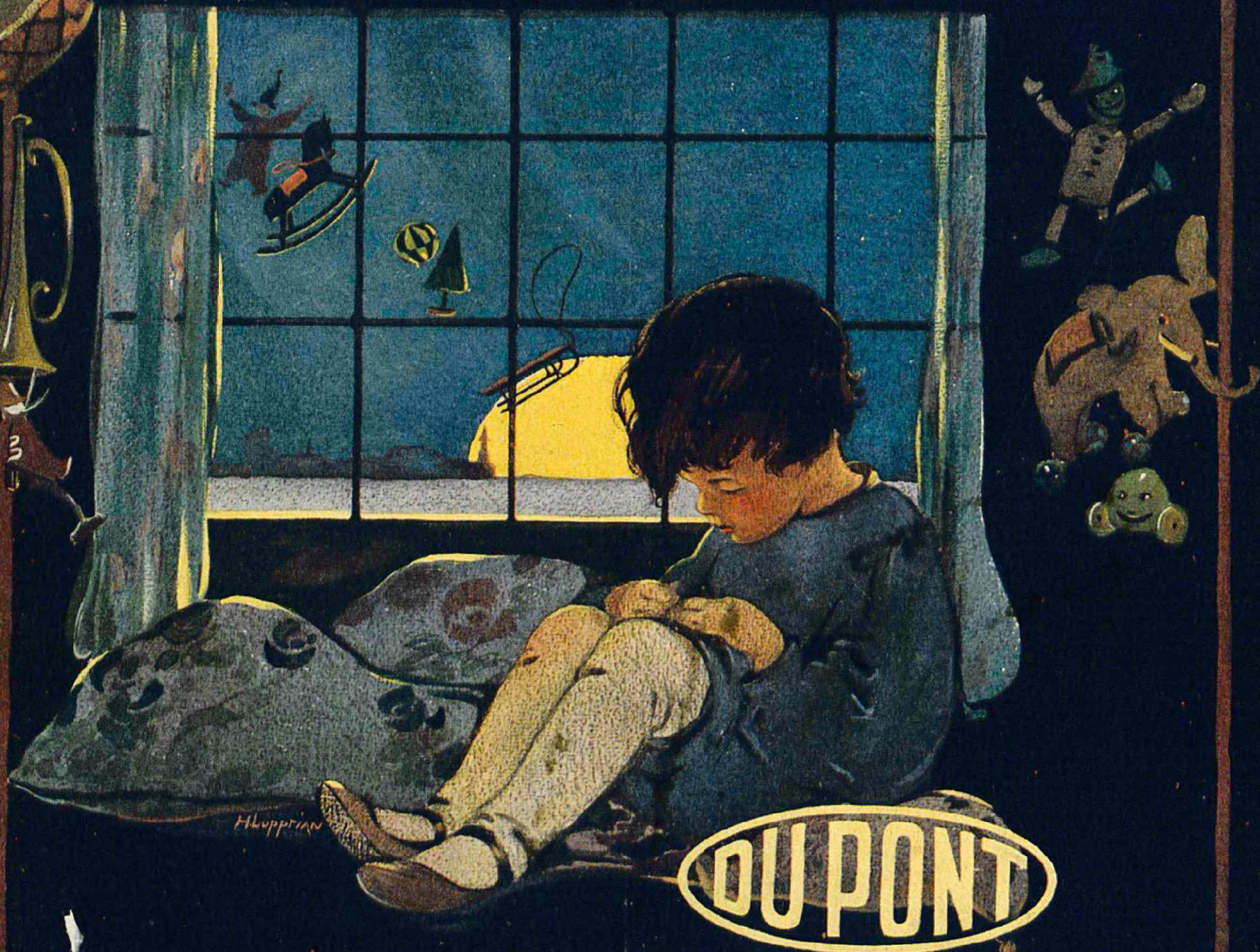


The DuPont Magazine

Vol.13 December-1920 No.6



DU PONT



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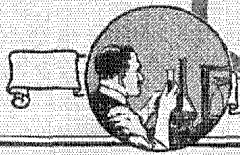
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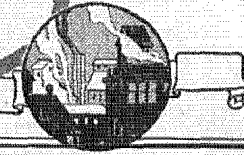
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DU PONT MAGAZINE



DU PONT



Volume XIII

DECEMBER, 1920

Number 6

The Du Pont Company--its directors, officers and representatives--desires to extend to the readers of the Du Pont Magazine heartiest wishes for

A Merry Christmas and
A Happy and Prosperous
New Year

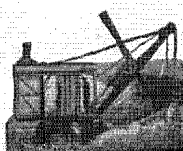
May the spirit of the joyous Yuletide be perpetuated throughout the New Year and find practical application in all our undertakings.

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J. R. SHULTZ, Managing Editor E. R. MANCHESTER, Associate Editor

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Unearthing King Coal

Not mining underground, but lifting the lid and quarrying black diamonds is the principal theme discussed



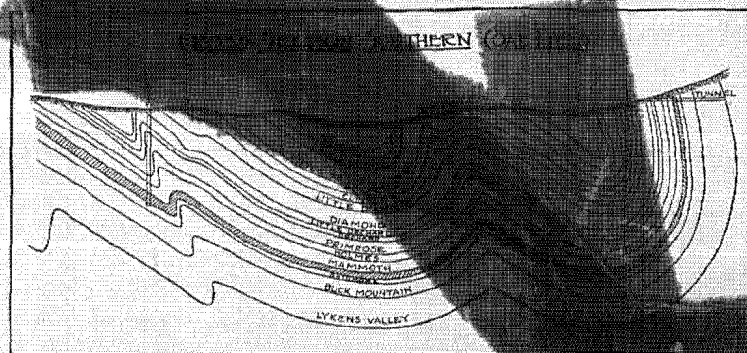
OF the 80,000,000 tons of anthracite coal sent to market annually, practically all is recovered by the regular methods of mining underground. There are several miscellaneous sources of supply that help to increase the output, such as the waste coal in culm banks and abandoned railroad fills, deposits on the banks of creeks, coal washed down in river courses, and considerable amounts obtained from stripping operations.

Before undertaking to describe methods of stripping, it is in order to discuss briefly the formation of anthracite coal beds and the usual mining practices employed.

Visualize for a moment a layer cake. In its finished state it presents a certain analogy to the geologic formation of a coal field. The layers of cake correspond to the deposits of rock, the icing to the veins or seams of coal. The rock layers vary in thickness from a few feet to 200 feet; and the coal layers from a few inches to 50 feet. The oven product is limited to the size of the baking pan, while a coal field may be many miles in length and breadth. In the anthracite field there are 16 recognized seams or layers of coal, with the greatest depth of the lowest seam from 2500 to 3000 feet below the surface.

When coal deposits were first formed they were like the layers of a cake—practically horizontal. But as the earth's surface cooled, contraction caused pressure on the coal beds analogous to a layer cake subjected to unevenly distributed pressure applied on one or both sides. The effect on the cake can readily be imagined; on the coal fields it is graphically shown in the accompanying illustration.

In sinking a shaft, which may be compared to an elevator shaft in a hotel or office building, coal seam after coal seam is intersected at various levels. As each seam of coal is reached, a gangway—like a subway tunnel, but of smaller dimensions—is started from the shaft. Each tunnel is about 7 feet high and 15 to 18 feet wide, and is driven from the shaft to the extremities of the property in either direction. Along the gangway at regular intervals of approximately 50 feet, openings known as "rooms" or "chambers" are started at right angles to the gangway. These are usually as high as the vein, about 30 feet, and are usually from 300 to 400 feet long.



When the crust of the earth cooled, the enormous pressure crumpled and distorted the strata of rock and coal.

From these rooms comes the bulk of our hard coal.

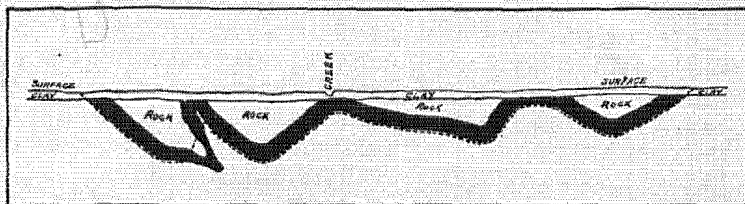
The plan of the gangway and chambers might be likened to a long, dark hotel corridor, with unlighted rooms opening from it at regular intervals throughout its length. As mining

By W. L. CHAMBERLIN

tinues, gangways parallel to the original one are driven about 400 feet apart, and from all of them similar rooms or chambers are opened.

Now, if the rooms are turned off the gangway at intervals of 50 feet, and the rooms are but 30 feet wide, there are left solid masses of coal 20 feet wide between the rooms. These "pillars," so-called, are left standing to support the overlying strata, and they represent about 40 per cent of the original deposit.

When a coal seam or a part of it has been mined as already described, then the pillars are either "skipped" or "robbed" to obtain as much as possible of the total amount of coal. Skipping means taking a slice off the side of the pillar, which increases the width of the room and correspondingly decreases the width of the pillar. "Robbing" consists in starting at the



An actual and ideal stripping basin from which clay, rock and coal have been removed to the depth indicated by the dotted line. Forty per cent of the coal had been taken out by mining. Clay 25 feet thick; greatest depth to which rock was stripped, 160 feet; coal, 50 feet thick.

end of the room farthest from the gangway and in taking out all or as much of the pillars as can be secured before the roof-rock falls. As the miner always has untouched pillars between himself and the gangway, robbing can be carried on with comparative safety. But in either skipping or robbing only a portion of the pillar coal can be recovered; the rest is crushed and covered when the caving finally occurs.

The percentage of coal originally in the ground that can eventually be recovered by mining varies greatly under different conditions. As a rule, a large percentage—90 per cent in some cases—can be recovered from a thin vein 3 or 4 feet thick, while it has been found difficult at times to get more than 40 per cent in a 30-foot vein that pitches upward 50 or 60 degrees.

Although all anthracite coal basins are more or less disturbed and crumpled, some sections are comparatively flat. Not infrequently in areas of considerable size the top seam of coal is found so near the surface that there is no layer of rock above it, but only sand, earth or gravel. This blanket of alluvial earth varies in thickness from a few feet to 60 feet or more. Under these conditions the coal cannot be mined at all, or at best only a small percentage, because there is no roof-rock to prevent the earth, sand or gravel from falling in upon the miners.

With the measures bent and folded, the coal seams and rock strata above and below them rise on either steep or gentle inclines, called the "pitch," until they outcrop at the surface.

In mining coal in the rooms, which on the steeper inclines are called "breasts," the operation is stopped a short distance before the outcrop is reached. The coal left in place is called a "chain pillar," to give support to the earth above.

From the foregoing brief and altogether elementary outline of the mining it will be seen that it is impossible by any one method to recover all of the coal. The proportion recovered depends both upon natural conditions and upon

the mining methods employed; but the amounts left frequently justify stripping operations.

Ideal results could be obtained by stripping or quarrying first the cover and then the coal, but such operations are confined between narrow limits owing to their cost. Prior to the world war some stripping contracts called for a price of 17 cents a yard for the removal of earth and 35 cents a yard for rock. This permitted the coal operator under certain conditions to remove 6 cubic yards of earth and 3 cubic yards of rock to each cubic yard of coal.

One advantage of the stripping method is that practically 100 per cent of the coal can be recovered. Such coal, as already stated, is to be found in surface veins with little if any rock cover; in outcrop pillars and chain pillars, and in virgin or pillar coal whose thickness warrants the uncovering of an entire basin to a depth of 200 feet or more.

Strippings are essentially pit or quarry operations. They are conducted according to their size and local conditions by mechanical aids, which range from picks, shovels and wheelbarrows to gigantic steam shovels, weighing 90 tons or more, such as were used in digging the Panama Canal. Aerial tramways, supported by towers located on opposite sides of the pit, and hoisting cables afford a means of raising and of removing the material in skips or boxes, except where large blocks of rock are hoisted by chains and cables directly.

After the earth has been removed from thick or pitching veins, gangways are opened below from which at frequent intervals chutes are driven to the outcrop. The rock, loosened and broken by blasting, may now be drawn through the chutes into mine cars, hoisted up the slope and sent to the spoil banks. This is known as the chute method. In the main it has been employed most successfully as an adjunct to the steam-shovel method.

In steam-shovel work on shallow surface veins and outcrop strippings the earth and rock are removed by the shovel dipper and loaded into side-dump cars of about 4 cubic yards capacity. Small locomotives or "lookies" haul trips of 8 or 10 of these cars to the spoil bank, which is located as

near to the work as possible. One trip loads while another is on the bank being emptied; the two, acting as shuttle trains, keep the shovel working almost without interruption.

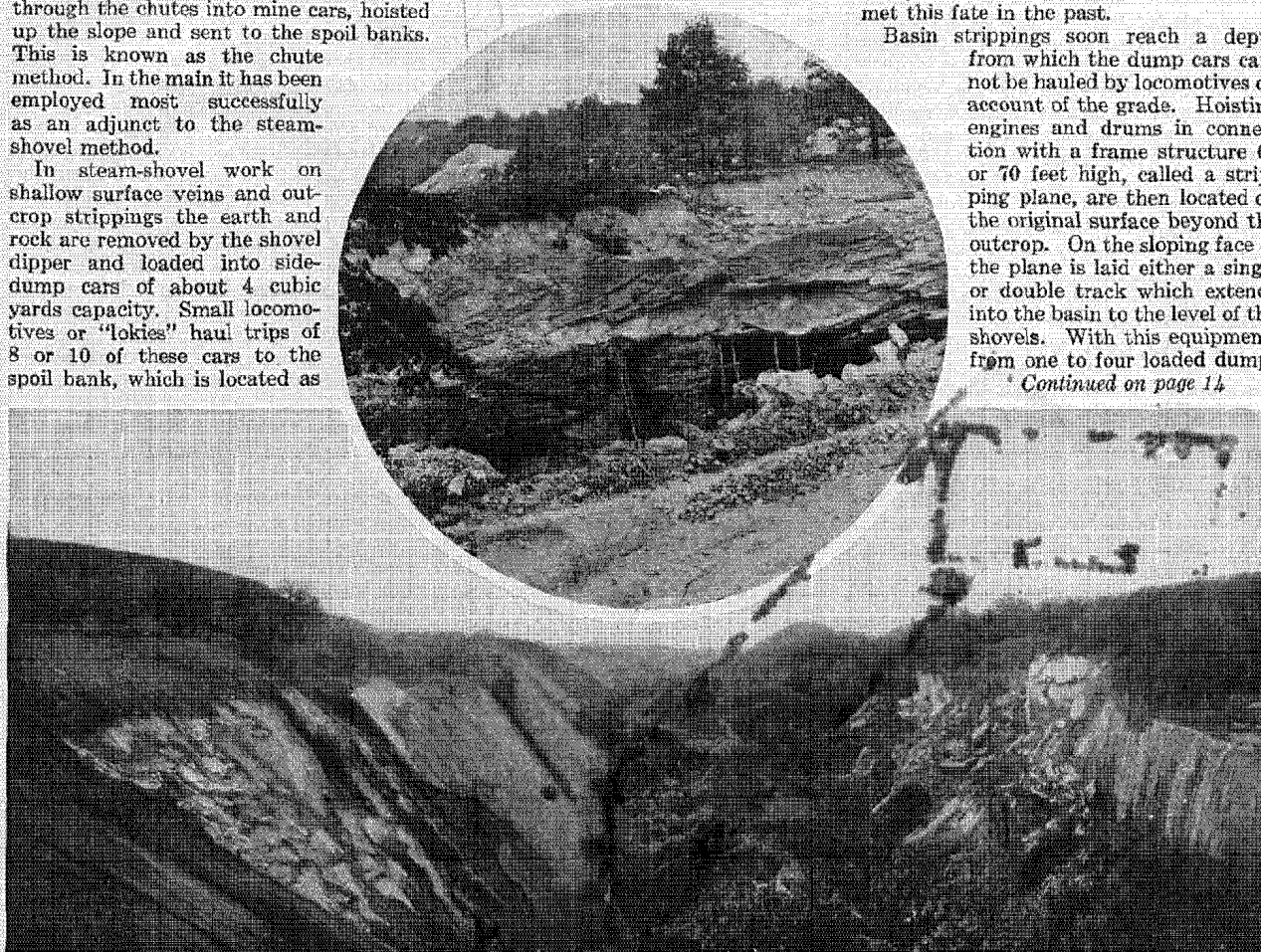
In deep basin strippings of considerable size, where the vein to be uncovered is usually 20 to 30 feet or more in thickness, three or four shovels may operate at the same time. The earth cover is first removed, and unless it is of the nature of hardpan, explosives are seldom required. The most satisfactory working face for the shovel in earth is about 30 feet. In removing rock the working face is, as a rule, either 15 feet or 22 feet high. This assumes that the rock has been drilled previously and loosened or broken up by black powder or 40 per cent dynamite. When rock too large to go into the dipper is encountered, block-holing or mudcapping with dynamite is resorted to in order to reduce it to a more convenient size for handling.

Only thick seams of coal admit of basin stripping to any depth, but the reward is the recovery of from 50 to 60 per cent of coal left in pillars, coal that could not be taken out economically by underground mining. Such seams are seldom found in the original or unmined state. They yielded the bulk of their treasures years ago, but enough coal was left to make it profitable to reclaim the rest in this later day.

As the stripping deepens the shovels approach the vein, crossing and recrossing pillars and empty breasts as the work progresses. Great care is exercised both on the outcrop and in the basin, especially when near the vein, in order to prevent the heavy shovels from breaking through the thin crust of rock or coal on which they stand. Fortunately, such accidents rarely occur, but more than one shovel has met this fate in the past.

Basin strippings soon reach a depth from which the dump cars cannot be hauled by locomotives on account of the grade. Hoisting engines and drums in connection with a frame structure 60 or 70 feet high, called a stripping plane, are then located on the original surface beyond the outcrop. On the sloping face of the plane is laid either a single or double track which extends into the basin to the level of the shovels. With this equipment, from one to four loaded dump-

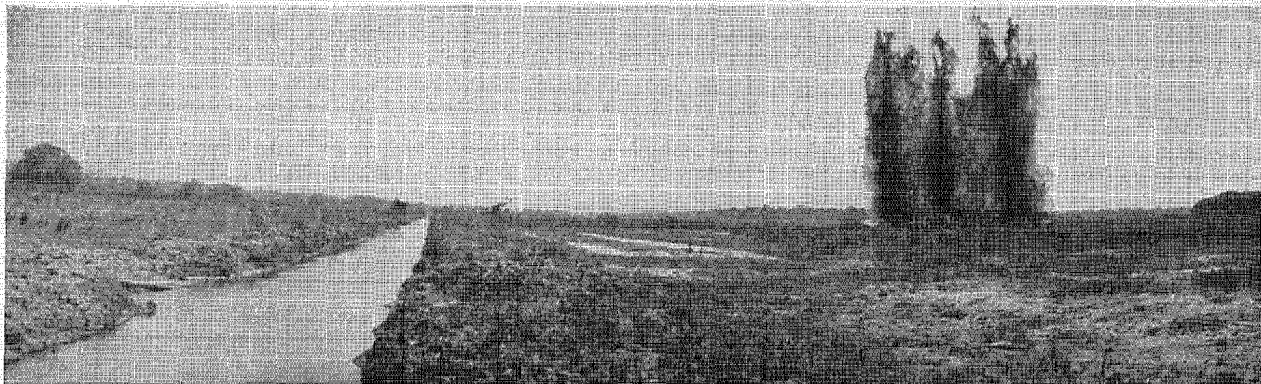
Continued on page 14



Top, a small section of an outcrop stripping, showing the means of chambers, and the coal pillars supporting rock and clay above. Bottom, basin stripping, middle anthracite coal field. At this point the bottom of the basin has not been entirely uncovered.

Reclaiming the Coastal Plain

From sodden savannas and pine barrens to fertile farms by the agency of dynamite



Typical savanna land, Sapelo Island, Georgia. The ditch is 14 feet wide at top, 6 feet wide at bottom and 6 feet deep. Dynamite dug it and no trimming was required. At the right a ditch blast is shown in action.

A CENTURY ago the first bench of the coastal plain of the South Atlantic states and the offshore islands comprised the most highly developed agricultural area in America. The high pine lands of the interior were then regarded as worthless for farming, and when settlement demanded more territory, the pioneers pushed their way through the pine barrens and cleared the oak and hickory soils of the uplands beyond. Later these forests of lordly yellow pines extending from North Carolina to Texas over a tract of 185,000,000 acres were converted by the lumbermen into a wilderness of stumps. But the passing years have turned the tables. Today the fine old plantations along the coast where cotton was first Americanized, where rice and sugar cane were domesticated, and where indigo production was carried on side by side with sericulture and olive growing, practically all lie wet and waste, whereas the former pine barrens have, in many localities, been transformed into fertile farms where agriculture and stock raising are carried on by methods and with results comparable with the best achievements of the Middle West. Cutting down the pine trees left the stumps, but blowing out the stumps leaves a prairie, and a prairie farm is the height of an American farmer's ambition. Consequently, instead of patches among stumps and trees cultivated with the one-horse plow, this region now contains numerous all-tractor farms growing acres of grain; and grand champions of standard cattle and swine breeds go to the International from the wiregrass that two decades ago knew only the Spanish scrub cow and the razorback hog.

Just as the removal of stumps has started the conversion of the pine barrens into tilled fields and, if continued on a large scale, will produce millions of acres of prairie where agricultural machinery can be used to multiply man power, so the digging of ditches through the low-lying savannas along the coast will restore them to productivity after sixty years of idleness; and they are today the cheapest good farming land in America. Indeed, there is no waste land in the coastal plain. It is all good, either for farming, for pasturage, or for reforestation. It produces a wide range of staple crops, a wealth of leguminous soil-building and forage crops, and a great variety of perishable truck and small fruits. The livestock industry in this section has already passed through the experimental stages and entered upon its permanent development. And today the largest single holding of wet land in the area is being drained to promote the natural reforestation of pine.

The coastal plain has been re-discovered and the demand for farms within its borders is large and growing. This re-discovery, however, is coincident with the greatest shortage of labor

By GEORGE D. LOWE

ever known on American farms. If the work of development were dependent upon unaided human hands, the outlook would be hopeless, but "the giant laborer," dynamite, has already been employed. Dynamite, which is merely labor compressed into packages which make it possible to direct and govern its energies, is always available. It is the agency which can rapidly remove the stumps and drain the sodden savannas. Indeed, through long continued experimental work and demonstration in this region by representatives of the Du Pont Company, the agricultural uses of dynamite in drainage and land clearing have been as thoroughly studied and as scientifically applied here as have been the industrial uses of explosives in other localities for mining and quarrying. The lightwood stump has been experimented with until it can now be removed as satisfactorily by dynamite as by any grubber or puller, and ditching problems have been solved so that with proper procedure a clean ditch can be dug that will require no after trimming with spades. Absolute efficiency and rapid accomplishment are assured by the use of dynamite for reclaiming the coastal plain, and in economy the comparison with hand labor and machinery is favorable to explosives.

Draining the savannas along the seaboard with dynamite has been proved to be an easy and economical process. On Sapelo Island, Georgia, once the best drained area in America, Howard E. Coffin, of the Hudson Motor Car Company, has re-opened with explosives nearly five miles of large main ditches and a short stretch of canal that had been filled up for half a century. The ditches are twelve to fourteen feet wide at the top, six feet wide at the bottom, and five to seven feet deep. A blaster and four negroes opened from six to eight hundred feet of this ditch in a ten-hour day, using one pound of Du Pont 50% Straight Dynamite to the running foot. This gave a low cost per cubic yard of soil. An entirely new ditch through a sandy savanna was blasted with the same loading, but at a more rapid rate of placement. This stretch of ditch, one and one-half miles long, fourteen feet wide and six feet deep, stands today as the most regular and uniform artificial channel through this type of soil ever seen in this section by whatever means made, hand or dredge. This same ditch could be opened through practically any flatwoods region at the same cost, with such variation as might be due to the necessity of increased loading for trees and stumps. A ditch of this size will take care of a tremendous run-off, and as the slope here is slight and the movement slow, it is folly to open small main ditches. Small laterals are easily plowed to empty into the trunk lines. This work on Sapelo Island was put under way by an

agricultural dynamite salesman of E. I. du Pont de Nemours & Company, Inc., Wilmington, Del. He determined the proper loading and instructed a young blaster who completed the work with plantation labor, producing ditches which have challenged the admiration of drainage engineers of broad experience and have changed saltmarsh into savanna land. It usually happens that there is some workman on a farm or development operation who can be trained by the agricultural salesman to do ditch-blasting successfully. There is also an increasing number of competent contract blasters who are available for important operations. As the action of dynamite in any soil is controlled absolutely by local conditions of texture and moisture, the proper loading and interval of placement should always be determined by test shots in the ditch line.

The main drainage problem presented in the coastal plain interior is that of opening channels along branches and shallow swamps to take the run-off from torrential rains. While hand-ditching under such conditions is practically impossible, dynamite finds its most economical application there. A typical blasted ditch of this type is one from six to eight feet wide and from four to five feet deep. This can usually be made by three men, without cutting a right-of-way, at the rate of nearly a thousand feet a day. A great many such ditches have been blasted recently at very low cost in comparison with any other method, all reported data showing less than fifty cents a running yard under swamp conditions.

In Florida ditches have been blasted successfully and economically through the flatwoods areas, through Dade rock and through muck prairies. In the trucking regions of the state, flooded fields have been unwatered and crops saved by ditches blasted expeditiously and economically. Under Florida conditions the blasted ditch remains open longer than the dredged ditch, because in the former the excavated soil is widely distributed.

In its great malaria-control campaign the United States Public Health Service is using the blasted ditch to great advantage. At Valdosta and Tifton, Georgia, and at Bamberg, S. C., may be found ditches blasted for this purpose where the cost ran quite low, and the rate of execution was so rapid that the main ditches through the swamps were completed long before the smaller hand-dug drains in the open were finished. Drainage is the only permanent cure for malaria, and as dynamite drainage is not dependent on labor conditions, the community that makes up its mind to get rid of mosquito-breeding places need not worry over the scarcity of ditchers. The supply of dynamite is normal and the service of the manufacturer assures that a competent workman on the job will be instructed in blasting, or an experienced blaster will be found elsewhere.

The reclamation for agriculture of the old forest belt of the coastal plain necessitates the removal of stumps, and the highly resinous lightwood stump of this area has, moreover, a substantial salvage value. It is good for fuel and good for distillation by either the steam solvent or the destructive method. The man who burns a lightwood stump in the field destroys an economic asset. Many farms now have no lightwood except in their field stumps, and in towns and cities last winter lightwood blocks sold as high as twelve dollars a cord.

The demand this winter will call for much more than will be removed from the fields of the entire coastal plain. The lower tap-root and the deeper laterals have no value for distillation, but make good fuel when dry. The body of the stump, the first fifteen inches of the tap-root and the exposed laterals are wanted by the distillation plants in increasing quantity, and they pay from three dollars to four dollars and a half a ton for sound stumpwood, depending on its quality and the location. A cord of such wood will weigh two tons, but the ton and not the cord is the unit to go by. Over most of the coastal plain, stumps number from ten to sixty per acre in cultivated fields and occupy an average of sixteen square feet of tillable soil. In raw cutover land, the stand is forty to one hundred and twenty-five per acre. In fields usually only the large stumps are left and they run into tonnage rapidly, but as an average of many tests it appears that five stumps to the ton of sound wood is a good basis for calculation and that five pounds of 40% Red Cross Extra will recover this amount of stumpwood.

Stumps may be removed either by dynamite or by stump pullers. Up to a certain point, the stump puller is very efficient. Operated by an experienced crew under good conditions, it will put a stump on top of the ground more cheaply than will dynamite, but a pulled stump is only half disposed of. If the wood be wanted, the stump must be burst with dynamite or sawed into sections and these split with the axe. There is no question as to the ability of the puller, either hand, horse or power, to get stumps out of the ground if they afford a good hold above the surface, but for stumpwood salvage, where the stump must be broken into pieces, the puller is at a disadvantage.

On the most efficient large-scale clearing operation in the South, where a puller is used instead of dynamite, it has been found that, because of rotten-top stumps, low-cut stumps and buried stumps, at least 25% of the total number must be blasted. On this operation a steam-power outfit capable of pulling stumps on forty acres from one setting is used, and the stumps are later broken up and sold to a distillation plant.

For several years Mr. W. B. Lamb, of Wadley, Ga., used a standard horsepower stump-puller and kept accurate cost data. It cost him fifty cents each to dispose of his stumps, including pulling, yarding together and burning. He changed to the dynamite method, obtained a lower initial cost, and had the wood to credit against the cost of the operation. His puller was used before the price of labor attained its present level, whereas the blasting was done last winter, with dynamite prices substantially what they are today.

The James L. Waterbury Company, of Bradentown, Fla., is clearing thousands of acres of small standing pine timber, an unusual operation. The work was begun with three horse-power

pullers, three teams and eighteen men. Sixteen acres a week was the fastest progress made, and in a single month cable replacements cost one thousand dollars. As time was a factor, they adopted the dynamite method, using one blaster and six negro auger-hands who cleared five acres each day. Costs did not increase materially, although dynamite was not recommended as more economical for this particular work.

At Oldsmar, Fla., the Reolds Farms Company is clearing



Ditch blasted through cypress and gum swamp at Bamberg, South Carolina, by the U. S. Public Health Service in a malaria-control campaign. Top width, 10 feet; bottom, 6 feet; depth, 4 feet. The right of way was not cleared and the ditch was not trimmed after the blast.

land on a large scale, removing green slash pine stumps from a tract just logged off, a very difficult and costly operation. Using a powerful steam outfit, they put their costs down from seventy-five dollars to about forty dollars an acre, but when they began to clear small, scattered tracts they turned to dynamite because of the expense of moving the big machine. Costs there with dynamite are substantially the same as the lowest obtained with the big land-clearing machine. The stump is an isolated unit and cannot be run through a machine like corn through a hopper. The dynamite method is the unit method.

When properly applied, dynamite is the absolute master of the stump. If the explosive is improperly placed, however, its great power is lost and in some cases it has left the stump a greater obstacle to tillage than before the blast. There are two methods of stump-blasting, the industrial and the agricultural, and only the latter is efficient from the farmer's viewpoint. By the industrial method, the body of the stump is shattered and knocked off at about the ground line. The tap-root is left high and the laterals are little disturbed. By the agricultural method, either the whole stump is removed as cleanly as a puller would do it with all roots attached, or the tap-root is cut off about twenty-four inches underground and the body of the stump and the laterals are heaved out in fragments. The agricultural method requires no more dynamite, but it demands a deeper hole bored at an acute angle into the tap-root. The industrial method uses a shallow hole at an obtuse angle; it does not make hole enough to confine the dynamite properly or to allow its placement low enough to hoist out the stump. Wood reduction companies have used the industrial method and farmers have taken a great dislike to it, arguing from what they saw that dynamite was not an efficient stump remover. Dynamite applied in that manner is not efficient because too much grubbing is entailed, but a change in the angle of direction of the hole and an increase in depth will get out the whole stump and practically eliminate grubbing.

The method of boring holes by hand has given place to the more efficient method of doing this work with power boring machines. Using a machine designed for the industrial method, skilled blasters cleared a five-acre plot in Mississippi with small dynamite consumption, but it required one hundred and sixty-four man-hours of grubbing to finish the work. On the other hand, in a recent test in Duval county, Florida, using another machine, which bores deep holes at an acute angle, on a single measured acre, entirely different results were obtained by a

Du Pont demonstrator. There were sixty-four stumps of all sorts, sound, rotten, large, small and buried, which were blasted so efficiently that neither the axe nor the grubbing hoe was needed afterwards except for filling the holes. From this acre the Duval Cattle Company gathered 18,800 pounds of sound wood for which it was offered a sum sufficient to pay for the blasting and the hauling and leave a surplus of three dollars and sixteen cents to be applied to filling the holes and making a complete job of clearing.

These instances go to show that satisfactory stump-blasting is all a matter of proper boring; given the hole bored in the right place, at the proper angle, to a sufficient depth, the veriest amateur can do practically perfect blasting and clean the cavities absolutely. Such holes can be bored by hand on small farm operations, but for salvaging the stumpwood and for important development operations the gasoline power boring machine is necessary. One of the most efficient machines drives a two-inch bit 32 inches into the tap-root in one minute and thirty-two seconds. One man operating the boring head and driving the mule can bore from one hundred and twenty-five to one hundred and seventy-five stumps in ten hours and two men can increase this number materially. A good blaster will load and shoot two hundred stumps in the ordinary working day without difficulty.

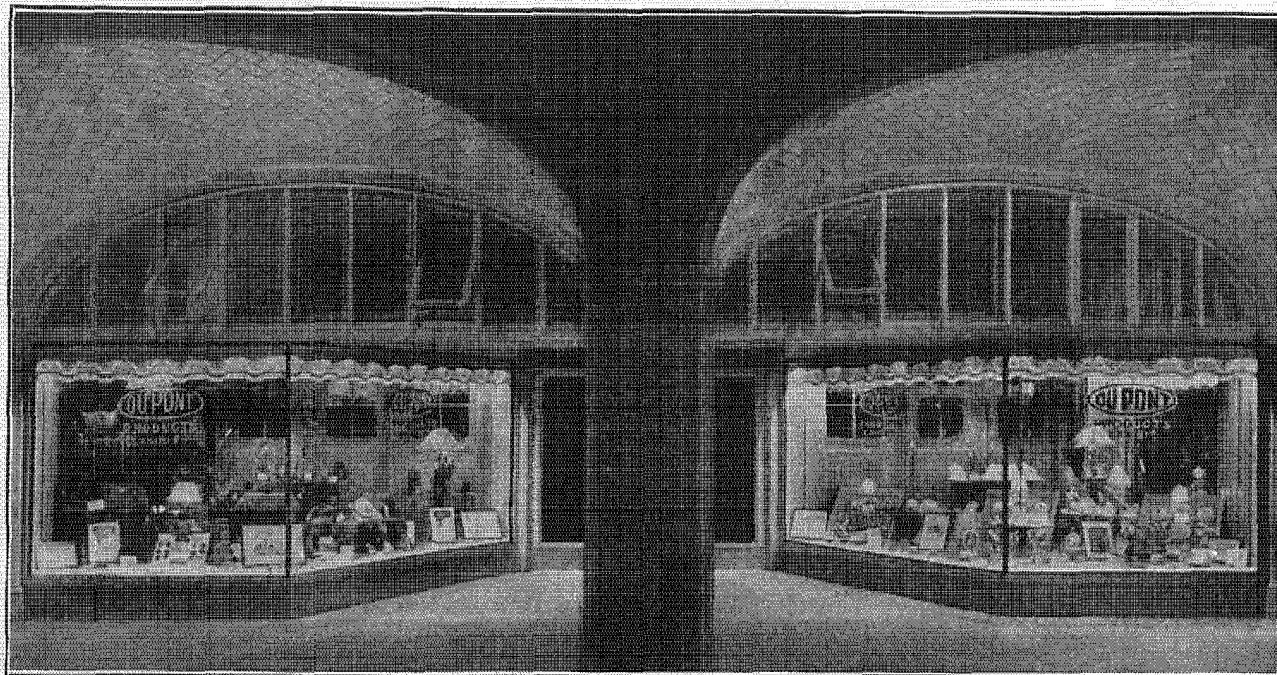
Where large areas of raw land are to be cleared, blasting the stumps out first will permit the use of the tractor and the heavy grubber plows that make fitting the land for farming practically a mechanical process throughout and greatly reduce the cost. There are some modern operations of this sort in progress at various places in the coastal plain, which, as they require a minimum of the common labor that is so scarce today, are making excellent progress. They are making prairies at moderate cost and salvaging everything salable while doing it.

What does it cost to clear land? This is a natural question, but there is no specific answer. A century ago Mr. James Couper, of Hopetown, Evelyn and Altama plantations in Georgia, then the foremost farmer in America and so recognized in Europe, cleared a cypress brake in the delta of the Altamaha river with slave labor. His plantation records show a cost of one hundred and twenty-five dollars an acre. At Oldsmar, Florida, in 1919, the Reolds Farms Company cleared and graded four acres of cypress swamp on its townsite at a cost of about

Continued on page 16



Land clearing with dynamite near Bradentown, Florida. The explosive lifted the trees out bodily. Tractors and grubbing plows did the rest



The attractive entrance to the Atlantic City Du Pont Products Exhibit is shown by this view taken late at night

The Du Pont Products Exhibit

In new quarters on the Boardwalk, this unique enterprise is rendering a noteworthy service

ATLANTIC CITY, "playground of the world," is the one place where people from all quarters of the globe gather to disport themselves in the surf, to promenade along the Boardwalk, and otherwise find recreation amid surroundings that are as unique as they are diverting. Just as the tides of the ocean ebb and flow, the transient throngs of Atlantic City visitors, in spring, summer, fall and winter, surge in and out with unfailing regularity. Last year many millions of people from all sections of the United States and from many foreign countries visited this famous resort.

Business thrives best where many people congregate. The cosmopolitan character of the people who make Atlantic City their headquarters for a few days each year singles out this place as one where a manufacturer is likely to meet scores of his trade associates, even though their home addresses may range all the way from Los Angeles, California, to Portland, Maine, and from St. Paul, Minnesota, to Key West, Florida; for this famous resort is one of the leading convention cities of the United States.

In April, 1916, the Du Pont Company leased a store at the corner of Pennsylvania Avenue and the Boardwalk in order to introduce the varied line of products manufactured by the Du Pont American Industries. It was the outgrowth of a sales promotion idea to establish another route to public understanding, and to combat the prevailing impression that the Du Pont Company was engaged solely in the manufacture of explosives. The exhibit proved a revelation to thousands of visitors who learned for the first time that the company's products were wonderfully diversified in character and that they were employed in the manufacture of thousands of products of everyday use. Interesting displays of Fabrikoid, Pyralin, chemicals, paints and varnishes, all made by the Du Pont Company, were shown along with articles made by other manufacturers who use Du Pont materials.

This enterprise, started in a modest way, has attained propor-

tions scarcely dreamed of by the originator of the idea. The exhibit itself has doubled in size, and in order to house it properly the company was compelled to lease larger quarters in July of this year. Its popularity as an attraction may be judged by the fact that nearly 100,000 people have visited the exhibit during the past ten months.

The new location in the Haddon Hall block is right in the heart of the hotel district, where thousands of people pass daily. The mail carrier knows it as 1121-23 Boardwalk—midway between Pennsylvania and North Carolina Avenues—but the casual visitor is apt to refer to it as "the Du Pont corner of the new building with the arcade in front, nearly opposite the Steeplechase Pier."

The display windows are well planned to attract attention. By occupying a corner location, with windows in front and on oneside, the Du Pont Company is in position to show groupings of its related products in seven windows. Each one presents a different group of products. For example, one window contains products made of Pyralin; another features Fabrikoid, and so on. In artistic arrangement and general effectiveness, few display windows along the Boardwalk can compare with those of the Du Pont Exhibit.

The equipment for illuminating these windows at night was scientifically installed by an expert. Every effort was made to obtain the best possible illuminating effects, and the result fully justified the attention given to this detail. The display windows of fashionable Fifth Avenue stores are not more effectively illuminated than are those of the Du Pont Products Exhibit.

The visitor who enters the store immediately senses the distinctive character of the exhibit. There's an air of refinement, of quality, about the place that takes it out of the class of wholly commercial enterprises. The interior is not garishly decorated, not cluttered with merchandise, not too obviously dressed up, even though the primary object is display.

Nowhere is it proclaimed by placard that the interior of the

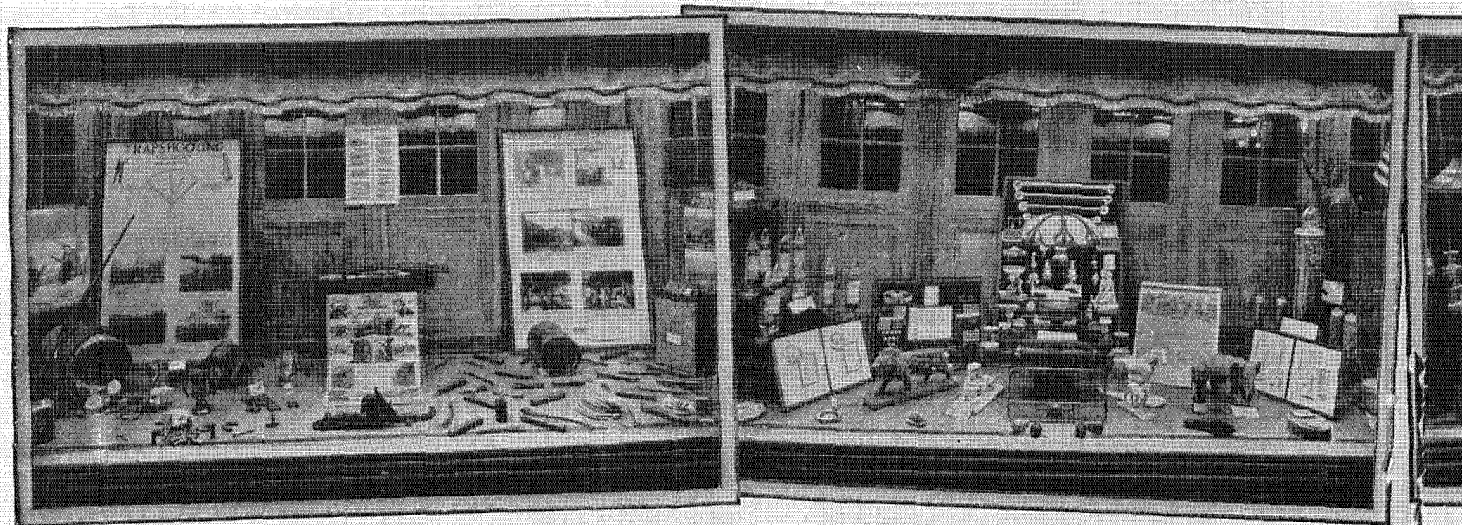


exhibit room—the floors, walls, ceilings, electric light fixtures, the panels and woodwork, furniture, showcases, and other store equipment, even the handsome green rugs on the floor—are made or finished with Du Pont products. Yet the floors, ceilings, walls and woodwork are coated with finishing materials made in company plants; the lighting fixtures are finished with Du Pont lacquers; the basket lamp shades are decorated with Pyralin enamels and the rugs on the floor are colored with Du Pont dyes. The room stripped of its merchandise is itself a demonstration of the uses made of company products.

It would be futile to attempt a description of the thousands of articles shown, but they are all Du Pont products in the sense that they are either made by the company or made with its products. Each display is identified by a tag which names the article, the Du Pont material used and the name and address of the concern manufacturing the article. These tags are all of uniform size and appearance.

For example, Fabrikoid is exhibited by scores of manufactured articles, such as suitcases, bags, novelties, railroad car seats, car curtains, trunks, luncheon sets, pillows, furniture, brief cases, and most conspicuously by a large automobile with a Craftsman top as its most distinctive feature.

Pyralin meets the eye in thousands of manufactured forms, illustrating the almost unlimited variety of ways it can be utilized. Chemical products, paints, varnishes, enamels, lacquers, dyes, explosives—in dummy cartridges—blasting accessories—in short, practically every product that the Du Pont Company makes is displayed attractively in some form of finished merchandise.

Generally speaking, there are three or four classes of visitors: The casual stroller, attracted by the window displays, enters the store merely to look over the exhibit. Curiosity is the prompting motive—the possibility of seeing something new or unusual. Another class comes into the exhibit room under the mistaken impression that it is only a high-class retail store, like hundreds of others that flank the thoroughfare. They express surprise when they are informed that the merchandise is shown primarily for display purposes, and that no exhibit articles are sold except upon the voluntary requests

of visitors. The regular visitors make up another group—people who habitually visit the exhibit each year to see what new products have been developed by the Du Pont Company or by manufacturers who use Du Pont materials in making their articles. Finally, there is the class of tired, jaded business men who come to Atlantic City primarily to seek a few days of rest before getting back to their desks. They rarely call the first few days of their stay. You are more likely to find them on the beach, at the baths or riding along the Boardwalk in chairs. A few days later, however, the business instinct reasserts itself, and many stroll into the exhibit to find out whether the company is manufacturing anything of particular interest to them.

It is surprising how many visitors of this class seek definite information about products manufactured by the Du Pont Company. Usually they secure it, for the representatives in charge of the exhibit are technically trained salesmen, selected for their ability to give accurate infor-

These effective windows, ph night, show—left to right powder and high explosives d finished with Du Pont lacq and other chemical prod manufactured with Fabrikoi varnishes, white lead, dry ments and acid



Top: Interior of exhibit room. Left: Pyralin-enameled lamp shades. Center: Store Py



windows, photographed at left to right—a sporting explosives display; articles Du Pont lacquers, enamels, Fabrikoid; and paints, to test, dry colors, pigments and acids

mation regarding Du Pont products and their varied uses in industry.

Someone asks, "Why does the company maintain this elaborate Boardwalk Exhibit?" Is it just to satisfy the curiosity of transient visitors? What is the big idea?

The answer is summarized in a word—service. The exhibit serves the general public, the Du Pont Company and its customers, particularly dealers and manufacturers who handle or use Du Pont products.

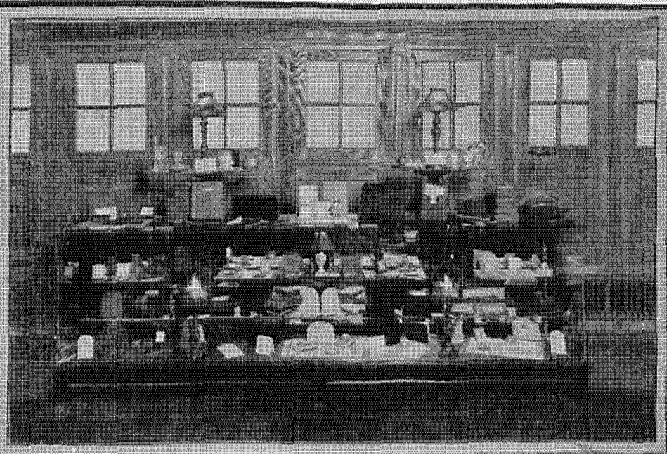
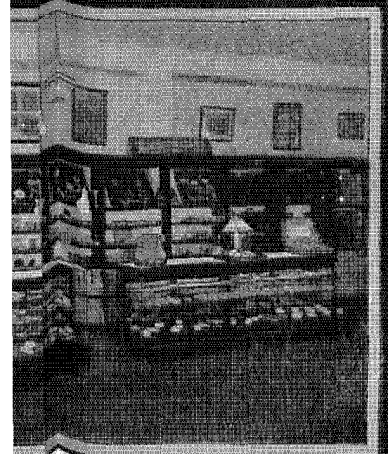
The exhibit renders an educational service. The public is invited to view the products displayed; to ask questions about them; to learn what products are used in making merchandise of all kinds, and why some types of materials are better than others for specific uses. Incidentally, competitive products are never adversely criticized, but the superior advantages of Du Pont products are made clear by explanation, and where practicable, by demonstration. It serves the company in two ways: First, it affords the company direct

contact with the ultimate consumers of its products. Considering that the Du Pont Company is a manufacturer, selling through jobbers, dealers and wholesalers, it has little opportunity to know, except indirectly, what the public needs and wants. The Atlantic City Exhibit, attracting as it does thousands of visitors from all parts of the country, furnishes a meeting place where the ultimate buyers and users of Du Pont products can express their ideas and state their wants. And they do. This personal contact enables the company to know pretty nearly what the public thinks about its products. Second, and perhaps most important, it enables the company to increase its output by developing new trade channels. A tremendous volume of business originates as a result of this unique method of sales promotion and sales co-operation.

Does the exhibit definitely help dealers and manufacturers to increase their sales? Yes, because every business day of the year each dealer or manufacturer who handles or uses Du Pont products is directly a beneficiary of this national sales service. He may display his products in the Atlantic City Du Pont Products Exhibit without charge in a location that during the entire year is more valuable for display purposes than Broadway and Fifth Avenue stores can offer. The Du Pont Products Exhibit is in effect a branch office for scores of concerns in all parts of the country. Inquiries developed by showing the various products are promptly reported to the concerns interested. In this way the Du Pont Products Exhibit is constantly finding

new customers for dealers and manufacturers and is definitely and constructively negotiating sales for them, even though the actual sales are made in some instances thousands of miles away.

One or two illustrations may serve to make this clear: For example, Mr. X, of Topeka, Kansas, calls and wants to know what is the best material to use in manufacturing a certain type of novelties. The Du Pont representative at the exhibit records his name; the firm or corporation he is connected with; his position; the character of his business; his address; the Du Pont products in which he is interested, and the specific information he desires. If the representative can furnish the information, he does so; if the advice sought is of a character to require expert at-



Left: Pyralin toilet articles. Right: Novelties made of Fabrikoid and Pyralin

tention, he finds a way to bring the customer and the expert together.

Another visitor enters. He has been attracted by a window display of lamps finished with Pyralin enamels. He is Mr. James, a buyer for a Milwaukee department store; he is stopping in Atlantic City only for the week-end and expects to leave for New York the following Monday. His question is, "Where can I buy these lamps?" The Du Pont representative furnishes the address of the New York City sales office of the lamp manufacturer. By next mail a letter goes to the manager with full details and a statement that Mr. James will call. And the buying transaction is concluded there.

Incidentally, hundreds of inquiries are received by mail from all parts of the United States. For example, one business man writes: "Kindly inform me if your leather renewer can be purchased in Pittsburgh, and who carries it." Another letter from Seattle, Washington, contains an inquiry about lacquers suitable for fishing reels. And the next letter is a request for the name of an agricultural blaster who can "blow a ditch through my land in Mississippi." Each request is answered promptly.

A well-known office accessory, made in part of Du Pont products, is on display in the exhibit room. Comes now the secretary of the Rotary Club, who has examined the display and has caught the idea of adapting this accessory to serve the purposes of his organization. He wants to know where he can procure these accessories in quantity, and is rather surprised to find that they are made in his home town. A letter reports the inquiry to the manufacturer and two or three days later the

manufacturer's representative calls with a line of samples and the sale is quickly consummated. The buyer and the seller have been brought together through the service rendered by the Du Pont Products Exhibit organization.

"Good morning!" is the friendly greeting a Du Pont representative extends to three men now entering the store. Their badges proclaim that they are delegates attending a convention on the pier.

"I just dropped in with my friends," remarks the leader, "to show them a Fabrikoid traveling bag like the one I purchased four years ago in Omaha. It has stood the knocks of constant traveling and is still presentable. Just thought you might be glad to know that I am well pleased with my purchase. If you don't mind, show these fellows some Fabrikoid luggage."

The foregoing are typical instances of what happens, not occasionally, but many times a day in the Atlantic City Du Pont Products Exhibit. People from all states of the Union flock to Atlantic City, and during their sojourn many of them find their way into the exhibit. They never fail to express astonishment at the wonderful variety of the displays, and almost always they show a keen interest in the educational features that are so happily combined with the pleasure of seeing manufactured products at their best. As an attraction, nowhere along the Boardwalk is there anything like it; as a national service institution it is a proved success, and no one knows this better than the manufacturers who use Du Pont material in making their own finished articles, and who display them along with the company's own products at Atlantic City.

Women at the Traps

The fascinating sport of trapshooting brings forth a new Woman's Champion at the G. A. H. Tournament

NOT so many years ago the idea of a woman participating in manly sports and pastimes was frowned upon—and that's expressing it mildly. Among the men, the suggestion provoked only a whimsical smile, such as might be expected if a three-year-old child had offered it. Among the women, and especially those bound by the conventions of the past, the idea was openly scouted as "unladylike, ridiculous, impossible!" Think of a woman shooting clay pigeons and engaging in other competitive sports with men! The iron-clad rules of social precedent forbade such a thing.

But what a change has taken place! The athletic woman, with glowing cheeks and buoyant energies, has far outdistanced her eminently proper and conventional sister, who possesses only the parlor accomplishments. With the emancipation of women, many of the virile sports that men enjoy are now commonly participated in by women. Today, the young lady who fails to add to her drawing-room accomplishments some of the graces of personality that come from engaging in wholesome outdoor sports is, to borrow the phrase, "out of luck."

For some years women have enjoyed a recognized place in sports of all kinds. They have proved that ability to excel in games is not alone a masculine attribute. Trapshooting furnishes an interesting illustration because it was once considered a sport wholly unfitted for women.

Each year the management of the Grand American Handicap tournament reserves an event for women trapshooters, and their exhibitions of skill are of a high order. This year the Woman's Championship was held in connection

with the Forest City Introductory. The women contestants took their places on the firing line beside the men and brought down their share of targets.

Mrs. Judd Bruff, of Pittsburgh, Penna., excelled all others of her sex, and won the Woman's Championship by breaking 85 out of 100 targets. Her nearest rival was Mrs. Harry Harrison, of Rochester, New York, a close second with 82. Third place was earned by Mrs. Toots Randall, of Lima, Ohio, who lacked only one target of tying for second place.

Those who follow closely the scores of women trapshooters in the annual G. A. H. meets point to this singular fact: Every titleholder of the Woman's Championship since 1916, when women began shooting in these tournaments, has been a married woman. Mrs. Bruff is the fifth titleholder.

Her achievement is noteworthy because it was the first Grand American tournament in which she had participated. Three years ago she took up trapshooting because her husband, who is a former sheriff of Allegheny County, enjoyed the thrills of the sport. Since then she has won many honors and trophies. During the past season she won the women's state championship of Pennsylvania, as well as the "Indian" championship at French Lick Springs, Indiana.

Apart from her success as a trapshooter Mrs. Bruff has demonstrated her skill in big-game shooting. Last year near Fort Myers, Florida, she shot one of the largest alligators found in that district. This year she and her husband are planning an extensive hunting tour in Alaska, where they expect to find plenty of big game.



Mrs. Judd F. Bruff, Pittsburgh, Pa.
Woman's Trapshooting Champion

Marksanship Makes Better Mechanics

Industrial efficiency is promoted by rifle shooting and pistol practice, and it isn't just a theory either

NOT long ago a purchasing agent was examining dies and tools made in an Ohio factory. He was about to place a large order. Previously he had examined the sample products of competing manufacturers and had made the usual price comparisons. The Ohio manufacturer's samples impressed him favorably, but he hesitated to place the order without knowing more about the plant and its ability to turn out the work on time. So he boarded the train for Urbana to satisfy himself about these points.

He was conducted through the plant by an official, and on returning to the office he said: "I have decided to give you the order. You have a modern factory and high-class equipment, but I am more deeply impressed with the character of your productive organization. I never walked through a plant where there was a higher class of intelligence or a better feeling. You have a real honest-to-goodness human institution here, and I am glad to put my work in a place where I can feel that every man in the shop is personally interested in seeing that my job comes through right and comes through on time."

The incident related is in no sense unusual. It might have happened in any one of scores of industrial plants where the management through its friendly relations with employees has developed a spirit of loyal co-operation and efficiency.

The Urbana Die and Tool Company has laid emphasis on the importance of the human factor in the development of its business. Its slogan is, "No man in this organization is a mere laborer." When the company established its factory at Urbana, Ohio, the management laid down this guiding principle, that "a modern factory is a co-operative organization of human beings working together for a common end." That doctrine has been adhered to, and every member of the organization has been treated on that basis.

The factory buildings are located on a spacious, partly wooded plot of ground that one might easily mistake for a college campus. Through the ivy-covered stone entrance a driveway circles around a close-cropped lawn on the quadrangle. Flower beds and shade trees flank the driveway. The same thoughtful care given to the surroundings outside is conspicuously evident within the buildings, which are well lighted and equipped with all modern conveniences for the employees. Working conditions are made as ideal as possible. The many-sided welfare activities are unobtrusively carried on, and an atmosphere of friendliness and fair dealing pervades the factory both during hours of work and hours of play.

The management also believes in the axiom about "all work and no play," and has provided recreational facilities for the

pleasure of its employees. Because the factory personnel is largely made up of men, the sports they enjoy most are baseball, boxing and rifle-shooting. The noteworthy fact about these sports is that they afford recreation for the men and at the same time they develop physical and mental qualities that are absolutely essential in an industry of this kind.

Making high-grade tools and dies is a highly specialized branch of mechanics. Knowledge, skill and accuracy—unvarying accuracy to the thousandth part of an inch—are required of the men who make this class of metal products. The machine work must be as exact in its flawless creation as the cutting of a precious stone. For this reason the personnel of the plant is carefully selected, and the management omits no opportunity to emphasize its requirement for extremely accurate work. The reputation of the house depends upon it.

Industrial efficiency is promoted by pistol practice, and it isn't just a theory either. This company has equipped a rifle and pistol range for the use of its employees. The men enjoy the sport, and develop precisely the same qualities as are required in their work.

The following paragraphs of a letter from the company furnish a striking testimonial in favor of introducing target practice in industrial plants:

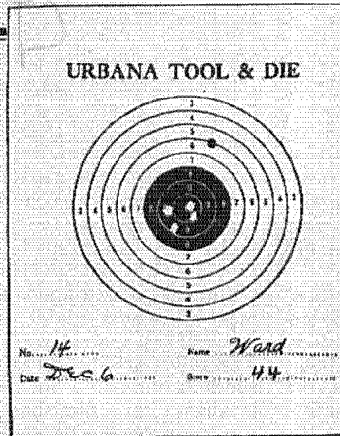
"The employees of this company have had a range for rifle and pistol shooting for the past five years. We are fortunate in having a room very well adapted to the purpose. This room is furnished with heat and light, without charge. The men meet

all expenses by monthly dues of 25 cents per member. They hold official shoots one evening each week, and conduct unofficial practice matches on certain other evenings.

"The style of target butts used are of the illuminated type, home-made, with sheltered lights in front to illuminate the target and a light in the rear to shine through any hole made in the target by a shooter. A manually operated switch enables the one shooting to turn off the front lights and turn on the rear light at will.

"Each member furnishes his own firearm, but arms are provided for the amateur who has none. While the primary object of target practice is entertainment, it has been pleasing to notice that steadiness of nerve, keenness of vision, fairness, honesty, confidence, good fellowship and pride in achievement are invariably the reward of consistent effort on the range."

NOTE:—The Military Sales Division of the DuPont Company has carefully studied rifle shooting as a means of promoting efficiency in industrial plants and will gladly furnish blue prints for ranges and detailed information to any corporations or employees' committees who may be interested in this sport.



Pistol Practice and Tool Making

Where's the
Connection?

Urbana Tools—Quality Tools

The ability to make a good score on the pistol range contributes towards "bull's eyes" in tool making. Fact! Good for the eye; good for the hand; good for the nerves. And the range is only one of the attractions, one of the many means of recreation which contribute so greatly to the morale of the Urbana organization. Drop in next time you are in this neck of the woods and let us show you.

Tools, Dies, Jigs, Experimental work, Special Machinery—and we're ready to work with you, now.

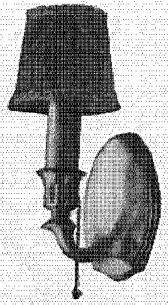
URBANA TOOL & DIE COMPANY
Urbana, Ohio, U. S. A.

URBANA

This full-page advertisement appeared in several trade journals

Signs That Flash in the Sky

You are led up to the theme of color illumination and you learn the use of lamp lacquers



CHRISTMAS EVE is a night apart on the calendars of kiddies and grown-ups. The youngsters think of it with joyous anticipation, for the morrow will disclose the extent of their favor with Santa Claus. The parental mind also rises to the occasion, and usually speeds the evening's program by supervising the work of hanging up tiny stockings beside the fireplace, hurrying little tots off to bed early, bringing forth the Christmas tree from its place of concealment—and decorating it. Where is the man or woman who does not enjoy dressing up a tree

with popcorn strings, tree ornaments, toys and other decorations? Where is the man who finds no delight in giving the tree its crowning glory by personally rigging up the electric light circuit and inserting the tiny colored lamps to illumine the finished work?

The little incandescent light globes—how pretty they are! And how much more satisfactorily they serve for decoration than the candles of a former day! They illuminate the Christmas tree without creating a fire hazard, and they glow with colors that naked flames could never give. In millions of homes this month these little bulbs of color will attract attention for a few days; then they will be packed away for another year. After all, they are just useful playthings, although almost every family has its supply.

But have you noticed the increasing use of incandescent lamps—particularly colored lamps—in electrical display signs? Of course, you think at once of the famous street called Broadway.

Broadway is Broadway—except after nightfall; then it's the Great White Way, or at least it was. The metaphor does not apply so accurately as it did some years ago, for although white lights still predominate, as they always will, colored lights have winked and blinked themselves into favor on Broadway, and they are now conspicuously in evidence in almost every sign you see. Particularly is this true of the larger displays. Green, red, blue, purple and yellow lights flash out of the dark in various designs and forms, presenting pictures artistically complete, in gigantic proportions and in animated figures.

This type of advertising is by no means confined to metropolitan districts; nor is the use of colored lamps in signs localized along this brightly illumined thoroughfare. Electric sign displays are found in practically every city of size in the country, although the use of colored lamps in connection with them is perhaps more strikingly apparent in New York than elsewhere.

The theatrical and amusement interests of the country have probably been the most consistent users of colored lamps for display purposes. Theaters and amusement parks are always well illuminated, for light

always attracts crowds of people. Light, gaiety and mirth are unfailingly associated with these places, and color finds a natural place in such an environment. A theater front without some ornate electric display in color is a rarity. An amusement resort like Coney Island or Luna Park without the brilliant illumination of white and colored lights is most likely in the hands of a receiver.

The increased use of colored lamps in electric signs of all kinds is explained in part by the demand for displays of more artistic character, and in part by the fact that chemical science has found a way to manufacture them quickly, satisfactorily and at a lower cost than heretofore.

The impression most people have about colored incandescent lamps is that they are all made of colored glass. This idea is not entirely erroneous, for years ago the manufacturing practice was to incorporate the pigment in the molten glass. Colored bulbs were in fact made of colored glass; and to some extent they are still made in that way.

But the colored lamps that shine down on Broadway are not made of colored glass; they are ordinary incandescent lamps made of transparent glass and then colored with lamp lacquers. The colors are incorporated in waterproof lacquers, which are specially prepared for coloring electric light bulbs. These lacquers form a film that adheres tightly to the glass and gives it a permanent color that will not fade, and the film will not peel off even though the bulbs be subjected to heat, light and the elements. It is true, these bulbs are not perfectly transparent; rather they are translucent or semi-transparent. The light rays diffuse as they pass through, giving a mellow radiance in contrast with the glaring brilliance of unlacquered white lamps.

It may surprise some readers to know that the so-called "frosted" lamps are lacquered products. They give an evenly diffused, soft light, without glare and are suitable for use both in homes and in display signs. Frequently the compelling message of an electric advertising sign is displayed by lamps of this kind.

The work of applying lacquers to incandescent light bulbs is not difficult, nor does it require much time, for they can be applied either by dipping, spraying or brushing. Probably the best method is to dip them into the colored lacquer and then turn on the lights while the liquid is drying. Spraying is also practical where the equipment is at hand.

Although lamp lacquers find their largest use in electric display signs, they are not exclusively used for advertising purposes. They are used to color incandescent bulbs near fire exits in public buildings; in subways, in connection with signal systems; as a part of elevator equipment in office buildings; in short, wherever color illumination is required to serve specific purposes. These lacquers may also be used for decorating lamp shades or other articles made of glass. They are practical for use on metal or

Continued on page 16



Typical display sign of a Broadway theater

Auto-Tops for Auto-Boats

Of course! Cockpits of motor boats as well as tonneaus of touring cars need to be protected

DESIGNERS and builders of motor boats seldom lose an opportunity to adapt every improvement that will add to the utility, comfort and convenience of their craft. The demand for greater speed has been answered in part by more skillful designing of hulls and by the adaptation of war-perfected, high-power engines. The demand for more luxurious appointments has resulted in many innovations in deck and cabin fittings. The same refinements you see in high-class limousines speeding over smooth highways, you may also observe in high-class motor boats skimming over the water lanes.

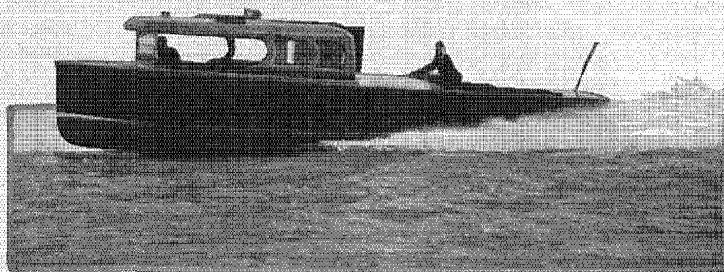
One of the most recent improvements adapted for use on motor boats of small size is the Craftsman permanent top, which is already popular on automobiles. It is a rigid, substantially built superstructure designed to conform with the lines of the hull, just as a Craftsman top is similarly designed and built to conform with the lines of an automobile body. The accompanying illustration clearly indicates how perfectly motor-boat builders have adapted the distinctive Craftsman top to enclose the cockpit of the modern motor boat. Built exactly like those used on motor cars, this superstructure has its solid framework, its padded top, its plate-glass windows and the characteristic water-proof and weather-proof covering of Craftsman Fabrikoid.

This Craftsman motor-boat top is firmly attached to the deck. With windows on the sides and at the rear, and a windshield in front, the occupants of the boat are thoroughly protected

against chilly blasts, driving rains and whipped-up spray. By using drop curtains the entire cockpit can be completely and snugly enclosed.

The covering of Craftsman Fabrikoid is admirably suited for marine service. It is unaffected by salt or fresh water, snow, ice or strong sunlight. It resists mildew and mold. Because it is practically wear-proof and readily cleanable, it retains its original fine appearance permanently. And the fact that this material is procurable in a variety of colors and grains gives the motor-boat owner wide liberty of choice in selecting material that will harmonize with the general color scheme.

The C. C. Smith Boat & Engine Company, of Algonac, Michigan, has taken the lead among boat builders in adapting Craftsman tops for use



Gar, Jr., is equipped with a Craftsman automobile top

on motor boats. Several of their latest speed boats have their cockpits enclosed with this equipment.

Gar, Jr., illustrated, is one of the high-power cruisers made by this company. Incidentally, it is the fastest cruiser in the world and one of a number of speed boats that have consistently won championship races for the past ten years.

Naturally, these Craftsman tops on racing boats have attracted much attention among the followers of this sport. The Craftsman top has made a favorable impression both on account of its trim appearance and its evident utility. No doubt it will attain in boating circles the same wide popularity as it already holds in the automobile field.

The Industrial Helmet

This rigid cap protects the skulls of miners and other workmen from serious injury

"LOOK OUT BELOW!"

This warning cry, frequently heard in mills, quarries, factories and on construction work everywhere, often comes too late, and serious injury or death befalls the unlucky workman who is beneath the falling object. How much better it is to be foresighted and provide operatives subjected to this hazard with a protector that will at least minimize the seriousness of such accidents!

The most adequate form of head protection for workmen is the recently produced "Hard-Boiled Cap," a covering that is warranted to cut down the accident list wherever used.

These hats are obviously a development from the war-time helmet, but they differ in that they are light in weight, and very comfortable to wear. They are, moreover, non-conductors of electricity and not affected by fire and water.

That they serve their purpose of protecting the workmen who wear them is attested by the following incidents:

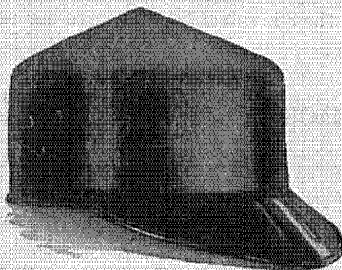
"A joining-iron weighing twelve and one-quarter pounds fell six feet, striking the head of a shipyard worker who was wearing one of these caps. The man was knocked to his hands and knees, but was not injured. Another man was knocked down by a twenty-ounce bolt falling forty-two feet. He sustained no injury and the cap was not broken."

"At a shipyard in March of this year, a man on a tank-ship construction gang was struck squarely on top of the head by a four and one-half pound piece of angle-iron (about a foot long), while wearing a safety cap of the type described. He was knocked down by the blow, but was uninjured. The piece of iron fell a little over twelve feet before striking the cap, which was not even scratched by it."

Not only above ground but in mines is there a crying need for such a cap. Since forty per cent of accidents in mines are caused by rocks or particles falling from the roof, it can readily be seen that miners need head protection. This industrial helmet with its metal "shock absorber" affords a means of preventing serious or fatal injuries without encumbering the operative with a heavy and unwieldy headpiece whose use soon becomes a hardship.

The cap weighs only 9 ounces, yet it will withstand a pressure of 400 pounds.

Naturally, the materials used are carefully selected for tensile strength and long-wearing qualities, and the cap is made to insure maximum comfort to the wearer. Even the sweatbands—made of Fabrikoid—can be depended upon to last indefinitely without becoming soiled or unsanitary from contact with perspiration, grease or grime. In every detail this cap is well made and will doubtless find a ready sale because of its practical utility in preventing serious injuries.



The "Hard Boiled" Cap

Complete Standardized Line of Paints and Varnishes

How the Du Pont Company co-ordinated various producing factors to perfect these products

THE Du Pont Paint and Varnish line has been completed, consolidated and standardized. It now includes a group of quality products combined under one name, and together they constitute a paint and varnish line equal if not superior to any in this country.

The recent purchase of the Chicago Varnish Company gave the Du Pont Company a line of varnishes long recognized as leaders in that particular field and furnished the one item necessary to round out a complete line of Paints and Varnishes.

The Du Pont Company now owns and operates the plants of three well-known, long-established firms, each of them famous for a particular group of products: First, there is the former Harrison Brothers and Company, of Philadelphia, a recognized leader in the paint industry for over a century as manufacturers of high-grade paints, oil colors and enamels; second, the former Bridgeport Wood Finishing Works, of New Milford, Connecticut, whose stains, fillers and finishes have been unexcelled for sixty years; third, the Chicago Varnish Company, whose varnishes "in the yellow can" have set a standard of high quality for more than fifty years. And the plant of the former New England Paint, Oil and Varnish Company, of Boston, provides for additional production.

In conjunction with these paint and varnish plants, the company owns and operates those producing the essential raw materials, such as lead, lithopone and dry colors. This is important in maintaining the unvaried quality of its finished products and providing protection for the expansion of its business.

It is significant that all these houses acquired by the Du Pont Company were specialists recognized as progressive leaders, each in its particular field. It was because of their invaluable

specialized knowledge, so essential in the paint business, that the Du Pont Company purchased these organizations.

To this specialized knowledge are added the great resources and the unequalled facilities for chemical research, development, production and distribution built up by the Du Pont Company during the past 118 years.

Out of this union of specialized paint and varnish experience with the chemical industry and extended facilities of our company, the standardized Du Pont Paint and Varnish line has been developed and is produced and presented under the Du Pont name.

The line is complete. There is a product for every purpose and each product possesses the merit of quality.

A group of well-known and fast-selling paint and varnish specialties will be featured in our sales and advertising programs. Among these specialties are the Du Pont Varnishes (as Supremis Floor Finish, Shipoleum and Navalite) in the square can with the yellow label, Du Pont Auto Finishes, Du Pont Tufcote Varnish Stains, and Du Pont Wheeler's Wood Filler.

Each of these specialties now has a distinctive package of its own with a label of striking color and design, and each, like every member of the line, bears the Du Pont oval in the oblong design

made standard for Du Pont Paints and Varnishes. The appearance of the Du Pont Line on the dealers' shelves will be particularly attractive and impressive.

Our present facilities in the paint and varnish business enable us to continue the manufacture of these products of established quality and standing. It will be of advantage to every dealer to stock this complete, standardized line, which has the support of a thoroughly efficient service organization.

Write our nearest branch office regarding open territory.



This yellow-labeled square can has symbolized quality varnishes for over fifty years. The Du Pont trade-mark on the new label is a guaranty of high quality for the future.

Unearthing King Coal

Continued from page 8

cars are raised by a hoisting engine and steel rope to the top of the plane and emptied.

Coal ideally located for basin stripping is usually found beneath the surface of slight depressions or valleys, affording drainage ways. Streams, of little consequence in dry weather, are to be feared in flood time if nearby stripping openings offer a way for the water to reach and drown out the mine workings below. Where choice stripping is found beneath a creek bed, new channels must be dug, sometimes beyond the outcrop, to make the coal available. For the same purpose timber flumes, 8 by 15 feet in section and from one-half to three-quarters of a mile in length, have been built.

In the case of shallow, surface veins and outcrop strippings, the colliery of which they are a part depends upon under-

ground mining for the major part of its coal production. It can afford to wait until the stripping work is fully completed before touching the coal uncovered, but when the principal source of supply is in the thick seams, already mined, and the output is furnished mainly by coal from the uncovered pillars, stripping work and coal recovery are carried on concurrently, although each interferes with the other to some extent. A race is always on between the two operations. The stripping crew is usually hard pressed to keep ahead of the coal removers. The ideal method of completing the cover removal before touching the coal, as in the case of a shallow stripping, is not feasible in basin strippings; for it would mean that coal production would cease entirely while a large and ever-increasing amount of capital would be tied up for long periods of time.



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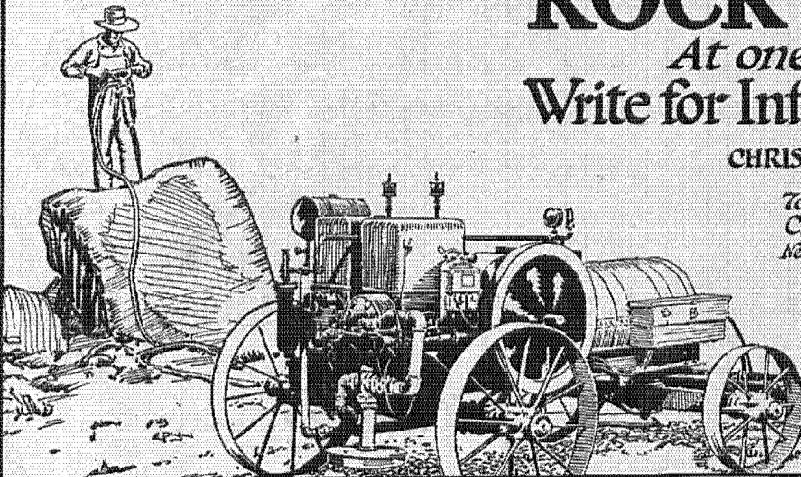
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Reclaiming the Coastal Plain

Continued from page 6

three thousand dollars. In Clay county, Florida, a test acre was cleared from the raw, with down logs, lightwood stumps, some scrub oak and high snags as factors in the cost. The lightwood stumps were blasted out, the stumps, logs and snags were piled and burned, and the holes were filled at a total cost of nineteen dollars and seventy-five cents. Many a coastal plain farmer will tell you that he has cleared land for five dollars an acre, but he left his stumps in the ground and did no more than a brushing job. There is no average stump and no average acre to which an average clearing expense will apply. However, this fact cannot be disputed—for every lightwood stump blasted from the ground and properly prepared for market there is a ready sale for it either as fuel or for distillation purposes. This means that there is a credit of varying size to set against clearing costs. In some instances the credit will balance the debit; in numerous others it will nearly extinguish the charge; and under average conditions it will greatly decrease the net cost.

Destructive distillation of wood is an old industry, but reduction of the extremely resinous lightwood of the coastal plain has presented numerous new problems. Small portable retorts for this purpose, which can be easily dismantled and removed to a new location, are appearing on the market at present and some of them seem to be approaching commercial practicability. As the supply of gum turpentine decreases with the disappearance of virgin forests, the turpentine of the reduction plants will be in increasing demand. The pine oils produced as a by-product of destructive distillation are being used for various industrial purposes of recent development, and the retort tar can be fractionated into derivatives that are likewise needed. Charcoal also finds a constantly widening market as the towns and cities burn more and more of it for domestic fuel and as the requirements of the charcoal iron industry grow larger. The fact that stumpwood will yield at least 26 per cent more of these products of destructive distillation than the ordinary top lightwood now used by the retort plants will furnish an added stimulus to land clearing. It is apparent also that the number of large central wood reduction plants employing the steam-solvent process is to be materially increased and they will afford a market for thousands of tons of stumpwood annually. As a rule, they pay all the wood is worth and buy over a wide radius. Thus the coastal plain has an economic asset in its lightwood stump which can be credited against the cost of clearing when the dynamite method is used.

Dynamite finds yet another application in the growing pecan industry, which is the coastal plain's greatest horticultural

opportunity. Robert C. Berckmans, nurseryman, orchardist and member of a famous family of southern horticulturists, says that after long observation he is convinced that no man should set a pecan tree in a dug hole. No matter how sandy the soil, the nature of the pecan demands that it be given the most favorable conditions possible, and this means that it should be set in a hole blasted with dynamite. A half-cartridge of 20% Red Cross Extra or Red Cross Farm Powder, giving four holes to the pound, is the proper charge. Placed at the bottom of a hole punched 2½ feet deep and properly tamped and fired, it will shatter the surrounding subsoil and pulverize the topsoil. The shot should not produce an open hole, but should bulge up the soil in a loose mound. The loosened earth should be shoveled out and the hole left open until several rains have come. Then the trees should be set and the hole filled with topsoil or woods' earth.

From pine forest to stump field and from stump field to pecan grove is a double transformation. Many parts of the coastal plain have already experienced these changes, and the demonstrated practicability of reclaiming both the stump lands and the flooded savannas by the agency of dynamite makes this area, naturally fertile and tremendous in extent, the most promising agricultural section of the country.

Signs That Flash in the Sky

Continued from page 12

other surfaces where a transparent color with medium gloss and good adhesion is required.

New uses for lamps are developing constantly. Electric lighting in connection with aeronautics will serve for illustration. Landing an aeroplane in daytime can be accomplished with relative safety if the pilot is experienced and can see the ground clearly. But landing at night is a hazardous undertaking unless the field is well lighted. Illuminating engineers are now studying this problem, which involves not only illuminating the fields properly, but doing it in a way that will protect the airman's vision from glare, which is as bad as no light at all.

The sky pilot must know where he is, what direction the wind is blowing on the landing field and other essential information. Lights will tell him. As colored lights are almost universally used for signaling at night, it is more than probable that colored incandescent bulbs will be used for these purposes.

The Du Pont Company does not make colored incandescent lamps, but it does manufacture the colored lacquers which have been described. They are thoroughly tested products, and can be supplied in the following colors: red, green, blue, purple, yellow and white.

Fabrikoid—the result of a process, adding beauty and long life to fabrics; some heavy and rugged, others dainty as linen—all pliable, scuff-proof, stain-proof and water-proof.

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