilitate comparison, the totals for each month are reduced to percentages of the average monthly sum for 1913. This method, and the large number and variety of articles included in the index number, make it probably the best available measure of wholesale prices in general.

According to the index number of the Bureau of Labor Statistics, average wholesale prices reached their peak in May, 1920, then being 172 per cent above their 1913 level. The following month they evidently began to fall and have kept on falling ever since. In the upward movement the greatest advance was scored by house furnishing goods,

**The Trend of Prices*, Du Pont Magazine, March, 1920.



Wholesale price movements—Bureau of Labor statistics price index numbers. (Average for 1913 considered as 100.)

which continued to rise after the average of all commodities had started downward, reaching in September a point 271 per cent above the 1913 average.

In December the average of wholesale prices had declined 31 per cent from the high point reached in May. All classes of commodities did not turn downward in June, some of them, notably house furnishing goods and fuel and lighting, continuing to rise for several months longer. By December, however, all commodity groups had declined somewhat from their high point for the year, some of them registering very pronounced declines. The greatest declines occurred in farm products, food, and cloths and clothing.

In the following table is shown the height above its 1913 average reached by each of the commodity groups at its highest point during 1920 and also in December last, together with the percentage decline from the high point of the year to December.

Commodity Group	High point of 1920*. Percentage above 1913 average.	December 1920. Percentage above 1913 average.	Percentage decline from high point of 1920 to December.
Farm products	146 (Jan. & Apr.)	44	41
Food, etc.	187 (May)	72	40
Cloths and clothing	256 (Feb. & Mar.)	120	38
Fuel and lighting	184 (Sept.)	135	17
Metals and metal products	95 (Apr.)	57	19
Lumber and building materials	241 (Apr. & May)	166	22
Chemicals and drugs	122 (Sept.)	88	15
House furnishing goods	271 (Sept. & Oct.)	245	7
Miscellaneous	147 (June)	105	17
All commodities	172 (May)	89	31

*Months in which high point was reached are shown in parentheses.

In the two graphs on this page are shown the monthly changes in the various commodity groups, classified into those entering directly into the cost of living and those used in industry. These groups bring out even more clearly than the figures the great rise which occurred in the prices of certain groups of commodities and the pronounced decline that has since taken place in some of these.

Indications point to an early slowing down of the decline in wholesale prices and the cessation of that decline within the next few months. Just how much further the movement will go and just when it will come to an end is not clear, but evidently the worst is over and the downward movement does not appear likely to continue much longer.

MEETING ECONOMY WITH ECONOMY

Consumers in every section of the country are demanding lower-priced merchandise. The more economical the buying public becomes the less extravagant the manufacturer can be. This is decidedly the time for every manufacturer to analyze his product in the light of these more exacting market conditions and to make every change that will enable him to lower the cost of his product without impairing its quality. This will enable him to retain, or even increase, his business by meeting economy with economy at a time when it is imperative.

Using leather and other high-priced products where Fabrikoid will give equal or better service at a great saving is an extravagance still too frequently practiced by manufacturers. In a great many cases the use of Fabrikoid would greatly enhance the serviceability of products which cannot be made so practically of any other material and yet bring these products to the consumer at a price he would be very glad to pay, no matter how closely he watches his pennies.

Substantial reductions have been made in the price of Fabrikoid itself, still further equipping the manufacturer to meet the general condition. In fact, present Fabrikoid prices are lower than the costs of production justify, but they have been made purposely to enable manufacturers to produce finished Fabrikoid articles which can be priced to sell in volume.

The Fabrikoid Division of the Du Pont Company will be very glad to give advice and expert technical assistance to any manufacturer who wishes to avail himself of Fabrikoid as a means of solving a price or service problem in his product. It invites inquiries of any nature and suggests that it can give immediate recommendations if manufacturers will state just how and for what purpose they are considering the use of Fabrikoid.

The Nashville Industrial Corporation is reported to have purchased the Old Hickory powder plant at Jacksonville, Tennessee. This plant was originally built by the Du Pont Engineering Company for government operation during the war. No doubt many who worked on that project will be glad to know that the plant and the plant site will be utilized as the basis for developing a permanent industrial community.

FRONT YARD BLASTING

Dynamite can be used close to buildings without damage, as is shown in this article

USING dynamite in open fields or where there is plenty of space and little danger of property damage is an old story. It has been done so repeatedly and so successfully that the use of explosives is taken for granted. But blasting in close proximity to a building still retains some of the thrill that in the beginning was accorded all use of dynamite. How frequently this is done nowadays without damage of any kind is the highest compliment that could be paid to the manufacturers of high explosives. Constant improvements have made dynamite wholly dependable for work requiring extreme accuracy.

One example of the use of dynamite where extreme care had to be exercised because of the proximity of buildings was the blasting of fifty-two stumps on the grounds of St. Joseph's Home for Boys, Chestnut Hill, Pennsylvania.

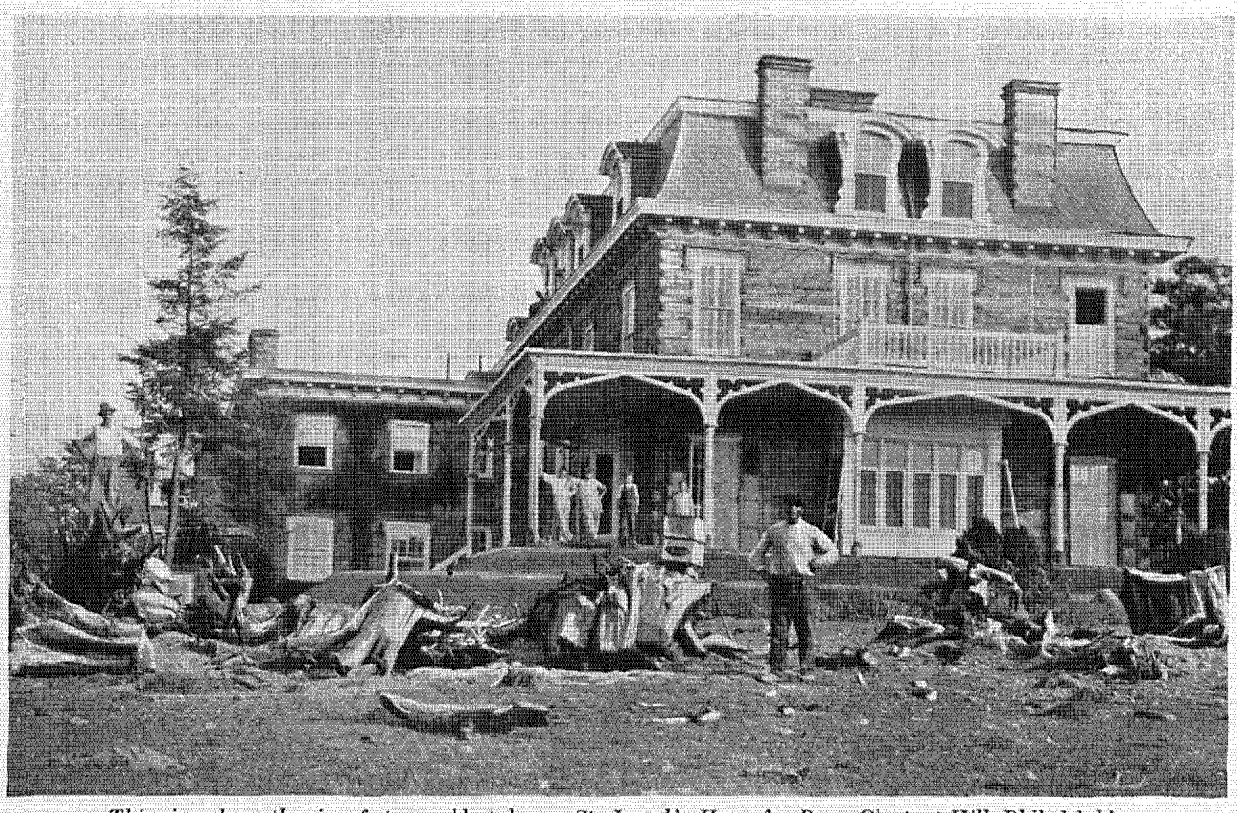
More than ordinary difficulty was attached to the operation on account of the character and location of the stumps. The average distance of the stumps from the house was fifteen feet, while some were only ten feet away. They were not small stumps. They were not dead stumps. Rather, they were the toughest kind of green stumps, the smallest of which was seventeen inches in diameter and the average thirty-eight inches.

No one knows how many years these massive oaks and chestnuts grew before reaching their maturity. No one has stated how long it took to fell these trees with saw and axe. So far as this story is concerned no one knows how many days or what expense would have been required to remove the stumps by the old method of excavating their roots and pulling them out with block and pulley. But we do know how long it took Mr. H. R. Tylar, an agricultural blaster, to do the work with Du Pont dynamite—just one and one-half days.

He bored holes in the ground under the stumps at an angle of 45 degrees, using the well-known agricultural blasting implements, a soil auger and punch bar. On account of the large size of the stumps it was necessary to bore an average of four holes to a stump in order to remove it with dynamite. Each hole was loaded with from one to one and one-half cartridges of Du Pont Red Cross Extra 60 per cent dynamite. And the shots were fired electrically with a Du Pont No. 3 Blasting Machine.

Excellent results were obtained from practically every shot fired. Mr. Tylar attributes his success to the fact that he exercised extreme care in tamping the loads. He states that because of his extraordinary precautions in tamping he accomplished the work with 50 per cent less dynamite than would ordinarily have been used.

Considering that all of the stumps were deeply imbedded in the ground and located so close to the building, it is remarkable that the work was accomplished without any property damage. Although many windows in the home were exposed to flying fragments, not even a pane of glass was broken.



This view shows the size of stumps blasted near St. Joseph's Home for Boys, Chestnut Hill, Philadelphia

ROMANCE OF VARNISH

This product, used long before the Christian era, was still crudely made in Colonial times

THE man who rises from a seat covered with poor varnish and either takes part of the finish with him or leaves part of his clothes is likely to find little romance in the subject of varnish. But those who sell and use high-grade varnishes will probably be interested in the history of this necessary product. The obscurity of its discovery, lost in the dimness of the ages before the Christian era, the strange source of many of its component parts, the variety of its uses, make varnish an interesting topic.

The first use of varnish is as obscure as the derivation of the word itself. Some claim Greek sailors found and melted a transparent amber gum which they applied on various articles to give them a lustrous coating. Because of its color these sailors are supposed to have named their find "Berenice," after an Egyptian queen famed for her amber locks. The claim is made that varnish was derived from the name "Berenice." Other etymologists derive the word from the Latin "vitrinire," meaning covered with glass, or glazed.

But whatever its derivation, the product was well known to the Chinese and Japanese long before the Christian era. From the high degree of perfection to which the latter people carried the art comes our word "japan," referring to a certain kind of varnish.

The ancient Egyptians made and used varnish. There are on exhibition at the Metropolitan Museum of Art in New York City, mummy cases which were covered with varnish perhaps 2,500 years ago. Though very light in color, the varnish on these ancient cases is surprisingly free from cracks.

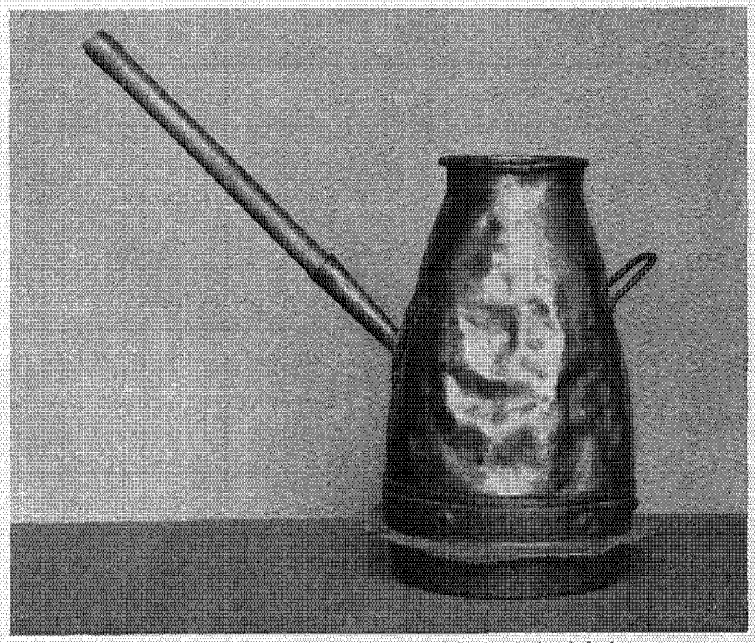
Excavations at Herculaneum and Pompeii have shown that the Romans used an excellent varnish. Covered with ashes and lava during an eruption of Vesuvius in 79 A. D., nevertheless wonderfully preserved wall paintings are found in some of the houses, notably that of Pansa, in Pompeii. After 1842 years there is hardly a scratch on some of these paintings, preserved as they are by a very thin coat of highly transparent varnish.

With the coming of the Christian era and the growth of feudalism, the art of making varnish passed into the monasteries. Formulas handed down from generation to generation, and carefully guarded by each, were used in manufacturing the product which was used extensively in the protection of paintings. Many of the world's masterpieces executed in those days owe their present state of preservation to the varnish made in monastic cells.

Even as late as our own Colonial times varnish was still made by primitive methods. It was less than a hundred years ago, in fact, that varnish-making really took its place among the world's industries. In the early days of this country, varnish was crudely made in small copper hand kettles by itinerant peddler-manufacturers. The heating kettle, oils, gums and solvents were loaded in a wagon and the manufacturer traveled from shop to shop throughout his district soliciting orders. Wherever his product was required he set up his kettle in the back yard and proceeded to make varnish for his customer. Then he drove to the next shop along his route. Sometimes in order to cover his trade territory the varnish-maker was on the road continuously for a year. When he returned, perhaps twelve months later, he collected from each customer the amount due for varnish supplied on the preceding trip. The reader will observe that Colonial trade customers had the advantage of long-term credits in buying varnish, for this was long before the 60-day limit.

The kettle in which the manufacturer boiled the various oils and gums was a highly necessary utensil. An illustration accompanying this article shows one of these old varnish kettles, which is now on display at the Du Pont Products Exhibit at Atlantic City. This relic was originally owned and used by Silas Burbank, father of Charles G. Burbank, of the firm of Burbank & Ryder, whose business was conducted for many years under the name of the New England Paint and Varnish Company, now a subsidiary of the E. I. du Pont de Nemours & Company, Inc.

With the development of the colonies, better means of communication followed and itinerant trades one after another became industries with fixed locations. Varnish-makers abandoned their wagons and established permanent plants. Burbank & Ryder launched their enterprise at Salem, Mass., in 1825. In 1861 the plant was moved to Charlestown, a suburb of Boston, and later to Everett, Mass. The Charlestown site was along the banks of the Mystic river at a point where tides inundated portions of the property. In those days wood was used as the heating agent in the manufacture of varnish instead of coal or coke. The kettle was suspended over an open wood fire, and on account of the inflammable materials used, the varnish in the kettle very often caught fire. Then Mr. Burbank would be obliged to thrust a long, wooden handle into a socket on the kettle and rush to the river to extinguish the blaze or else lose the whole batch.



A kettle in which varnish was made in Colonial times

The firm of Burbank & Ryder prospered from the be-

ginning. Soon a larger factory was required. The type of kettle formerly used was now too small and too dangerous to meet the requirements of the day. New vessels of larger capacity were provided. Storage tanks for aging the varnish were installed and filter presses came into use. Coal and coke replaced wood as a fuel and one improvement after another was added until varnish-making took its rightful place among the world's industries.

It was at this time that the former Chicago Varnish Company was formed. Anson C. Potwin and Captain O. H. Morgan founded the company in 1867 and commenced business at 194-196 Pine street. At that time their factory was one of the most pretentious buildings in the country devoted exclusively to manufacturing varnish. The site of the first building of the company is now occupied by the Fourth Presbyterian Church, and Pine street has become North Shore boulevard.

The great fire in 1871 destroyed the factory and the homes of every one connected with the business. It virtually wiped out the capital of the company. The young firm, however, made another start, rebuilt its factory and within a few months resumed business. A few years later William C. Potwin and B. C. Chambers became connected with the firm. All of the original founders have died or retired except Captain Morgan, president of the company, a Civil War veteran, who has been active in the business since its formation.

In 1883 the company was incorporated under the name, Chicago Varnish Company. The yellow label on the square can, with which this concern has distinguished its product for half a century or more, is one of the most familiar things in the trade. This label has become a hall-mark of quality to paint dealers. Some of the most desirable customers of the company have been its patrons for fifty years.

The brand names of many of the products of the former Chicago Varnish Company—now owned by the E. I. du Pont de Nemours & Co., Inc.—are as familiar to the trade as the yellow label on which they are printed. The company, following the line of specialized development, has produced many varnishes ideally adapted to meet the individual needs and particular requirements of its customers.

Supremis Floor Varnish represents the first successful effort along this line, presenting a product that dries quickly enough to make application practical in the home. In durability, also, it stands the test of severe wear, producing an elastic, waterproof finish of good lustre. It is light in color, thus developing the full beauty of light woods.

The success of Supremis Floor finish led to further developments of specialized products. Among these are Shipoleum, for interior woodwork; Chi-Vo, for producing the soft tone of hand-rubbed work; Florsatin, for a durable, velvety finish on floors; Navalite, for exterior work; auto and carriage varnishes and other products necessary to round out a complete and representative line.

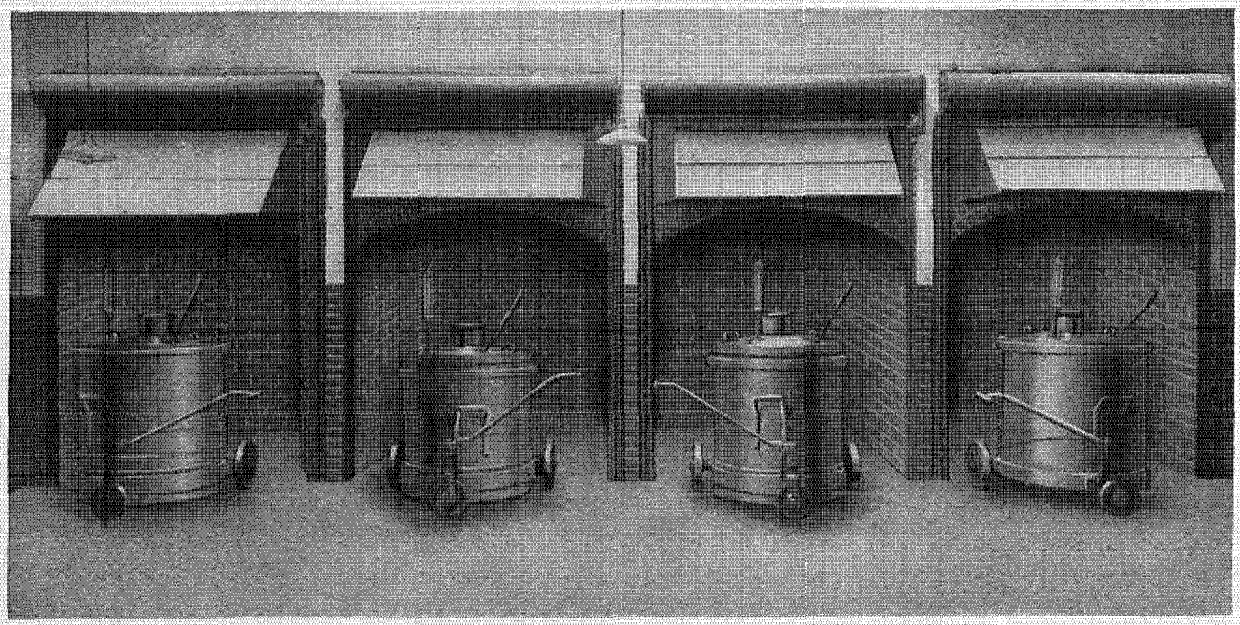
The process of manufacturing varnish is as interesting as its history. The mechanical details are comparatively simple and consist of boiling, thinning, and filtering. Three essential ingredients enter into a varnish composition—gum, oil and a solvent or thinner. Gum gives to varnish the necessary hardness and lustre; oil imparts elasticity, and the solvent keeps the material in a liquid state. Into almost every varnish a drier is also added as a fourth ingredient.

Copper kettles are still used to melt the gum and heat the oil. But the venerable varnish kettles of Colonial days, with which Mr. Burbank rushed to the river to extinguish a blaze, are pigmies beside the huge, portable containers in a modern varnish factory. They are large kettles of from 150 to 250 gallons capacity.

Fossil gums are usually employed in the manufacture of the best varnishes. These gums are the excretions of trees. Thousands of years ago the sap ran upon the ground, became hard and was covered with layer upon layer of decayed vegetation so that it is necessary in some cases to dig several feet to obtain the gum.

In manufacturing, the gum is heated in huge kettles placed over a coke fire under a stack. When the gum is melted, oil—generally linseed, or China wood oil—is added, having been heated separately. To obtain the best results the oil must be added at just the proper time, and only an experienced operator knows when that moment has arrived.

Continued on page 16



The modern varnish kettle, unlike the relic shown on the opposite page, is made for big scale production

OUR 1921 ADVERTISING

How it is building a preference for Pyralin with twenty million readers

By A. H. BERWALD
Advertising Manager, Pyralin Division

IN the January issue of this magazine our dealers were told in detail how the 1921 line of Ivory Pyralin toiletware was standardized and what features in the make-up of the new line were of special interest and advantage to them. They were also told very briefly of the powerful support they would receive through our 1921 advertising, the details of which were promised in this issue.

Mere size is not always an accurate measure of power. So when we say that our 1921 advertising is by far the largest campaign ever undertaken by a manufacturer of toiletware, we realize that the efficiency of this advertising is as important to our dealers as its scope. Is our campaign so conceived and will it be so executed as to exert all of its stimulus in the various channels through which increased sales must come? We can only state the facts and leave our dealers to judge for themselves.

We have always regarded the advertising of Ivory Pyralin toiletware as a process for the systematic creation of demand, and to the systematic character of our advertising we attribute in large measure its very generous results. Our 1921 advertising is necessarily much stronger than any previous campaign because it supports a merchandising structure which has grown immensely in all directions. The important thing was to plan the campaign, as the foundation for any structure is planned, with its strongest members where the heaviest strain must be met, but with no part of the business of selling Pyralin toiletware left unsupported by the omission of any necessary advertising feature.

We visualize the production and sale of Pyralin specialties as a great tree, its roots the factories from which the merchandise comes; its trunk, our sales department through which the merchandise passes into and through the larger limbs, representing our jobbers, and the smaller branches, representing our dealers. Around the whole tree, but always in contact with the dealers' branches, are the myriad leaves which represent individual purchasers, who must own and be satisfied with the merchandise before we can regard it as actually sold.

It is only as the number of these leaves increases that the branches and limbs can expand and the entire tree grow. In nature, sap and sunlight make new leaves. In business, information and desire make new consumers. So we use the structure of our tree to circulate the sap of information—printer's ink. Saturating this with convincing facts, we nourish the desire that brings many new customers to our dealers and makes our line popular, fast-selling and profitable.

One great artery through which the sap of this information reaches the consuming public is our 1921 list of national magazines, whose covers are shown with this article. These magazines were so selected that practically every logical user of Pyralin toiletware would be included among their more than twenty million readers. Grouping the magazines according to their special appeal to various classes of people, every section of the discriminating public is found to be covered adequately. Only full page advertisements will be used, and in the more important selling seasons these will be in four colors. No effort has been spared to make each advertisement as beautiful and impressive as possible. Special attention has been paid to the copy, the underlying purpose of which is to aid the consumer in the intelligent selection of toilet articles; to cultivate a taste for what is truly beautiful and serviceable; to encourage the starting and completing of full sets of Pyralin; and thus to establish our merchandise as a year-round leader and staple seller for every purpose of gift-giving and personal use.

The desire which this national advertising creates is not left to die through lack of information as to where Pyralin toiletware can be purchased, but it is crystallized into actual sales through effective dealer co-operation. Every dealer is given the means of identifying his store with our campaign in so many ways that, if he will use them, the prospect will decide to buy and where to buy Pyralin toiletware in the same thought. He will consider no other dealer.

Twenty million people will read about Pyralin in these national magazines

Our plans work out in this way: The prospects who read about Pyralin toiletware in our national magazines also read in their local newspapers the advertisement of some live dealer who has it for sale. For we furnish without charge, to every dealer who will use it, an extensive electrotype service covering a wide assortment of complete newspaper advertisements and of appropriate separate illustrations, ready to print. Everything is done to make it easy for the dealer to select and order these electrotypes from our catalog. Through their use he reaches an additional number of

his prospective customers whom our national advertising, however extensive, may not reach.

If the prospects attend the local motion picture theaters they will, in many cases, see the dealer's advertisement of Pyralin toiletware thrown upon the screen, for any dealer who can use lantern slides is provided with a colored set without cost; and here again he can not only freshen the desire already created in the minds of a great many prospective buyers, but he can undoubtedly reach an additional number that our other forms of advertising have not covered.

Alert dealers will make large use of these helps to increase Pyralin sales

If the prospects are on the mailing list of this live dealer they will get from time to time little folders, each one describing some particular pattern of Pyralin toiletware, or calling attention to that pattern in new decorations or new materials, such as Amber Pyralin and Shell Pyralin. The dealer pays nothing for this literature and can always have a supply of folders appropriate to the merchandise he is stocking. There is, for instance, a special folder on each of the following: Du Barry, La Belle and Plain Patterns; Du Barry and La Belle Patterns Decorated; Amber and Shell Pyralin Decorated.

When the prospects go down the street, they see in the dealer's window a large, attractive window card featuring the same advertisement of Pyralin toiletware they have just admired in their favorite magazines. And this happens again and again, for we furnish a series of eight of these cards, about 14 by 22 inches each, to dealers who will display them during the months in which the respective advertisements they feature are running.

Going into the dealer's store, the prospects' attention is arrested by various counter displays which again urge the purchase of Pyralin toiletware. These the dealer has received from us and put up in prominent places. At the show case, where the prospects are confronted with the beautiful merchandise itself, they hardly need further urging, but even there they see alongside the pieces they have decided to buy a handsome little card which assures them that these pieces are indeed "Ivory Pyralin."

If a prospect desires any information about the quality, construction or care of the merchandise, the clerk is equipped to give it. To meet this need we have prepared for him booklets such as "Points on Ivory Pyralin for the Retail Clerk" and "The Autobiography of an Ivory Pyralin Brush." If information about pieces, patterns or decorations not in the dealer's stock is wanted, the clerk has our two illustrated catalogs to which he may refer.

There is no way in which the prospect, once interested by our national advertising or the dealer's local advertising, can lose interest, if the dealer uses our sales helps to keep it aroused and always moving toward the point of purchase. A considerable part of our 1921 campaign is being devoted to the instruction of the dealer, because we know that the dealer who understands the plan and purpose of our campaign will cooperate with us in the ways suggested and share in the increased business this advertising will develop.

By this time the dealer should have received our folio of national advertising, showing him just what advertisements will appear throughout the year and in what magazines, with all circulation data and information as to the purpose of the advertising. He should also have read in his trade papers our two-page January advertisement, explaining our 1921 standardized line and telling where and how it will be advertised. Subsequent issues of his trade papers will advise him every month when and how to sell Pyralin toiletware to the greatest advantage. This will be supplemented by whatever useful information and additional sales helps changing conditions make practical.

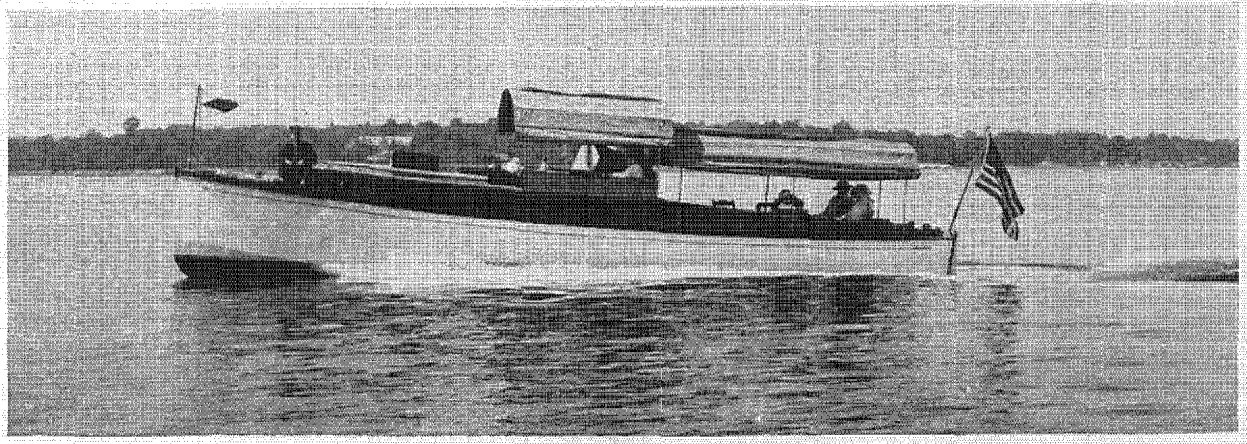
Our salesmen will always be glad to show dealers the various advertising helps designed for their use, to take orders for advertising supplies, and to explain any features of our advertising that may not be clear. Once our dealers fully understand the plan of our campaign, we know we shall have their full co-operation and be enabled to make the economic value of our advertising ever greater by producing more and more business for them and for ourselves.

We want every dealer to feel he is a partner in this advertising—that its value is not to us alone. Our toiletware, delivered to his store, has no real value to him until the public has been informed of its existence there and educated to its purchase and use. There must be in all advertising a social service which includes consumer, dealer and manufacturer or it fails of its true purpose. We believe our 1921 campaign fully meets this requirement.

FUSE LENGTHS FOR DELAY SHOTS

To avoid misfires in metal mining and to assure a proper sequence of delay shots, we recommend that the fuse for each round of holes be cut four inches longer than for the preceding round. In case the number of holes in a round is too large to permit a four-inch cut, it may be left to the judgment of the shot firer to reduce the cuts to three inches, or even two if necessary, but, in general, the four-inch increase in fuse length for each successive round is a safer and more efficient practice.

MARITIME PROTECTION



The Du Pont Nautico line of paints is complete and fills every requirement for boats of all kinds

DID you ever hear a ship referred to as "he?" Of course not; for ships are always considered as feminine and spoken of as "she" and "her." Just why this should be so is an interesting speculation. Old salts say it is because of their tendency to develop temperament on the least provocation; because they are hard to manage in stormy weather; because they must be humored at all times. Our own explanation is that ships are properly classed as feminine because they require elaborate outfitting of a peculiar and distinctive kind.

Almost every article in common use on land must undergo considerable transformation before it is adapted to marine service. Specially treated metals and woods, certain kinds of machinery, peculiar instruments, even to a particular kind of "clock," must be supplied to "those who go down to the sea in ships."

The conditions met at sea differ so radically from those on land that almost everything needs special preparation. Starting with the fatuous truism that land is dry and water is wet, the comparison of contrasts might be carried to any length. The severity of storms at sea and weather conditions generally show plainly enough the necessity for articles specifically adapted to marine use.

It is only natural, therefore, that ships should require special kinds of paint. The general idea of the landsman is that the paint he uses on the outside and inside of his house is also suitable for use on boats. This, of course, is erroneous. Not only do boats require special kinds of paint but almost every part of the ship must have its own individual composition to meet the special requirements and particular exigencies of its location.

Within the same month the paint on a vessel may be called upon to withstand Arctic blasts and the furnace-like breath of tropical winds. Its exposure to howling gales, the corrosive effect of salt water, blistering sun, and spray that is ice before it touches the decks, place an extraordinary demand on marine paint which cannot be met by ordinary products for land use.

The demand for ship paints has grown with the demand for an American merchant marine. Coincident with this development the Du Pont Company has carefully studied the needs of ships for paint protection and has added to its original line of marine paints many specialized products. The Du Pont Nautico line now includes a complete list of tested marine paints, made to fill all the needs of ships and to meet every demand of this exacting trade.

Some of the requirements of marine paints, to enable them to withstand the action of the elements, have been mentioned. There are in addition to these, however, other demands peculiar to the marine trade. In order to meet these needs the Du Pont Nautico line carries, among many others, Anti-Corrosive and Anti-Fouling Ship Bottom Paints.

Corrosion is one of the enemies of long life for a ship. The action of the chemical agents in the salt water of the ocean or tidal streams has an injurious effect on metal. The hull of a steel boat, if left unprotected in salt water, soon becomes corroded and unseaworthy. The Du Pont Nautico Anti-Corrosive Paint is used on metal bottoms as a first or priming coat. By using this paint, pitting and corrosion are prevented. It also forms an excellent foundation for the application of Anti-Fouling Ship Bottom Paint.

Fouled bottoms are and have been the bane of boat-owners since the first ship sailed the seas. Barnacles, cemented together with sea growths of various kinds, often cling to the entire bottom of a boat, covering it a foot deep. Unless the vessel is placed in drydock, scraped and repainted from time to time, this fouling interferes seriously with the speed of the ship, adds to the expense of its operation, makes the boat hard to manage and results in speedy deterioration of the part affected.

It was discovered some time ago that sea growths, barnacles, worms, seaweeds and the like, could not exist when attached to copper. The metal poisoned both the crustaceans and the plants, leaving the bottom comparatively free from parasites. Ship-owners accordingly resorted to the expensive method of sheathing the bottoms of their vessels with copper. This, while not altogether satisfactory, at least retarded the accumulation of foul matter on the bottom of a boat.

Nautico Anti-Fouling Ship Bottom Paint and Copper Paint are used, as the names signify, to prevent fouling. The former is used on metal bottoms, generally over a priming coat of Anti-Corrosive, while the latter is used to protect wooden bottoms, replacing the expensive copper sheathing.

The combination of these paints has proved satisfactory. Anti-Fouling paint, in contrast with some others, does not saponify. The action of the alkali in the salt water has no

injurious effect upon it. Neither will the friction of the water wash off the paint nor cause it to peel. Copper paint is smooth and tenacious, giving the best possible protection to wooden bottoms. In this way it serves the same purpose as Anti-Fouling Paint for metal vessels.

While ship-owners were wrestling with the problem of keeping their ship bottoms clear of fouling, a durable paint to be used at the water line was also a pressing need. For many years it was impossible to make a paint that could resist the alternate action of salt water and exposure to air, such as paint on the boot-topping of a vessel must withstand. The paint used at that time peeled off rapidly, leaving the hull at the mercy of the elements.

It was the practice of those who sheathed boat bottoms with copper to extend the metal well above the water line. Those who did not have copper bottoms on their vessels placed bands of copper around the boot-topping, well under and above the water line. Both expedients served the purpose but were an expensive substitute for paint.

Included in the Du Pont Nautico Line is a Boot-Topping Paint specially compounded to meet the peculiar demands of paint at the water line. When a vessel is sailing "light" a considerable part of the hull, usually under water, is exposed to the salt air. When it is heavily loaded the same portion of the vessel is submerged and subjected to the action of salt water. When this part of the boat is covered with Nautico Boot-Topping Paint, protection against the alternate action of air and salt water is secured.

The complete line also includes paints for hull and superstructure use. They are sold either in prepared or in semi-paste form. These products represent the essential requirements of the marine trade and are suitable for painting either steel or wooden parts. They can be used on the bridge house, funnels, stanchions, davits, life-boats, forecastle, masts; in fact, all parts of the vessel above the boot-topping referred to.

Varnishes manufactured by the former Chicago Varnish Company are an important part of the Nautico line. These are already well and favorably known to the trade as Navalite, Cabinoleum and Supremis Floor Varnishes. For interior and exterior finishes, either for decorative or utilitarian purposes, this line is particularly adaptable. Because of their known quality and their proved durability in the face of the exacting demands of the sea, these varnishes make a valuable adjunct to the Nautico line.

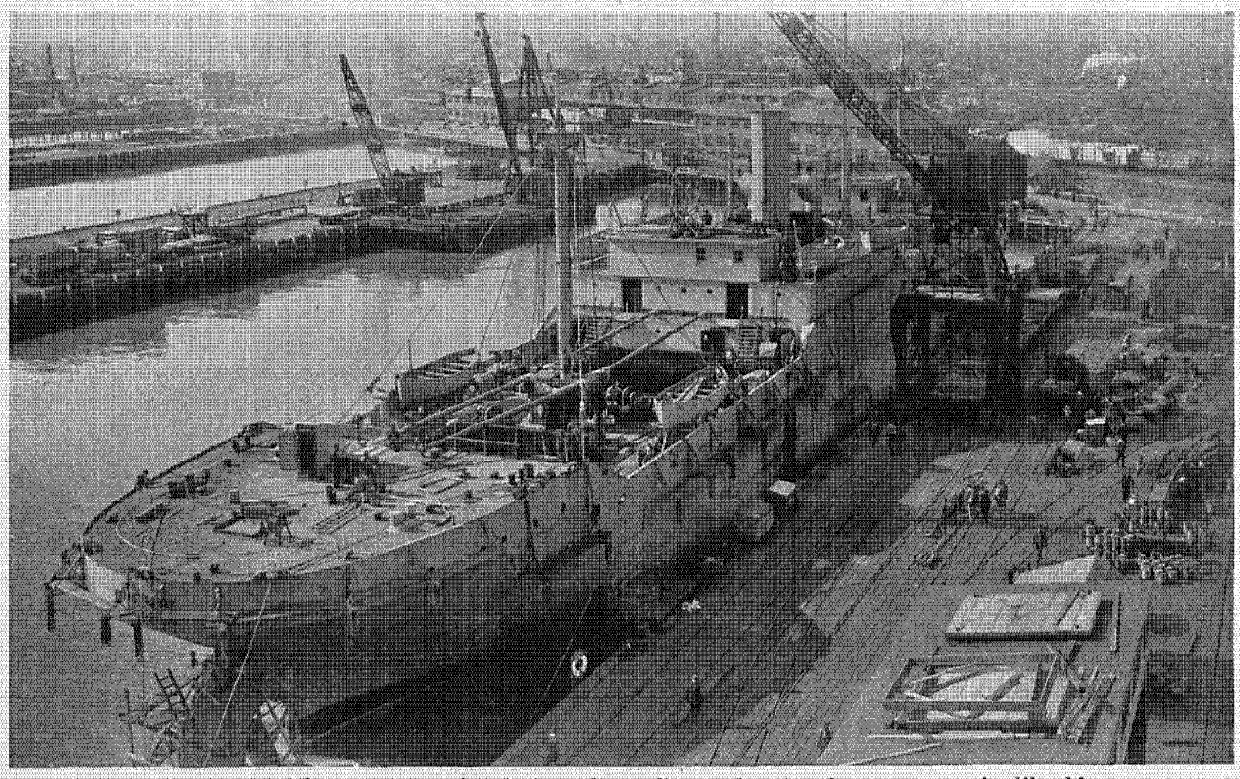
Supreme Yacht White, also known to the trade, is another of the older paints which has been added to the complete marine line. This paint is generally used on pleasure craft. It is of excellent quality and can also be used on boat interiors.

In addition to those already mentioned, a line of deck and floor paint is available. This paint will give maximum service under the most trying conditions to which such a coating can be subjected in a ship. It finishes with a tough, elastic film, is resistent to moisture and retains its color indefinitely.

For cabin work the Nautico line provides Inside Flat White, a finish for interior woodwork or as a priming coat for Supreme Yacht White. This paint adds to the appearance of roominess, is washable, sanitary and reflects light.

Signal Colors, for ventilators, screens, cowls, winches, and trimmings, are also part of the general Nautico line. These colors are brilliant, as suited to their uses, and they are permanent in shade.

In order to please her feminine and fickle majesty the Ship, the Du Pont Nautico line has been produced in a variety of colors suitable to the particular purposes to which it will be applied. The interior paints, including the flat whites, Supreme Yacht Whites and the line of varnishes, should please the most fastidious. These allow a range of selection which is sure to meet the most exacting requirements of the marine trade.



Paint is essential to every type of craft, from the smallest rowboat to a large cargo carrier like this.

DOCTOR DANIELS' DILEMMA

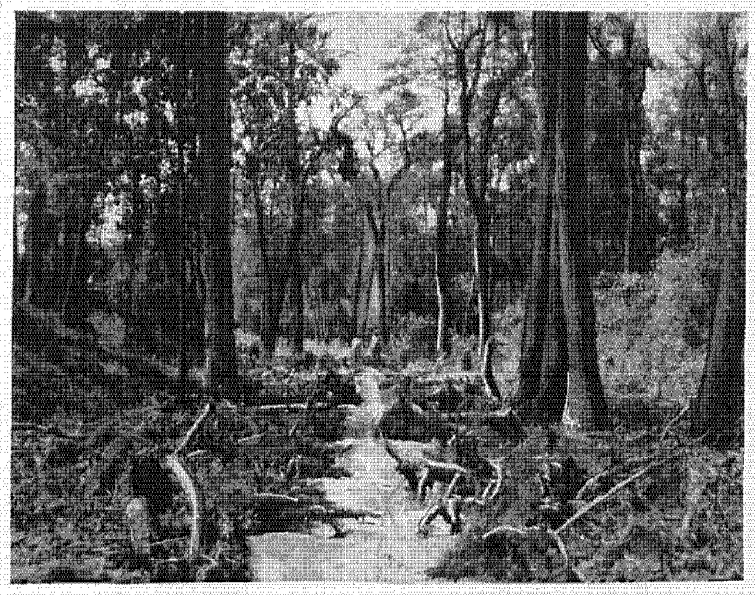
Georgia physician discovers a modern method of soil surgery and rescues his investment in partly finished project

"I TELL you, Doctor, it can't be done." "Looks that way, doesn't it, Joe," said Dr. Daniels. "But we've got to finish it. Can't have the neighbors giving us the laugh and saying 'I told you so.' That always annoys me. I'll show them that Dr. J. W. Daniels doesn't start anything he can't finish—at least not yet."

Dr. Daniels was a man of modern ideas. He was always ready to employ new methods in his professional work, especially if they were sound and had been successfully tried out by others. This same progressiveness prompted him to install a modern lighting and power plant for his dairy and farm buildings located near his country home in Georgia.

Up to the time of the above remarks he had built a dam, spent several thousand dollars for machinery and had his water wheel on the ground. By dint of hard work he and his helpers had built all the hillside mill race; but the problem now was to dig a drainage ditch through the lower swampy ground to carry off the water from the dam.

He had tried to finish this ditch by hand, but had to give it up. The ground was in parts covered with brush and tightly bound by roots of trees through which the ditch had to run; other parts were swamp-land. He had written to the Du Pont Company for advice on how to blast this ditch. He realized that he really had an unusual problem, and even with the detailed information at hand, he was afraid of the complications and methods of procedure.



Ditching through swampy woodland is a difficult job for hand labor, but an easy one for dynamite

Again Joe repeated, "Give it up, Doctor, and forget it;" but the words had hardly left his mouth when "BOOM!" a dull explosion, apparently about one-quarter of a mile distant, was heard.

"Now, what do you suppose that means?" asked the doctor.

"Sounded like a blast; but let's run over and see."

The two men started over the hill, but noted nothing unusual until they came to E. F. Doyle's farm, where a group of men were gathered around an object that at first sight appeared to be a dead animal. On approaching they discovered it was an unusually large tree stump, which apparently had jumped out of the ground, roots and all.

"Hello, Doc,—just in time," exclaimed his neighbor; "I want you to meet Mr. Albert, of the Du Pont Company. Albert's showing us how to get these pesky stumps out of the way for good. He figures we can blast out about twenty of them today."

"Glad to meet you, Mr. Albert. You're just the man I want to see. When you finish up here would you mind running over to my place. I want to run a ditch through a piece of woodland and I don't know how to go about it. Think blasting will do it?"

"It ought to. I'll run over in the morning and take a look at it," answered Albert.

"Save your time, Albert," chimed in Mr. Doyle. "Daniels has been working on that ditch for weeks, and I tell you it can't be dug. You won't even do it with dynamite."

"We'll see," replied the blaster with a smile.

The next morning Albert and Dr. Daniels looked over the ground. "Well, what do you think?" asked the doctor.

"Yes. It can be blasted," said Albert. "I'll make a test shot in the swamp and show you."

This was done and the doctor saw at once that blasting the ditch was the only solution to his problem.

On Albert's advice three hundred pounds of 50 per cent straight N. G. dynamite were ordered, and when the explosive arrived the Du Pont man was on hand to supervise the work. The scoffers from the other farms came over to see Dr. Daniels fail. There followed some good-natured joshing, but the doctor took it all in good part and was all the more determined to "show 'em."

One cartridge was placed in each of the holes, which were spaced about twenty inches apart and from twenty-two to twenty-four inches deep. Naturally, preparing these holes along the ditch line through the swamp was no easy task, but it was child's play compared with digging the ditch by hand.

Number 6 blasting caps and fuse were used to start each blast, and the detonation of the first cartridge started the blast down the line for one hundred or one hundred and fifty feet. This is known as the "propagated method."

In ten hours' time the work was completed. The result was a ditch about one thousand feet long, three and one-half feet deep and between six and seven feet wide. The accompanying illustration shows one section of the ditch.

"I knew there was a way to dig that ditch," remarked Dr. Daniels, "but without your help, Mr. Albert, I was afraid to tackle it."

"Well, Doctor," replied Albert, "the Du Pont Company keeps me traveling all the time just to show what can be done with Du Pont dynamite. I'm obliged to you for giving me the chance to prove to these gentlemen that, when it comes to blasting, what 'can't be done,' can be done by Du Pont explosives. This job will serve as a demonstration."

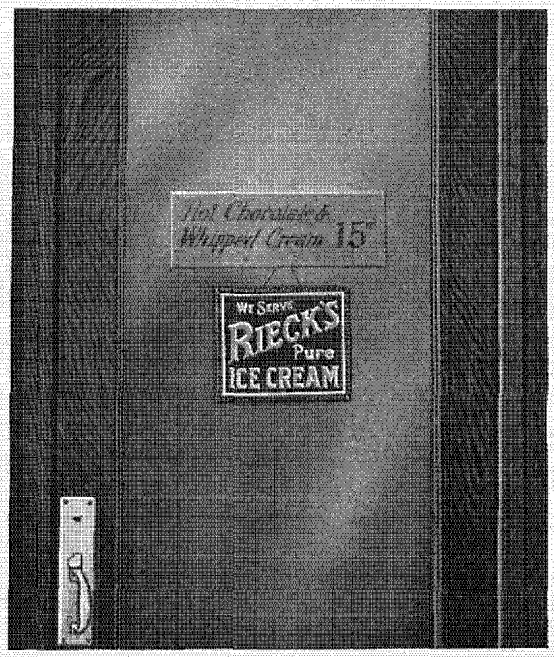
"SILENT SALESMEN"

While not endowed with tongues, signs made of Pyralin sheeting are nevertheless persuasive

THE merchant's store or window sign is his "silent salesman," but a salesman none the less even if it does not express itself vocally. For signs have a language of their own—the sign language, if you please—and they can and do convey selling suggestions to thousands of people each day. They make live prospects of pedestrians who are led by the power of suggestion to pause, enter stores and purchase goods. It takes a strong man—or a blind one—to resist the convincing, unceasing appeal of a store sign at its best.

People read whatever is attractively prepared to catch and hold the eye. That explains why store signs are so universally used to attract trade; it also explains why sign manufacturers are alert to find the most adaptable materials for making signs more attractive. Manufacturers and distributors of nationally advertised products make large use of signs and naturally each wants his own signs made of materials that will appropriately represent his firm and the character of its products.

The signs you commonly see in stores are made of cardboard, wood, glass, tin or other metals. Each possesses qualities that make it especially suitable for certain uses and for certain classes of signs. One does not expect to see a cardboard or tin sign in a bank nor an expensive bronze sign in a small grocery store. The variety of treatment given to store signs made of these materials proves that sign makers are responsive to the demand for novel and striking effects; in their efforts to keep up with the progress of the day, it is not to be wondered that they have become interested in Pyralin as a material lending itself especially to their work.



This all-Pyralin sign tells its story day and night

Pyralin is no stranger in the advertising field. In fact, one of its first commercial uses was for calendars, cards, book-marks and other small advertising novelties. In this field it soon gained popularity because the material was found to be unusually well suited for such uses. The lustrous Pyralin sheeting satisfied every requirement for tensile strength and flexibility; its light weight was a recommendation; it could be kept clean and, best of all, the material, beautiful in itself, could be printed, lithographed, embossed, engraved, or painted. Manufacturers recognized that it was the ideal material for advertising novelties.

The extensive use of Pyralin sheeting in these small novelties soon proved its adaptability for advertising mediums of larger size. Transparent Pyralin Sheeting came into use as a protection for wooden and cardboard signs. It became the common practice to print an advertisement on paper or cardboard, mount it on wood and then cement a sheet of transparent Pyralin over the face of the sign to protect it.

With the development of Pyralin in solid colors, mottles, stripes, plaids and in the likeness of amber, shell, pearl, horn and other materials, it was only natural that this sheeting should be more extensively used for signs of all descriptions. It was but a step from the use of Pyralin as a covering for signs to making the sign itself entirely of this material.

Such signs have been produced by manufacturers for some time, but one alert manufacturer uses Pyralin sheeting to make a new form of distinctive indoor hanger. The lettering of the advertisement and its decorative background and border are embossed in one operation. Then, leaving the lettering in its natural Pyralin color, the remainder of the sign is artistically painted. Each word on the sign, embossed on the highly polished, translucent sheeting, shines forth from its semi-opaque background of black, dark blue, or dark green with a brilliancy that catches the eye and commands attention.

As the illustration accompanying this article is in one color it cannot do justice to the attractiveness of the sign reproduced.

One of the best qualities of a sign made of Pyralin sheeting is its transparency, which allows it to do a double duty. The rays of the sun pass through the lettering by day, illuminating and heightening the color effect; at night the artificial lights within the store shine through, making the sign one hundred per cent efficient.

A sign made of the proper material is like a salesman who is careful about his personal appearance—both make a good impression for their employer. No one is attracted to a salesman or a sign that is "down at the heels" and no progressive merchant tolerates either. The use of Pyralin sheeting for "silent salesmen" assures signs that will be both attractive and, in their subtle way, persuasive.

SOUNDS WITH SOUND WAVES

By sounding with sound waves instead of a steel cable a Frenchman has been able to determine the depth of the ocean in a few seconds where the ordinary process requires minutes and hours.

In contrast to the usual equipment of cable, reels and donkey engine, he equips himself only with a quantity of high explosives, a microphone and a chronometer. Detonating a charge of explosive in the wake of his moving vessel, he hears in his microphone both the noise of detonation and the echo produced by reflection from the bottom. Reading the time interval from the chronometer and knowing the speed of sound in water, he is able to calculate the ocean's depth at that point. Tests have shown that the method yields sufficiently accurate results for practical purposes.

THE
DU PONT
MAGAZINE

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E. R. MANCHESTER ..... *Managing Editor*
MATT DENNING ..... *Associate Editor*

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COMPANY CHANGES

John J. Raskob, a vice-president of the E. I. du Pont de Nemours & Co., Inc., has been chosen as one of the fifty-seven leading business men of the country who will constitute the American committee of the International Chamber of Commerce.

F. Donaldson Brown, treasurer of the E. I. du Pont de Nemours & Co., Inc., has resigned that position to accept the treasurership of the General Motors Corporation.

E. W. Proctor has been appointed treasurer of the E. I. du Pont de Nemours Export Company, succeeding F. Donaldson Brown. Mr. Proctor's office will be at the headquarters of the Export Company, 120 Broadway, New York, N. Y.

The entire business of the Du Pont Fabrikoid Company, Inc., has been purchased by E. I. du Pont de Nemours & Company, Inc., and is now operated as the Fabrikoid Division.

W. M. Boyle, who has been manager of the Company's high explosives plant at Ramsay, Montana, since it was put in operation in 1916, has been transferred to the Compania de Explosivos de Chile to serve as general manager. He will make his headquarters in Chile. J. H. Wellford, formerly assistant manager of the Barksdale, Colorado, plant, succeeds Mr. Boyle as manager of the Ramsay plant.

E. W. Wiggins, manager of the Arlington, N. J., plant of the E. I. du Pont de Nemours & Co., Inc., has been granted a year's leave of absence. R. W. Brokaw, assistant manager, has succeeded him.

P. N. Denison, formerly manager of the Pittsburgh Explosives Branch Office, has been appointed general sales manager of the Pittsburgh Consolidated Office.

Giles McDaniel, formerly manager of the Columbus Consolidated Office, and more recently assistant general sales manager of the Pittsburgh Consolidated Office, has been appointed sales manager, Paint and Varnish Division, of the Chicago Consolidated Office.

Ernest R. Cathcart, formerly assistant manager of the Company's Fabrikoid plant at Newburgh, New York, has been appointed superintendent of the Fairfield plant, at Fairfield, Connecticut, succeeding L. A. Beecher, resigned.

J. W. Elms, vice-president of the Du Pont Chemical Company, has been appointed manager of the Parlin, New Jersey, plant of the E. I. du Pont de Nemours & Company, Inc. He takes the place of F. L. Fullam, who has retired.

Walter S. Carpenter, Jr., has been named treasurer of E. I. du Pont de Nemours & Company, Inc. For nearly two years he has been a vice-president and director of the corporation, in charge of its Development Department. He succeeds F. Donaldson Brown, who has become connected with the General Motors Corporation. Mr. Carpenter has been with the Du Pont Company for about twelve years. He is a Cornell man. On first coming with the Du Pont Company in 1908 he was attached to the Engineering Department. He afterwards spent two years in Chile, South America, representing the Treasurer's and Purchasing Departments of the Company. Later he became connected with the Development Department and after handling important work in that branch was named as assistant director, then as director, and finally vice-president in charge of the Department. His work in the Development Department, having to do with a careful study and analysis of new enterprises, as well as his South American experience, well fits him for his present position as treasurer of the Company.

GOOD ROADS A NATIONAL NEED

The need for good roads for the development of highway transportation was forcibly emphasized by the Secretary of Agriculture in his recent annual report. He said:

"It required a great national catastrophe to awaken the American public to the inadequacy of our transportation facilities and to the fact that we must depend largely on our highways, in conjunction with motor vehicles, when a sudden expansion in transportation is essential. Our experiences during the last three years have clearly demonstrated that the failure earlier to inaugurate a sound road improvement program has retarded the effective development of one of our most vital national requirements.

"The use of the motor vehicle for highway transportation has increased tremendously within a short period. In 1906 only 48,000 motor vehicles were registered in the United States. By 1914 the number had risen to 1,700,000, while the registration now totals nearly 8,000,000, exclusive of motorcycles. The actual vehicle-mile use of our roads, it is estimated, has increased 500 per cent, in strictly agricultural communities, and more than 1000 per cent near the larger centres of population. These figures indicate the extent to which community and short-haul transportation will be served by better highways."

A NOVEL FOLDER ON CRAFTSMAN FABRIKOID

The Fabrikoid Division of the E. I. du Pont de Nemours & Company, Inc., has recently prepared a fourteen-page booklet which has some very distinctive features. The cover of the booklet is a "cut-out" showing a young lady seated in an easy chair. On six following pages are reproductions in actual colors of six different samples of Fabrikoid, and the pages of the booklet are so arranged that the front cover can be placed over any one of these colored reproductions. In this way the reader is able to get an accurate idea of how the chair appears when upholstered with Fabrikoid in these different colors.

This booklet is made to enclose in a standard small-size envelope, and is suitable for distribution by retail furniture dealers as well as by jobbers of upholstery materials. Space is reserved on the back for dealers' or jobbers' imprints. A specimen copy will be sent to anyone interested.

THE FABRIKOID SUPER-FINISH

A new and important development of special interest to many manufacturers

By L. S. UTLEY

Special Representative, Fabrikoid Division

IN a society as complex and exacting as ours the utility of a product may have very little influence upon its actual use. A product which satisfies every test of the service for which it is designed may fail utterly if it does not satisfy the eye of the prospective user. This sight test makes the finish of most products very vital to their commercial success. Since this is true of the general run of products, the matter of finish must indeed be paramount in a product which, like Du Pont Fabrikoid, is very often used primarily because of its surface character and appearance. In such a product an improved finish is of the utmost benefit to all who use it, and can be quickly translated into its dollars' and cents' value.

The Du Pont Company has solved many problems in the production of Fabrikoid, but no development of recent years is of greater importance or of wider application than the production of a super-finish on Fabrikoid that makes it entirely practical for many uses of a de luxe character for which no material of its type could heretofore satisfy the close scrutiny of exacting users. While the new super-finish increases the possibilities of Fabrikoid for all of its established uses, and opens up entirely new fields for it, its most immediate advantages will accrue to manufacturers who capitalize it as a means of duplicating with absolute fidelity the appearance and feeling of fine leathers which were hitherto unmatchable.

Fabrikoid of regular finish matches exactly the standard leathers used for furniture upholstery, traveling goods, and other purposes, but there are many rich special finishes on fine leathers in color combinations that our regular qualities do not match. The new super-finish brings all of these special leathers within the range of the manufacturer who wishes to duplicate them in Fabrikoid. Better still, he can match the particular finishes desired in his own plant and develop new finishes and combinations himself with which to make his line more novel and attractive. Any number of striking designs and beautiful color effects can be obtained, and all this can be accomplished without any long training or high degree of skill. Only the introduction of some inexpensive equipment is necessary and the use of some special formulas, but the process is simple, practical, effective and easily carried on after competent preliminary instructions.

The bookbinder and novelty manufacturer, especially, will find the super-finish on Fabrikoid a means of elevating the standard of their work and greatly increasing their selling field. Special qualities of Fabrikoid have been produced for "cut-flush" covers and for novelties that, when decorated and finished, are more desirable than the leathers formerly used for this purpose, and far less expensive.

Combinations of embossing and stamping in antique finishes, variegated effects, embossed gold or bronze titles, illuminated pictorial and ornamental designs, all are readily executed in Fabrikoid; and not only do they make a finer and more distinctive finished product but they are big factors in attracting new business and in making sales against competition.

The process incidental to the production of these effects offers the manufacturer with originality and creative ability unlimited scope for extending his line, for keeping it novel, elegant and impressive and for improving the appearance of every number at only a slight additional expense.

The use of this new process for finishing Fabrikoid makes it possible to produce combinations of leather and Fabrikoid in identically the same finish. For example, it is often highly advantageous to line pocket-books, bill-folds, portfolios and numerous other articles of genuine leather with Fabrikoid. A perfect match is naturally desirable—or absolutely necessary. Such a perfect match is made possible by the super-finishing process.

The use of the super-finishing process is particularly adapted to book covers of every description and has proved productive of greater profits, and wonderfully increased sales on subscription sets, historical and educational editions, catalogs, holiday booklets, bride, baby and guest book specialties; diaries, address, note and memorandum books; pass and check books; college annuals, menus, programs, calendars; Bibles and hymn books; cook books, advertising folios and binders. In the specialty and novelty lines it is being used to excellent advantage on hand bags, pocket-books, fancy frames, advertising signs, counter mats, desk pads, cutlery cases, jewelry cases and other articles. It offers endless possibilities, but we believe that one of its biggest selling features will be in the bookbinding and advertising specialties fields, where manufacturers can secure orders on the basis of reproducing the prospect's trade-mark, package, product or plant in a most faithful and impressive way, and in any colors or with any type of ornamentation or embellishment desired. And not only will the finished product have an elegance far beyond its cost but it will be non-fading, stain-proof, scuffproof and cleanable.

For such concerns as are not interested in doing their own finishing and decorating on this type of work, connections can be established with firms that have installed this process under our supervision for the purpose of catering to the trade in general. Fabrikoid is now also offered by the roll in several of the new finishes produced on our standard qualities, making them more attractive for many purposes than the materials previously supplied to the trade.

The service of an expert for demonstrating the super-finish and improved methods of embossing, stamping and decorating Fabrikoid is at the disposal of our customers. Equipment for doing the work can be obtained from several sources. Information regarding the cost and other particulars will be furnished on request to any manufacturer.

The Du Pont Company has developed the super-finish as a means of making Fabrikoid more beautiful and useful. It has nothing to sell in the finish itself, but will be glad to co-operate with all who wish to use it on their products, knowing that this will result in an increased use of Fabrikoid as well as in the general esteem in which it is held.

The reason that we have not illustrated the super-finish in connection with this article is that no reproduction in black and white could possibly show the distinctive character of this finish or the refinements that make it different from regular Fabrikoid. We will, however, be glad to send a specimen showing the finish to any manufacturer desiring it.

PIONEERS IN RESEARCH WORK

In a recent article on industrial research work the *New York Times* called attention to the fact that the E. I. du Pont de Nemours & Co., Inc., was a pioneer in this field. The article declared large corporations, government agencies, engineering organizations and universities were combining to salvage the knowledge gained during the war.

"It is only recently, however," the article continued, "that research has become a really national undertaking. The Du Pont works are known as pioneers in industrial research in this country, their work in this field dating back more than a century."

BLASTING AND TRIGONOMETRY

A ready reckoner for quarrymen and others that does away with guesswork

By CHARLES S. HURTER
Technical Representative

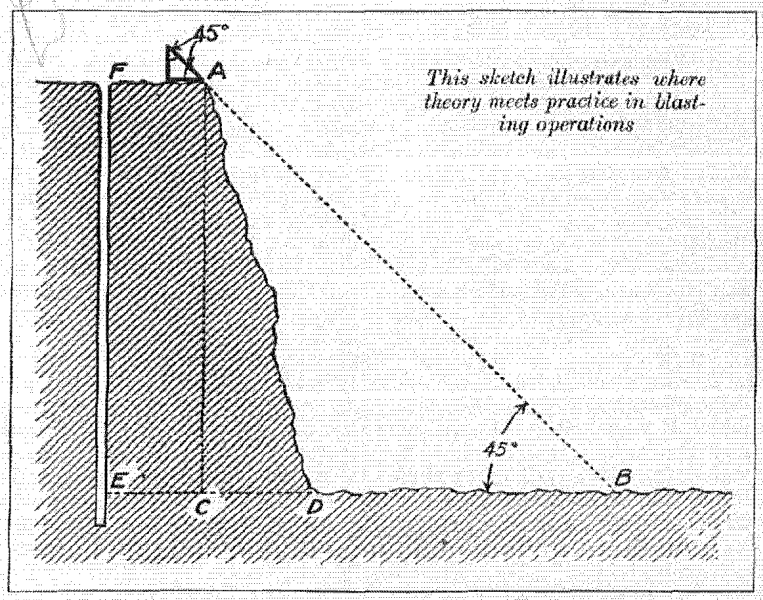
IT seems a far cry from the school boy knitting his brows over the "Pons asinorum" of geometry or its application in trigonometry to the perplexed blaster with a particularly difficult piece of work to do. There is a connection, however, that vindicates the inclusion of these subjects in the curricula of our high schools and colleges.

The average high school student finds very little of interest, and in his way of thinking, very little of practical value in the study of geometry. When his instructor explains that this subject is prescribed in his course for its value in developing the ability to reason logically and consecutively, he is quite likely to accept the statement with mental reservations.

For instance, take the proposition, "The square of the hypothenuse of a right triangle is equal to the sum of the squares of the two other sides." Doubtless thousands of young Americans are racking their brains to prove geometrically that the statement is true, but one wonders how many are thinking further than the time when "Q.E.D." can be subscribed to the work.

The fact is, this old killjoy of the classroom has many practical applications. To be more specific, blasters find it invaluable in solving some of the knotty problems they meet in their work.

Explosives are frequently required to blast away the face of a cliff or quarry, such as is shown in the accompanying sketch.



This sketch illustrates where theory meets practice in blasting operations

Where the mass of earth or rock to be moved by the charge is known, the proper amount of explosives can be easily determined. But it is where nature places difficulties in the way of estimating the exact mass to be moved that the connection between mathematics and the blaster appears.

In quarry work particularly, but also in large cuts for railroads, highways, canals and some land-leveling operations, blasting is sometimes complicated by the difficulty mentioned. Often when the time comes to load a blast, particularly in a quarry where well-drills are used, the determination of the thickness of the rock between the bottom of the hole and the bottom or toe of the face is largely a matter of guess. For example, if a bore hole for the explosive is drilled five feet from the top edge of the face, it may be sixty or seventy feet from the bottom of the face because of the projection.

The scientific blaster takes time to compute accurately this projection in order to determine the amount of material or burden which the explosive is required to move. He takes no chance of setting off a charge that may be either too weak to do the work or too strong for the economical recovery of the material blasted. The character of the rock or earth, and many other variable factors must be considered. For this reason he reduces the chances of misjudgment as far as possible by computing the burden even if it does involve a mathematical problem.

While highway, canal or railroad builders occasionally meet such problems, especially on large cuts, it is chiefly for the benefit of quarrymen that this article is written. The quarry blaster, on account of the nature of his work, must prepare his shots with the greatest care in order to get out the material in the best possible form, inexpensively, and without unnecessary waste. Heretofore he has either depended on his experience to help him guess the burden, or he has consumed valuable time computing it accurately each time.

There is a quick and easy way to solve such problems to the nearest foot without guessing or extended figuring. It involves the use of a simple apparatus and the application of the geometrical proposition referred to. This method is fully explained below:

Construct a forty-five degree right triangle out of two-inch square material, with each side twenty-four inches long. These dimensions are suggested in order to give a triangle that will be light, substantial and of handy size. Set this triangle as level as possible on the ledge, with the vertex A at the edge of the face, as shown in the accompanying sketch. Sight along the slanting side of the triangle to a point on the quarry floor, B, and measure the distance AB. A helper holding one end of the tape can be sighted along the triangle, and he can assist in taking the measurement at the same time. The line AB is the hypothenuse of a 45-degree right triangle, one leg of which is AC, the height of the quarry face, and the other BC. To ascertain the length of either of these legs the mathematical calculation would be to square the distance AB, divide by two, and extract the square root.

Sounds easy, doesn't it? But unless the quarryman is accustomed to figuring the square root of numbers, he is quite likely to pause before undertaking the task that confronts him in solving an actual problem of this kind. The average man looks upon the task of extracting the square root of a number with almost as much aversion as a dental patient looks forward to having a troublesome tooth extracted. He knows it can be done—in fact, ought to be done—but he dislikes to think of it. That attitude of mind explains why so many apply the rule of guess in blasting practice instead of the more scientific method of computing the data required.

The next step of the easy method suggested is to measure the distance on the quarry floor from the point B to the bottom of the face represented by the letter D. Subtracting this distance from the computed distance BC, as already found, enables the quarryman to determine accurately how far

the face of the quarry at the bottom projects beyond the perpendicular line AC dropped from the top edge of the face; that is, the distance CD.

In order to avoid the necessity of making this calculation, the accompanying table has been prepared. As soon as the distance AB is known, consult the table and find the equivalent number shown in light-face figures. The distance AC and BC, shown in black-face figures, can now be read off from the column opposite.

Finally, by adding to CD the distance represented by the line AF, which is equivalent to the distance EC, the burden, ED, in front of the hole at the bottom of the face, is found. And from this the proper load for the blast can be determined.

Now let us take a specific problem and see how the table can be used to solve it.

Suppose the hole is drilled twelve feet back of the edge of the face and a line run from the edge to the quarry floor at an angle of 45 degrees. AB measures seventy-eight feet. The distance from the point B to the bottom of the face, D, is forty-seven feet. Consulting the table, we find that when the 45-degree line AB measures seventy-eight feet, AC and BC, which represent respectively the height of the face and the horizontal distance from B to a point directly under the edge of the face, measure fifty-five feet each. Subtracting the distance from B to the bottom of the face, D, from 55 (55 minus 47 equals 8) we find that the toe of the face extends eight feet beyond the top. Then adding to this result the distance between the bore hole and the edge of the face (twelve plus eight equals twenty) we find that the burden in front of the toe, or bottom of the hole, is twenty feet.

This method of calculation can also be used to locate the drill holes for a new blast. Suppose it is desired to locate a line of holes fifteen feet apart so that each hole will have a burden of twenty feet on the toe; and it is also desired to drill each hole three feet below grade. Given a forty-five degree line, AB, measuring ninety-eight feet, and a distance from B to D at the bottom of the face of sixty feet, the table shows AC and BC both to be sixty-nine feet. The toe then extends (sixty-nine minus sixty equals nine) nine feet beyond the top edge of the face. To provide for a burden of twenty feet in front of the hole, it will be necessary to measure (twenty minus nine equals eleven) eleven feet back from the edge of the face to find the proper place to bore. Since each hole is planned to extend three feet below grade, this one should be drilled seventy-two feet (sixty-nine plus three equals seventy-two). Repeating this simple procedure at fifteen-foot intervals will insure that each hole is drilled to exactly the proper depth and that it will carry the proper burden.

Especially when the top of the face is not level is this easy method of determining the exact depth and burden of each hole valuable in order that the most effective and most economical loading may be used.

GRAND AMERICAN HANDICAP

Trapshooters will be interested in the announcement recently made that the G. A. H. Tournament and its classic event, the Grand American Handicap, will be held this year on the grounds of the South Shore Country Club, of Chicago, from August 22 to 27. The popularity of these grounds is attested by the fact that similar tournaments have been held there four times previously.

THE READY REFERENCE TABLE FOR QUARRYMEN

Light-face figures show AB or 45° line in feet. Dark-face figures show (AC or BC) leg of triangle in feet.

1	**0.7**	26	**18**	51	**36**	76	**54**	101	**71**	126	**89**	151	**107**	176	**125**	201	**142**	226	**160**	251	**178**	276	**195**
2	**1.4**	27	**19**	52	**37**	77	**54**	102	**72**	127	**90**	152	**108**	177	**125**	202	**143**	227	**161**	252	**178**	277	**196**
3	**2.1**	28	**20**	53	**37**	78	**55**	103	**73**	128	**91**	153	**108**	178	**126**	203	**144**	228	**161**	253	**179**	278	**197**
4	**2.8**	29	**20**	54	**38**	79	**56**	104	**74**	129	**91**	154	**109**	179	**127**	204	**144**	229	**162**	254	**180**	279	**197**
5	**3.5**	30	**21**	55	**39**	80	**57**	105	**74**	130	**92**	155	**110**	180	**127**	205	**145**	230	**163**	255	**180**	280	**198**
6	**4**	31	**22**	56	**40**	81	**57**	106	**75**	131	**93**	156	**110**	181	**128**	206	**146**	231	**163**	256	**181**	281	**199**
7	**5**	32	**23**	57	**40**	82	**58**	107	**76**	132	**93**	157	**111**	182	**129**	207	**146**	232	**164**	257	**182**	282	**199**
8	**6**	33	**23**	58	**41**	83	**59**	108	**76**	133	**94**	158	**112**	183	**129**	208	**147**	233	**165**	258	**183**	283	**200**
9	**7**	34	**24**	59	**42**	84	**59**	109	**77**	134	**95**	159	**112**	184	**130**	209	**148**	234	**166**	259	**183**	284	**201**
10	**7**	35	**25**	60	**42**	85	**60**	110	**78**	135	**95**	160	**113**	185	**131**	210	**149**	235	**166**	260	**184**	285	**202**
11	**8**	36	**25**	61	**43**	86	**61**	111	**78**	136	**96**	161	**114**	186	**132**	211	**149**	236	**167**	261	**185**	286	**202**
12	**9**	37	**26**	62	**44**	87	**62**	112	**79**	137	**97**	162	**115**	187	**132**	212	**150**	237	**168**	262	**185**	287	**203**
13	**9**	38	**27**	63	**45**	88	**62**	113	**80**	138	**98**	163	**115**	188	**133**	213	**151**	238	**168**	263	**186**	288	**204**
14	**10**	39	**28**	64	**45**	89	**63**	114	**81**	139	**98**	164	**116**	189	**134**	214	**151**	239	**169**	264	**187**	289	**204**
15	**11**	40	**28**	65	**46**	90	**64**	115	**81**	140	**99**	165	**117**	190	**134**	215	**152**	240	**170**	265	**187**	290	**205**
16	**11**	41	**29**	66	**47**	91	**64**	116	**82**	141	**100**	166	**117**	191	**135**	216	**153**	241	**170**	266	**188**	291	**206**
17	**12**	42	**30**	67	**47**	92	**65**	117	**83**	142	**100**	167	**118**	192	**136**	217	**153**	242	**171**	267	**189**	292	**206**
18	**13**	43	**30**	68	**48**	93	**66**	118	**83**	143	**101**	168	**119**	193	**136**	218	**154**	243	**172**	268	**190**	293	**207**
19	**14**	44	**31**	69	**49**	94	**66**	119	**84**	144	**102**	169	**120**	194	**137**	219	**155**	244	**173**	269	**190**	294	**208**
20	**14**	45	**32**	70	**50**	95	**67**	120	**85**	145	**103**	170	**120**	195	**138**	220	**156**	245	**173**	270	**191**	295	**209**
21	**15**	46	**32**	71	**50**	96	**68**	121	**86**	146	**103**	171	**121**	196	**139**	221	**156**	246	**174**	271	**192**	296	**209**
22	**16**	47	**33**	72	**51**	97	**68**	122	**86**	147	**104**	172	**122**	197	**139**	222	**157**	247	**175**	272	**192**	297	**210**
23	**16**	48	**34**	73	**52**	98	**69**	123	**87**	148	**105**	173	**122**	198	**140**	223	**158**	248	**175**	273	**193**	298	**211**
24	**17**	49	**35**	74	**52**	99	**70**	124	**88**	149	**105**	174	**123**	199	**141**	224	**158**	249	**176**	274	**194**	299	**211**
25	**18**	50	**35**	75	**53**	100	**71**	125	**88**	150	**106**	175	**124**	200	**141**	225	**159**	250	**177**	275	**194**	300	**212**

A DEALERS' HELP

A new color card on Du Pont Prepared Paint is ready for distribution by the Paint and Varnish Section of the E. I. du Pont de Nemours & Company, Inc. This paint includes a combination of the most popular and fast-selling shades of the former Harrisons "Town and Country" and Bridgeport "Prepared Paint" lines.

In addition to the color card, which gives an accurate idea of the results attainable by the use of this paint, the folder also contains a short introductory article on the function of paint, directions for using and a table of suggested color combinations.

The introduction says:

"The selection of colors for painting the home or other buildings is largely a matter of individual taste. The natural surroundings and other environment, as well as the style of architecture, should be considered in the selection of suitable color combinations.

"The low-built, rambling house requires light and cheerful coloring, as this has the optical effect of raising the house, while the larger and higher houses may be painted in the more neutral and somber colors with pleasing effect.

"It should be borne in mind, however, that the function of the paint coating is not merely decorative. Property protection is a matter of even greater consideration. Neglected and unpainted buildings deteriorate rapidly, incurring repair expense far in excess of the painting cost. It therefore should be considered that paint is an investment that may be measured in real dollars' and cents' value.

"Quality paint is always the cheapest in the long run, as the additional years of protection represent a decided saving."

Even the master painter will find the table of suggested combinations in the color card helpful. The most practical colors for body, trim, sash and roof are shown. The directions for use tell how the surface should be prepared, and also explain how to do either old or new work.

One of the simplest methods for estimating the quantity of paint needed is explained as follows:

"Du Pont Prepared Paint will cover approximately 350 square feet to the gallon, two coats. Generally, it will cover 400 square feet or more, but this depends naturally on the condition and nature of the surface to be covered.

"The best method to estimate the quantity required for the building is to measure the distance around it; multiply by the average height; add about one-fifth for trimmings and cornices; divide by 350. The result will be approximately the number of gallons to buy."

Du Pont Prepared Paint is a scientifically made product—the result of more than a hundred years of paint-making experience. This insures to the user a paint that produces a tough, elastic coating of uniform thickness—one that will give maximum protection.

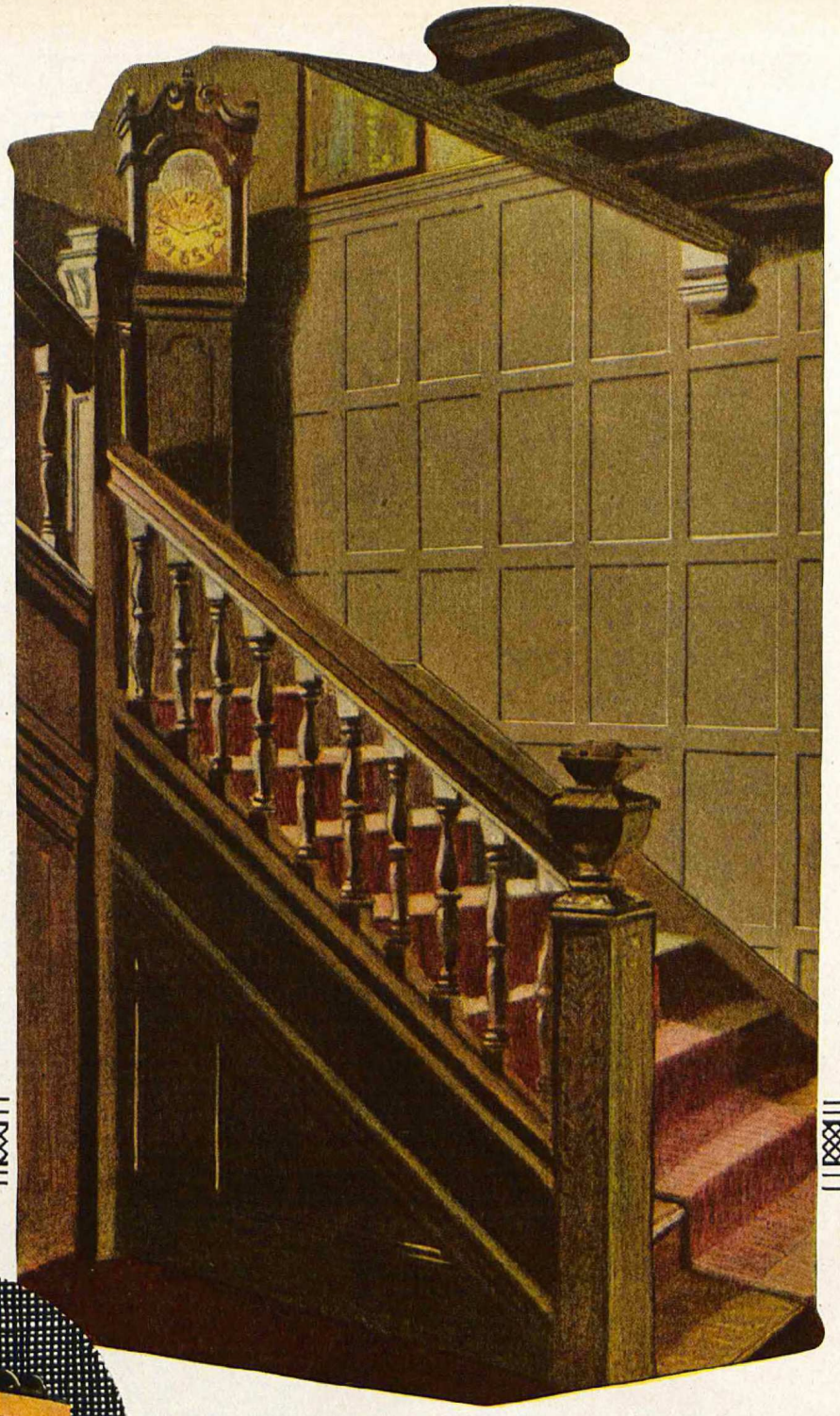
ROMANCE OF VARNISH

Continued from page 5

After these ingredients, with driers and neutralizers, have been cooked for several hours, the kettles are wheeled out of the stacks and allowed to stand until the mixture is cool enough to stir in a volatile solvent, such as turpentine.

The varnish is then pumped into a receiving tank connected with a filter press. The filtering operation is an important one designed to remove all dirt and foreign matter and leave the varnish as clear as refined honey. The liquid is then put into huge storage tanks where it is allowed to age or ripen. This aging or ripening process requires several months, depending on the grade of varnish.

The chemistry of varnish-making is now so highly developed in contrast to the primitive methods formerly used that the laboratory is scarcely less important to the varnish-makers than the melting kettles. Poor equipment and meagre facilities in this regard are great handicaps. The Du Pont Company, with its extensive laboratories and corps of efficient research workers, makes searching tests to be sure that the materials entering into all its varnishes are up to the standard of purity and that the finished products are as uniform in quality as they can be made.



SHIPOLEUM
for Interiors

SUPREMIS
for Floors

NAVALITE
for Exteriors

CHI-VO
for wax-like finish

THE beauty of fine woodwork is enhanced by the use of Du Pont Varnishes. These varnishes, put up in the square can and bearing the yellow label, have been used for over fifty years for finishes of the hightest type.

E. I. du Pont de Nemours & Company, Inc.
Sales Dept.: Paint and Varnish Section
Wilmington, Delaware

Branch Offices and Warehouses:

BOSTON, Harvey Bldg. — NEW YORK, 21 E. 40th St. — PHILADELPHIA, 35th & Grays Ferry Road — PITTSBURGH, May Bldg. — CHICAGO, McCormick Bldg.
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DU PONT

THE STANDARD SHOTGUN POWDER

The Du Pont Plan for Reducing Your Inventory on Shotgun Shells

IN these times no one can afford to give shelf-room to "slow-movers."

The Du Pont plan *advocates the elimination of all shell loads except those in active demand* with the great majority of shooters. This cuts out all "special" loads that tie up space and dollars, and provides highly concentrated stock that can be turned over rapidly and completely.

The loads themselves are listed below. They are the very best that our experience of over a century can produce, and will satisfactorily meet all requirements in all sections of the country. Last fall practically every sportsman's magazine carried our message to the shooter, to ask his dealer for shells from this table. This campaign will be stronger than ever in 1921. Bear this in mind when ordering your stock for the coming year.

Most Shooters Use Du Pont Powders

STOCK THEM IN THESE STANDARD LOADS

DU PONT

Standard Twelve Gauge Loads

	DUPONT SMOKELESS Drams	BALLISTITE SMOKELESS Grains	DUPONT BLACK Drams	OUNCES Shot	SIZES Shot
Large Ducks	3, 3¼ or 3½	24, 26 or 28	3½	1⅛ or 1¼	4, 5, 6 or 7
Small and Medium Ducks	3, 3¼ or 3½	24, 26 or 28	3½	1⅛ or 1¼	5, 6, 7 or 8
Grouse, Partridge, Prairie Chicken	3 or 3¼	24 or 26	3¼	1⅛	6, 7 or 7½
Pheasants	3	24	3¼	1⅛	5, 6, 7 or 7½
Geese	3½	28	3½	1⅛	4, 3, 2, 1, or BB
Wild Turkey	3½	28	3½	1⅛	4, 3, 2 or 1
Squirrel, Rabbits	3	24	3¼	1⅛	6 or 7
Doves, Pigeons	3 or 3¼	24 or 26	3¼	1⅛	6, 7 or 8
Quail	3 or 3¼	24 or 26	3¼	1 or 1⅛	7½, 8 or 9
Snipe, Woodcock	2¾ or 3	22 or 24	3	1 or 1⅛	8, 9 or 10
Shore Birds	2¾ or 3	22 or 24	3	1 or 1⅛	8, 9 or 10
Sora Rail	2¾ or 3	22 or 24	3	1 or 1⅛	8, 9 or 10
Trap Loads	3 or 3⅛	24 or 25		1⅛ or 1¼	7½ or 8

Facts that Every Dealer Should Know about Du Pont

"Du Pont" has the largest sale of any powder made.

* * *

—because it gives the highest velocity.

* * *

—because it gives the closest patterns.

* * *

—because it develops the lowest initial pressure, which means less strain on the gun.

* * *

—because it is the cleanest-burning powder made.

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—because it is waterproof, dependable, and absolutely uniform year in and year out.

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A shell is only as good as the powder it contains.

E. I. du Pont de Nemours & Co., Inc.
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