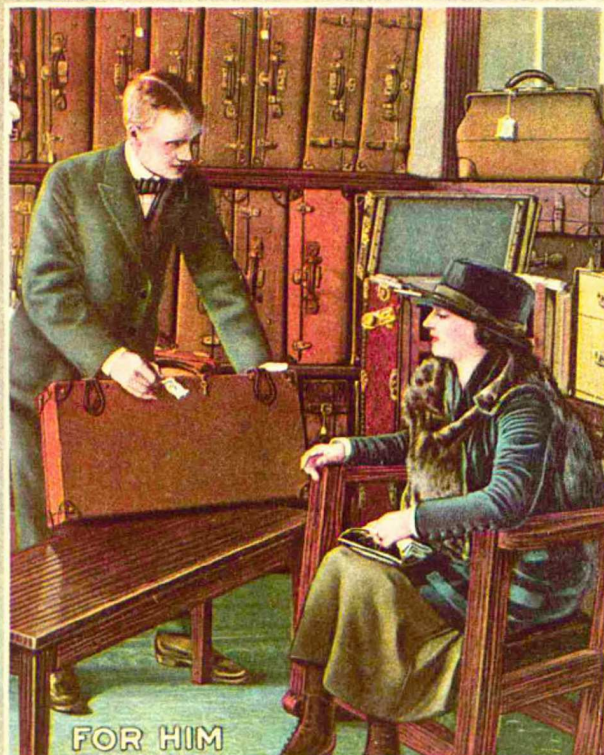


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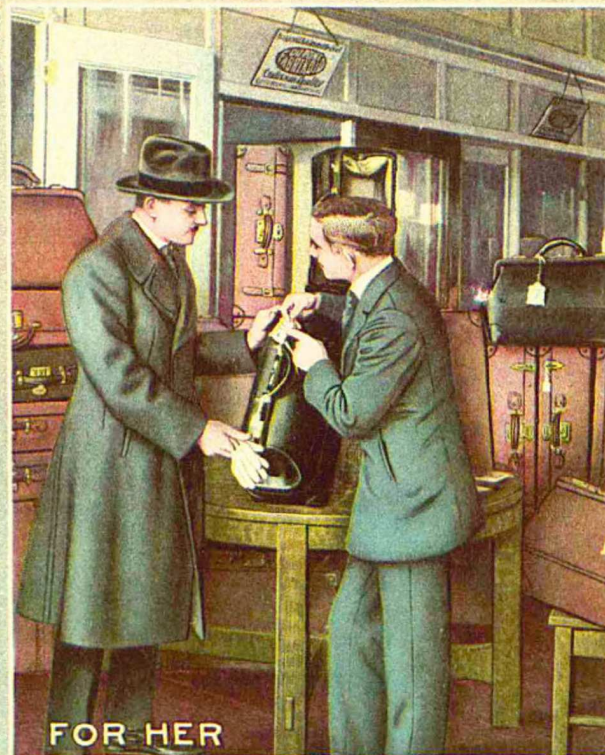
DECEMBER
1918

DUPONT MAGAZINE





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Number 6

The World's Vital Problem—The Question of Ships

Walter Scott Meriwether, of United States Shipping Board

(Specially Prepared for the DU PONT MAGAZINE)

NOT only is the United States Shipping Board planning for a "bridge of ships" to span the Atlantic, but it is instituting a system of ocean transportation along the various sea lanes which already surpasses all standards which had existed previous to the war.

There is now under the control of the Shipping Board a fleet which numbers upwards of 1,500 vessels. Two of these ships are now doing the work that required three in pre-war days. This increase in service has been obtained through curtailment of the time spent in port, more direct routing, unification of cargoes and the adoption of what may be described as a marine skip-stop system.

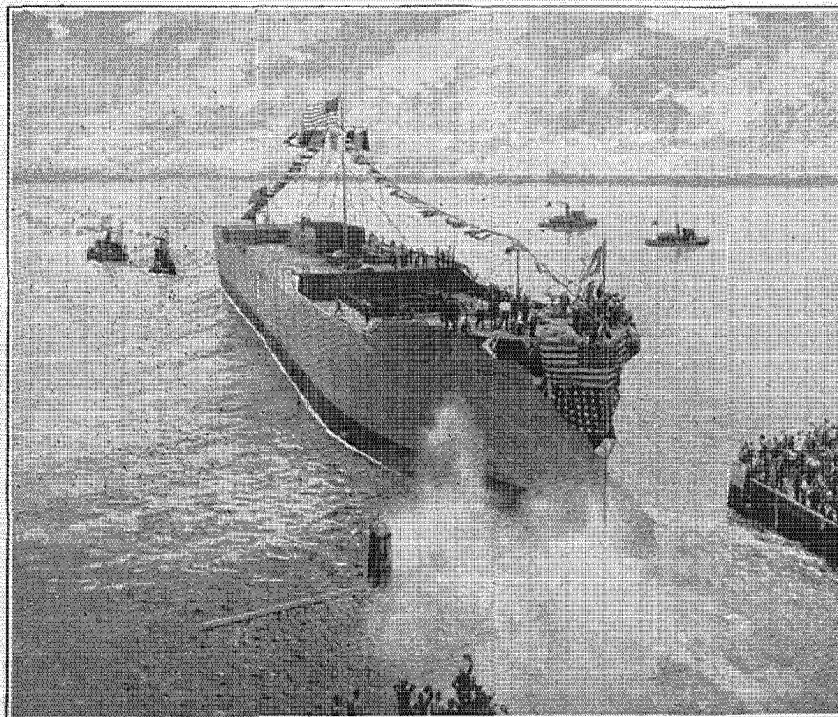
Plus the 1,500 vessels under the authority of the Shipping Board—subject to the orders of the Shipping Control Committee—the records of the Division of Planning and Statistics list 3,000 engaged in commerce that bring commodities to the United States and about 2,500 others scattered around the globe, trading for the most part with the Allies or their colonies. All told, the Shipping Board follows the movements of more than 7,000 vessels or,

roughly, about one quarter of all the merchant ships in the world. Lloyd's Register for June, 1914, shows a grand total for all countries of 30,836 steam and sailing vessels over 100 tons.

Under the energetic leadership of Chairman Edward N. Hurley, ships are being turned out in record numbers. Up to date 561 sea-going steamships aggregating 3,057,873 deadweight tons have been launched, while 281 vessels having a total tonnage of 1,725,731 have been completed and placed in service. All of this has been accomplished since the present Shipping Board was organized a little more than one year ago.

With a huge army of skilled shipbuilders straining at the task, the question of what they can put out is

no longer one of shipyards and ways. For we now have a total of 171 shipyards with 946 ways—more than double the number of ways in all of the rest of the world. The problem now centers around the supply of steel; can this be supplied in sufficient volume to occupy the yards to their full capacity? But the genius of Mr. Hurley in bringing to his side the great steel king of America—Chas. M. Schwab—will



U. S. S. Quistconck, First Ship of the Merchant Fleet Launched at Hog Island

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doubtless solve this problem. The program for steel ship construction is planned up to the limit of the steel, machinery and equipment possibilities. The output of steel ships and of wooden ships is constantly increasing, but the maximum of output in steel construction has not yet been reached. The output of steel plates and shapes of our rolling mills is still considerably greater than the needs of steel shipbuilding at its present rate of production, and Mr. Schwab's concern in securing a proper distribution of the available steel supply, is not that the steel output will not meet our present needs, but that it may not meet the greatly expanded needs of our future plans. He is bringing up the subject in time so that steps may be taken to increase the steel producing capacity in conformity with the plans of steel ship construction.

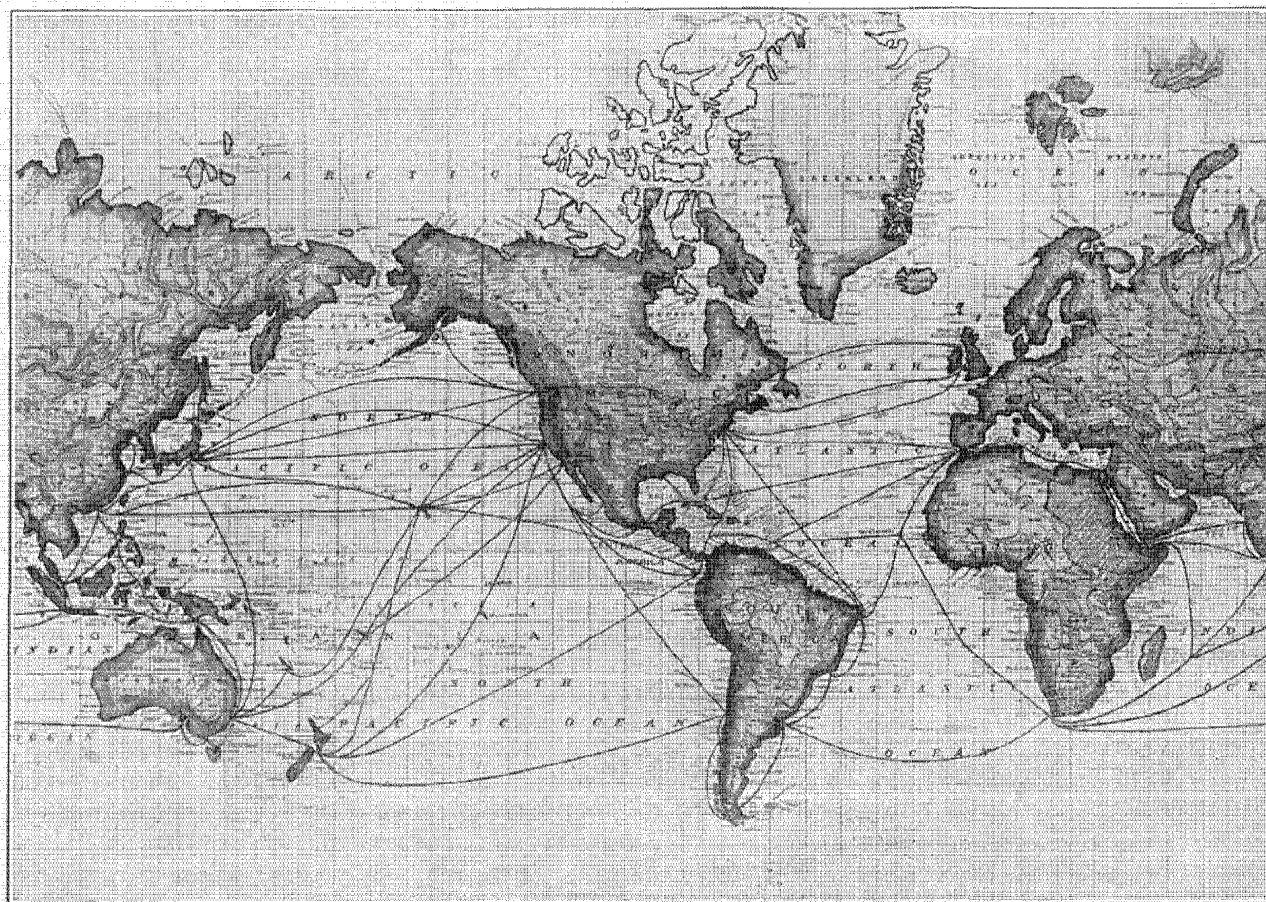
There has lately been a persistent campaign for the building of concrete ships, a campaign based on the misconception that there is an untouched reservoir of raw material and labor which can be used for this purpose without burdening transportation facilities and without impairing the output of steel and wooden ships now under construction. The concrete ship crusaders have been imbued with the idea that a ship is simply a hull, losing sight of the important fact that the equipment of a 7,500-ton concrete ship is the same as the equipment of a 7,500-ton steel ship.

The plain facts of the situation are explained by Mr. Charles Piez, Vice-President of the Emergency Fleet Corporation. Mr. Piez says:

"Because of the limitations in our power and ship equipment producing capacity, our output of ships is measured by the number of vessels we can equip rather than by the number of hulls that we can launch. Facilities for the production of power equipment, deck equipment and other ship equipment have steadily been added to and the production is constantly increasing, but, even today, the hull-producing capacity of the country in steel and wood ships is in excess of what may be termed the power and equipment producing capacity for fitting out these ships.

The mere addition of another 140 ways, turning out, as has been suggested, from 400 to 450 concrete hulls aggregating over 2½ million tons, would, even if that construction program were possible of execution, add not a single ship to our fleet.

As a carrier, the steel ship is admittedly from fifteen to twenty per cent. more effective than a wooden or concrete ship of similar tonnage. The Emergency Fleet Corporation has, therefore, been wise in concentrating its efforts on the construction of steel tonnage and treating the wood and concrete ships as purely emergency agencies."



Ocean Routes of the World Which Will be Reopened to Trade Upon the Cessation of Submarine Warfare

A Nation of Shooters

Peter P. Carney

WHEN the war is over—speed the day—and peace once more reigns throughout the world, America will again be a nation of shooters.

The word "again" is used advisedly. In bygone days every American could shoot—and shoot straight. Shooting in those days was necessary to protect the home and to supply the larder.

As the population of the United States increased and America gained wealth and strength through its varied industries, many of us failed to give the same time and consideration to firearms that our forefathers gave. Hereafter every son of Uncle Sam will be friendly with a gun, whether he is now wearing khaki, or still is a schoolboy in his teens. Something has been learned that will not be forgotten.

When the Yanks come home—millions of them—after a year or two of fighting over the scarred battlefields of Flanders and knee-deep in the mud trenches of France, and having had for a companion all this time a rifle or shotgun, they will be expert shooters. And the return of the Yanks brings us back to our original statement that America will again be a nation of shooters.

The day is coming when no city or town, big or little, will be able to meet its requirements without a gun club. There are now 4,323 gun clubs in America, and there will be double that number in the days that we shall live to see. It was these schools of shooting instruction that helped answer the charge of unpreparedness against the United States, for they turned out the shooters who stopped the Huns in their very first conflict, and ever since have been pushing the now fast-crumbling Germans back to the soil of the "Fatherland."

Shooting is now a game with Americans. Many have played it in the past, millions more will play it in the future. Shooting is a test of skill, and when this war concludes will be engaged in by the Americans with just as much vim as football, baseball, golf and other sports. In the cantonments and flying schools our soldiers and aviators have been taught to shoot with the shotgun, and no man has passed a successful examination as an aviator who could not break flying

targets with this gun. The gun to the boy of the future will be what the lariat is to the cowboy of today.

One thing we shall have to remember, and that is that a great many men in returning from the battlefields will never again return to office routine. They will have acquired that desire for outdoor life that will change their mode of living upon returning. They will take to farming and other outdoor activities. The United States Government realizes this, and has plans under way for the distribution of farm land for those who have honorably served the country and aided in making the world free for all peoples.

The shotgun is the companion of all those who relish outdoor freedom. Americans enter into the

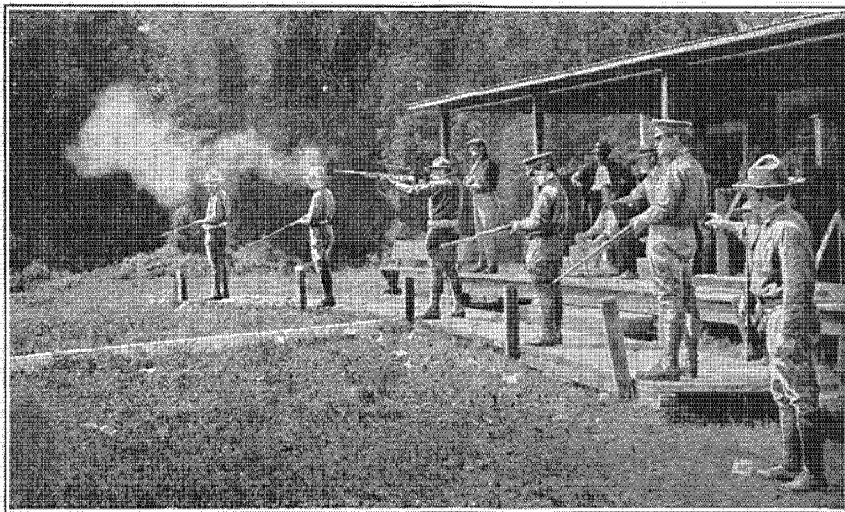
spirit of shooting as they enter into other sports. They will use the gun not for the purpose of killing, but for the pleasure attained in hitting the target aimed at. Breaking the thrown target is their goal, just as knocking out a home run when one run is needed to win is the goal of the ball player.

Shooting is the

national sport in Switzerland, and has been since the time mythical William Tell shot the apple from his son's head. Thanks to a splendid system of universal training the Swiss army is one of the finest bodies of marksmen in the world. The boy goes to school at the age of seven, is presented with a gun and instructed how to use it. When the lad is called for service at eighteen he is well qualified to render the efficient service required. Every male in Switzerland between the ages of eighteen and fifty-two is eligible for service. The Swiss mobilized their troops and placed them on the frontiers just as soon as war was declared in 1914, and on account of their accuracy with all kinds of firearms no one has trifled with them.

The Swiss think highly of their army, as the following bit of conversation between the Emperor of Germany and a Swiss general indicates. Shortly after the war began the Kaiser attended a shooting carnival at Berne. The Kaiser plied the Swiss general with questions, as is his custom.

"How many men could your country put on the field in a week?" said the All Highest.



Draftees Receiving Instructions at the Gun Club

"About 500,000," answered the Swiss general.

"What would you do if I came against you with 1,000,000 men?" said Wilhelm.

"In that case, your majesty," suavely replied the general, "we would have to shoot twice."

We shall have that same feeling about Americans when this war is all over. There was a feeling when the United States went into the war that we were unprepared, that we could not shoot any better than the first British army that Lord Kitchener saw in action. Kitchener's cable to England to teach the men to shoot first and drill afterwards is history.

We were not unprepared. America hadn't given as much time to the high-power rifle as in the past, but in late years those who desired sport with the gun took to trapshooting, and trapshooters and the trench shotgun have written a lot of history in this struggle.

The trapshooters with the trench shotguns were the boys who cowed the Huns at Seicheprey—and this brought out the fact that trapshooters were proving to the world at large that the training they had received at the traps was beneficial in warfare, and also that America had contributed a worthy weapon in the short-barrel shotgun.

The Government recognized the value of trapshooting for the soldiers, sailors and aviators by installing traps in every school of military aeronautics, in some of the cantonments and naval stations and behind the firing line in Flanders and France. Eighty-six traps in all are being used by men in the service, and the Government is distributing 1,000,000 clay targets each week. These men will continue to shoot and will always be a help to America just as the Swiss lad is to his country.

The shotgun has been adopted as the official firing piece of the Home Guards in a great many States, and only recently Governor Charles S. Whitman, of New York, and Governor Keith Neville, of Nebraska, issued letters to every gun club in their respective States, suggesting that the clubs take hold of the draftees and educate them in the art of shooting before they were called into service.

Thousands of trapshooting clubs have been instructing the draftees in the art of shooting, so that when they reported for service they were far along in their schooling and much better fitted to give aid and comfort to Uncle Sam. Every one of these draftees will continue at the sport of shooting after the throne of the Kaiser has been abdicated.

In not less than a dozen cities traps have been installed in the public parks. In these places any one can learn to shoot at any time, as capable instructors are always at hand.

In Chicago traps are operated in Lincoln and Washington Parks, and thousands frequent these park traps in the course of a year. The Utica Gun Club has just been given permission to erect a club house and traps in Roscoe Conkling Park, which is in the heart of the city. In Spokane, Wash., public traps are located in the Stadium.

As city and state executives begin to realize how the shotgun benefits the youth and makes for better citizenship, and prepares for perpetual peace, traps will be placed in public parks all over the United States, just as tennis courts and golf links and baseball diamonds now are.

The first American soldier to put his feet on German soil in this war was a trapshooter, Sergeant James Maloney, of Sault St. Marie, Mich., and he was carrying a trench shotgun.

Frequent reference to the trench shotgun has been made in this article. We will describe this gun which has caused so much "whining" on the part of the Huns. The trench shotgun is the deadliest short-range weapon ever used by man. It is a modified Winchester riot gun, 1897 model, six-shot, hand-operated, single barrel pump shotgun, an improved type of the gun that was used in the Bad Lands more than a half century ago, where it cowed many a desperado and other bad actor.

The gun is provided with an outer steel coat, which is perforated and held a short distance away from the barrel proper and forms an air chamber that acts as a cooling jacket and prevents the scorching of the shooter's hands. To this jacket the bayonet is attached. The gun itself weighs 7½ pounds, and the bayonet 1½ pounds, and is carried over the shoulder the same as a rifle. The magazine holds five shells; one shell is in the chamber, and with the jacket keeping the barrel cool and away from the shooter's hands it is possible to shoot just as fast as the gun can be loaded. The six shells can be fired in that number of seconds, and one man shooting with others loading guns for him can fire 50 shells a minute.

These shells spray a veritable shower of lead, and the only umbrella that is useful when the guns are spouting is an armored tank. The shells contain 3½ drams of smokeless powder, 00 buckshot load, 9 pellets, each the size of a 32-calibre bullet. You can readily understand what damage these guns can do in the hands of men who can shoot. No column of troops can stand before a fire from these guns at short range. At 50 yards the pellets will go through a pine board 1¾ inches thick.

Trapshooters are sportsmen and as such are willing to take a sporting chance. The Huns having had practice in tossing hand grenades did considerable damage to American property until the shotgun appeared. These hand grenades explode four seconds after being thrown or, to be exact, four seconds after the thrower sets the fuse. If a grenade is held too long, an unexpected killing occurs. The shotguns are used to deflect the grenade. The compactness of the shot checks the grenade and causes it to explode wherever it falls, thus keeping it away from the American trenches and making the explosion fatal to the enemy. But if the shooter fails to connect with the grenade, he forfeits his life.

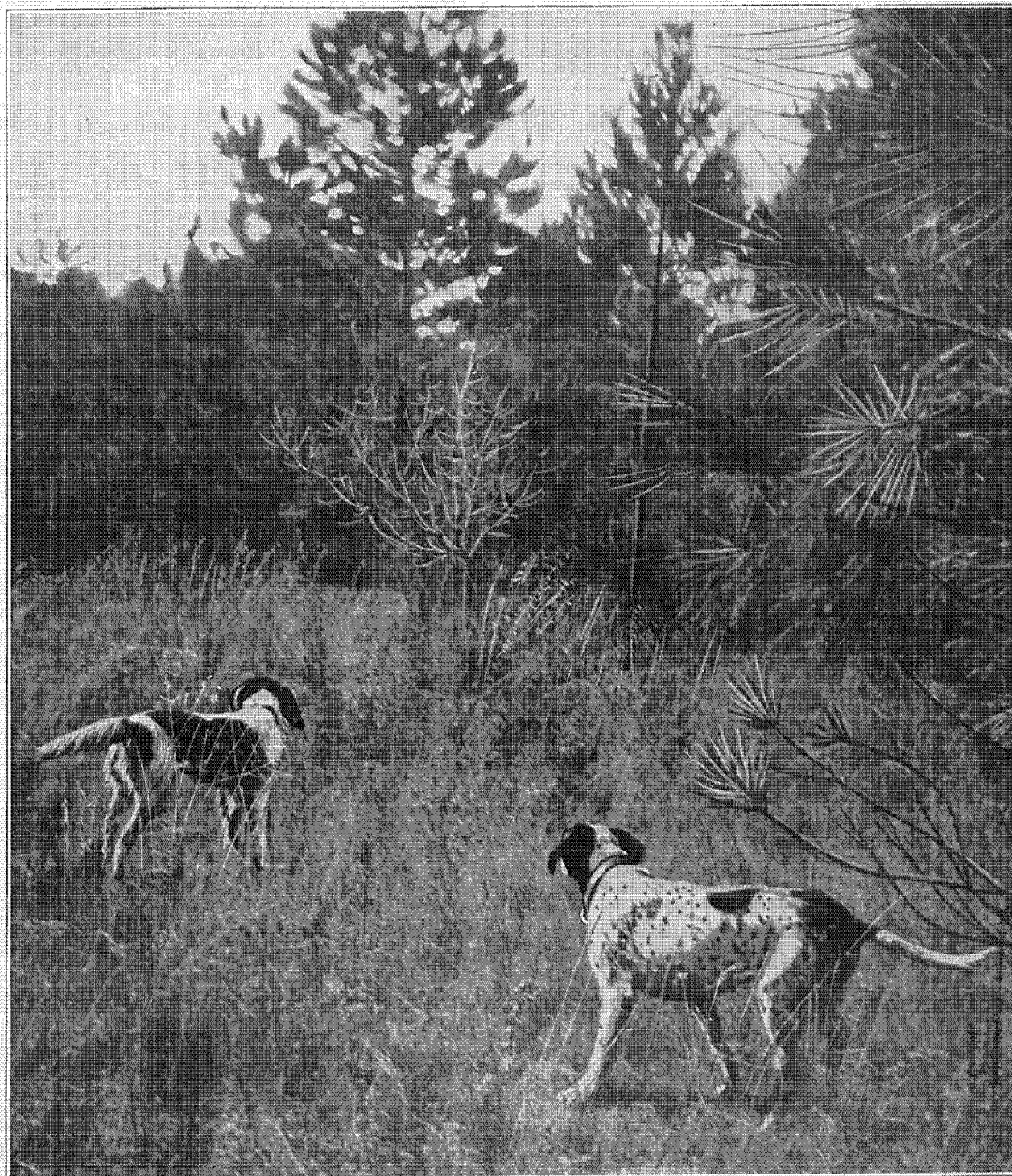
Shooting is great sport, always has been, and will be a greater sport when Peace reigns once more.

The Amateur Championship Stake of America

W. A. Shafer

THE momentous events of the great war have so filled the minds of men, that achievements of normal times cause but a ripple in the stream, and the birth of the first association of Amateur Field Trial Clubs was almost unheralded.

In the year 1874 the first field trial by an organized club was held by the Tennessee Sportsmen's Association, and a black native setter called "Night" was judged winner in a field of twelve competitors. This sport has each year increased in popularity, and



In Training for Amateur Championship Stake

annual trials are now held in all parts of the country. Most clubs hold their trials in the fall before the cold weather arrives, although spring trials on liberated birds are preferred in some localities. One of the largest meets of the year is held at Medford, N. J., by the English Setter Club of America during the early days of April. The New York State Field Trial Association also holds a spring trial on quail.

These trials are held at some point convenient to the clubs' clientele, where suitable grounds are available. The courses must be open, and fields sufficiently wide to demonstrate the speed and range of the contestants, and should be well stocked with feathered game, as the dogs must show first of all that they possess the fundamental hunting instincts, ability to scent birds, staunchness on point, and their training in steadiness to shot and wing.

Famous field trial grounds are located in several Southern States where the bobwhites abound, and large estates and game preserves have not been fenced into small plots for intensive farming, as in the more thickly settled country further north.

Field trials are divided into two distinct classes, the "Big Circuit" in which as a rule only professional handlers compete, and amateur. The dogs entered in the former are either famous, or have qualities which their owners and handlers believe will bring them before the public. These dogs are placed in the hands of professional trainers and receive expert care and attention from early puppyhood.

While putting their charges through training, the handlers ride horseback, and the dogs are trained to go out wide and cover the fields at a rapid pace. They are, however, kept under control and trained to keep on the course and obey the signals of their handlers.

In the summer the handlers take their strings to Manitoba or the Dakotas, where they are worked until September, when the first of the Grand Circuit trials is held at Denbeigh, N. D., and at the close of this competition the trainers and their strings go South, and the dogs are hunted on the Texas prairies or Alabama ranges until the fall and winter meets are held.

The winners in the Grand Circuit trials are eligible to compete in two national championships, one at

Grand Junction, Tenn., and the other at Calhoun, Ala. The same dog may win both, and thus become a double champion.

Amateur trials are held by clubs all over the country, principally in the Atlantic Coast States, although several of the Western clubs are very progressive, and their trials are well attended. These clubs are supported and run by sportsmen who keep and handle their own dogs. A great many of these men become so deeply interested that they maintain large kennels and breed a great many excellent dogs. Some become expert handlers, and can hunt their favorites on equal terms with the professionals. However, the greater number, on account of environment, are content to find a good

pup, have him developed by some trainer, and put in shape for them to handle at the annual meets of their clubs.

During the intervals between the Big Circuit trials the professionals often bring their strings to the Amateur meets, and it sometimes happens that the Amateur wins over these com-

petitors, although the chances always favor the professional, who has his dogs in constant training and under his individual control.

To prevent handicapping the amateur by odds of this nature, a good many clubs hold member stakes, or amateur stakes, from

which the professionals are excluded, but nearly all clubs welcome the professionals in their open classes.

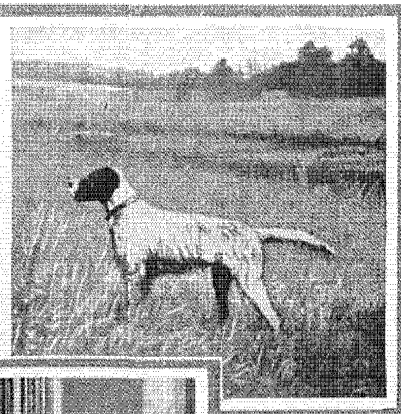
There is no difference in the quality or kind of dogs on the Big Circuit from the good ones owned by the amateurs, but dogs constantly trained on the big ranges and open prairies develop greater speed, wider range and more stamina than pups broken in country cut up by woodland and underbrush, where the average dog is trained and handled.

Under these conditions, while the amateur could win in a club trial, he was shut out from the opportunity to compete in a championship on anything like even terms.

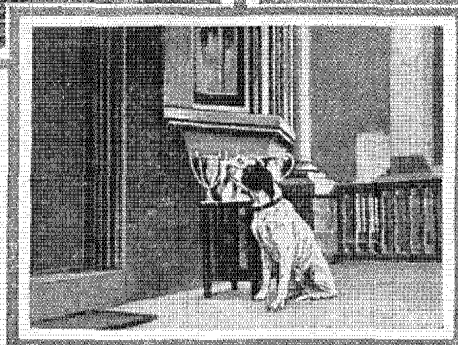
A few of the sportsmen dog owners decided to remedy this condition, and arrange to hold a Championship in which amateurs only would compete. An informal discussion of the scheme was held at Medford, N. J., at the meet of the English Setter Club of America, on April 3d, and on the 23d of the same month, at a



"Fairy Beau," Winner of Amateur Championship



"Mr. Hart," Runner-up in Amateur Championship



"Delaware Frank," Winner of 1917 Derby

formal meeting in the offices of Mr. Samuel G. Allen, New York, the Amateur Field Trial Clubs of America was formed, and now has a membership composed of the following clubs:

Atlantic City Sporting Dog Club, Connecticut Field Trial Club, New York State Field Trial Association, Pointer Club of America, English Setter Club of America, Delaware Setter and Pointer Club, National Capital Field Trial Club, Page Valley Field Trial Club, Virginia-Carolina Field Trials Association and Piedmont Field Trial Association.

Each member club is entitled to a delegate or alternate who acts as one of the Board of Governors of the Association. The officers of the association are elected by the board from their personnel, which is a most democratic and equitable arrangement, as each club is entitled to control in the association to the extent of its representation.

Mr. Frank Reily, of Medford, N. J., was elected president, Mr. J. R. Mitchell, of New York, and Mr. O. H. Aylor, of Luray, Va., vice-presidents, and Mr. W. A. Shafer, Wilmington, Delaware, secretary-treasurer.

The requirements for eligibility to compete in the Annual Championship are very simple. A winner to be recognized by the association must be placed first or second in All Age, or first in Derby Stakes in a licensed trial held by member club, and handled in making such wins by an amateur.

Thomasville, N. C., the theatre of many famous trials, was chosen as the site for the first championship, and the date appointed was December 14, 1917. The running, however, did not take place until January 14, 1918, on account of weather conditions.

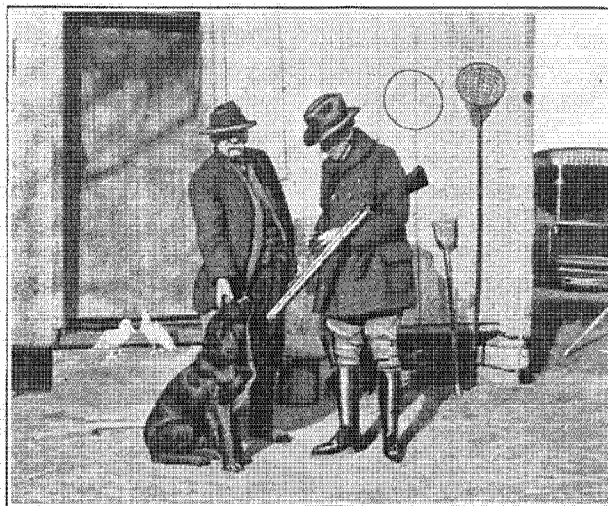
The Sunny Southland was storm-swept from coast to mountains, and the ground was covered with snow, almost continuously from the middle of December until the middle of January, and the mercury hovered during this period close to the zero mark. However, on January 14 the sun came out warm and bright, and there was just enough thaw to make the ground excellent for both dogs and handlers. The weather forecast, however, which predicted zero weather and snow for this section, prevented a great many sportsmen from attending the meet, and a good many eligible dogs were prevented from running by this and other causes. Out of eighteen qualified to run, only seven were actually started, but quality counterbalanced any lack of quantity, and the trial was pronounced by those who attended as one of the most interesting of the season.

The Championship was won by Fairy Beau, owned

by Mr. H. D. Kirkover, of Buffalo, N. Y. Mr. Hart, owned by Mr. Tracy S. Comstock, of East Hartford, Conn., was placed second, while third honors went to Miss Kate W., owned by Mr. P. H. Powel, of Denton, N. C.

The Champion, through a coincidence, was whelped on George Washington's birthday, and like the great American who has gone down into history as "First in war, first in peace, and first in the hearts of his countrymen," Fairy Beau will go down as "First in field trials, first on the bench, and first in the heart of his master." He is a good-sized blue belton and tan

ticked dog weighing about forty-five pounds, and was bred by Mr. B. F. Weeks, of Washington, D. C., who owned both his sire and dam. He was whelped on February 22, 1912, and is by Beau Danstone ex Fairy Legend. Fairy Beau is a very consistent performer, and can be depended upon always to show his wonderful hunting instinct and superior training. He has already been placed nineteen times in field trials, which is the record for English setters in America. On the bench he has fourteen wins to his credit, his last being



The Author Talking "Dog" With a Native

first in the field trial class of the Westminster Kennel Club Show, at Madison Square Garden, New York. Mr. Harry D. Kirkover, his owner, uses Beau constantly as a shooting dog, and values him very highly as a hunting companion. Thus in this remarkable setter we find combined the superlative qualities of three distinct types, and Mr. Kirkover is to be congratulated on the attainment of his ambition to own a true combination dog.

An interesting story is told of Fairy Beau, which illustrates the wonderful instincts given by nature to the pointing breeds. In one of the amateur trials Beau was lost, and although a diligent search was instituted, he could not be found, and the trial proceeded. After several heats had been run, one of the handlers called out, "There is Beau, dead." Mr. Kirkover, greatly shocked and heart-broken, ran to the spot indicated, and found his dog "dead on point." The birds were flushed, and Beau, nearly worn out from a terrific strain of pointing for over an hour, was taken to his kennel.

Mr. Hart, the runner up in the Championship, hails from the West, was bred by Mr. H. J. Burgoon, of Zanesville, Ohio, and like Fairy Beau, is a February pup, whelped on the 27th, 1914. He was owned for some time by Mr. George B. Robertson, of Virginia, who started him out on his winning career, but Mr.

(Concluded on page 27)

From Munitions of War to Munitions of Peace

Du Pont Dyestuffs Sales Department

IT is but a short step from explosives to dyes in days such as these, when explosives are complicated chemical combinations whose ingredients are, in large part, the bases of the coal tar dyes. These coal tar dyes have supplanted natural coloring compounds as the newer explosives have supplanted the original gunpowder of the Chinese.

America, with her men and munitions of war, helps to save the world from German military domination; through her dye industry she is equipping herself with the munitions of peace that she may be free from German commercial domination. She had been successful in the first; success in the second was to be expected.

America has been known as a land of abounding wealth; its people as a people fertile in resource, splendid in energy and audacious in the accomplishment of their undertakings. Our technical skill has been acknowledged by all the world and our inventiveness has become a proverb. Though the world perhaps had thought of us as brilliant improvisers rather than as a people given to a vision of the future with plans carefully elaborated and laboriously carried out, many American industries are solidly based on scientific knowledge, with careful organization and an eye to future developments. Perhaps none is more characterized by these qualities than E. I. du Pont de Nemours & Company.

The Du Pont Company, founded in 1802 by a French émigré of distinguished ancestry and careful scientific training, established the business of manufacturing explosives in the United States. The continued control of the company by a long line of men of unusual ability in the same family has been due not only to their natural ability, but also to a technical training in the lines of their business, so that some of the most valuable discoveries and processes of the industry are due to men who would ordinarily be thought of simply as owners. The du Ponts have been active in the direction of the company; they have worked with it practically and fruitfully; two of the family have lost their lives in connection with its operations. Its steadily growing success has been due largely to the constant employment of the best trained men to be had.

Throughout the 116 years of its history the relations of the Du Pont Company to the Federal Government have been of the most patriotic nature. This is true from the days of 1812, when wagon trains carried powder to Commodore Perry on Lake Erie—"the first experience of rush orders and overwork in the American powder industry"—through the Mexican War, the Civil War and the Spanish War, down to the present days of gigantic production.

These war days have seen many romantic expansions of business. None have been more romantic than

the growth of the Du Pont Company in its enormous production of explosives and in its extension to related industries.

The Du Pont Company bases its claims to recognition not upon promises but upon accomplishment. It had a foremost place in the manufacture of explosives at the beginning of the European War and that place has been splendidly maintained.

The word explosives usually spells war to the uninitiated, but the proportion of the Du Pont explosives actually used for military purposes before 1914 was very small—about 5 per cent. The remainder—except for sporting powders—was used for industrial purposes, and it was absolutely indispensable to the conduct of modern industry.

During the life of the company, through the use of explosives, over a quarter of a million miles of railroad and more than two million miles of highway have been built in the United States; over 400,000,000 acres of land have been cleared and improved, and in one single year over 600,000,000 tons of coal have been mined. The Panama Canal has been excavated, and in New York alone millions of tons of stone have been moved for the building of aqueducts and subways, all of which was accomplished by the use of explosives. A large percentage of them was manufactured by the Du Pont Company. Without the use of such large amounts of explosives this country could not have made such marvelous progress.

Never has the Du Pont Company looked to its country's military exigencies for profit, but rather to legitimate commercial growth. Still it is a matter of great pride to the Du Pont Company that it has played such a large part in furnishing to our own country and to our Allies the explosives without which the war would long ago have been lost and with which we look to see it brought to a successful close.

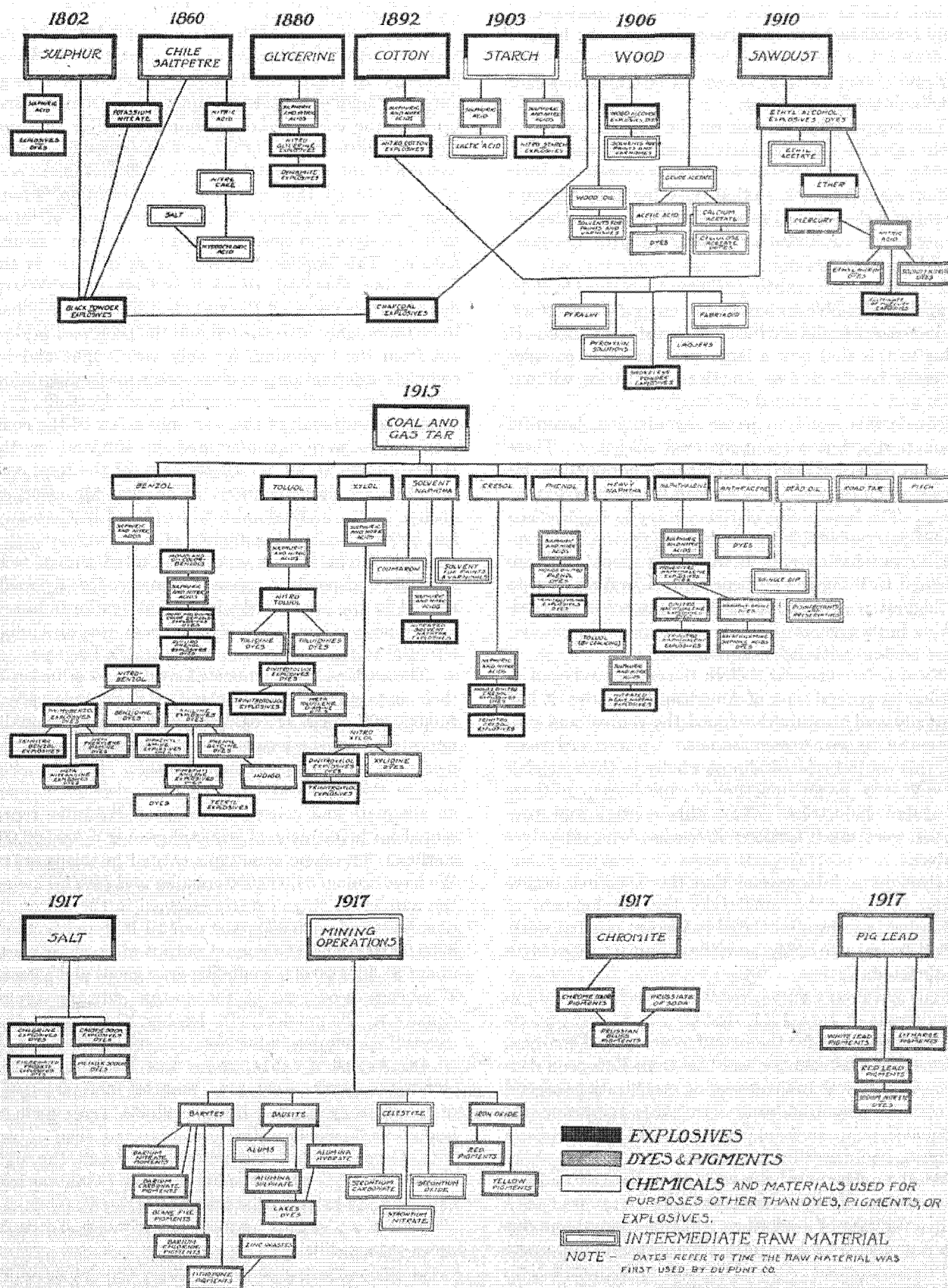
The company early in the war, before the United States Government entered the conflict, decided upon the policy of protecting our Government against any increase in the cost of powder to them, if it were possible; and throughout 1914, 1915 and 1916, when the price ranged \$1.00, 90 cents and 80 cents to foreign governments, the company furnished the United States Army and Navy all their requirements, aggregating 10,690,000 pounds of smokeless powder at 50 to 53 cents per pound.

The Du Pont Company derives its power from two sources: organization and control and production of its raw materials.

The Du Pont Company has always placed its organization and its personnel before production, knowing that having these, production was certain.

At the outbreak of the war the Du Pont organization had reached a high degree of perfection. The

DU PONT AMERICAN INDUSTRIES CHEMICAL PROGRESS CHART



period of experimentation was long past. It had proved its permanent usefulness, its fitness to meet the demands of customers and its power to meet competition. Moreover, a second stage had been reached, that in which the accumulated experience of firmly established enterprise was shown in the highest development of its powers, the powers of the industry itself and also of the men whose strength and character alone limit accomplishment.

This organization is made on the basis of the *cadre*, as the French call the skeleton arrangement which provides essential factors for every branch of their military establishment, so that directing skill is always present and the size of the organization can be adapted to any need—expanded or contracted with the least possible confusion.

It is due to this existing scheme that the Du Pont Company were able to handle the enormous and startling increases of military business thrust upon them. It is due to this that now a large part of their energies can easily be directed to American Industries, without strain and with continued efficiency.

Nor is this merely a paper organization, beautiful schematically, but without material efficiency. There is a man for every place, the best man obtainable. He is trusted and given the opportunity to show his capacity. The best brains of the country in engineering, in chemistry—both research and analytic—in operation, in purchasing and in sales, are sought and encouraged to bring the efficiency of the organization to the highest possible point. This company is forward-looking in its organization. It has achieved much, but is not content with its achievement.

Even before the war, before the company began to develop its general plan of American Industries, it had gradually and steadily developed the control and production of its own raw materials. Up to a few years ago, this control related almost wholly to the materials entering into the manufacture of explosives or to those of related industries. Now this control and production goes much further; it reaches from explosives to dyes.

It ought to be apparent that the Du Pont organization is equipped to undertake the development of any industry naturally related to its own original work. It will be easy to show how the manufacture of dyes is so related.

The Du Pont Company stated in their original announcement of July, 1917, that they had (a) the necessary raw materials for the manufacture of coal tar dyes, products of this country and free from European control; (b) chemical and engineering organizations second to none in magnitude and scientific attainment; (c) unequaled plant and laboratory facilities, and (d) an adequate commercial organization.

At the outbreak of the war, when need arose for a vast output of high explosives, Germany was in a unique position of advantage. She had very large dye establishments; and both the processes of manufacture and the equipment required for making high explosives

are, in many cases, very similar to those required for the manufacture of certain dyes and intermediates—in other cases they are identical. It was therefore but a short and easy step from the manufacture of dyes to that of high explosives.

When this war, with its unprecedented demand for high explosives, was forced upon America it was found necessary to create the factories required for a large output of high explosives, in most cases, from the first brick to the last piece of equipment. After the war, America, in the person of the explosives manufacturing concern of the Du Pont Company, will, insofar as possible, apply all this experience, organization, equipment and raw materials in the manufacture of intermediates, dyes and closely related products of a similar nature. This implies, however, years of work in the engineering, chemical, research and operative departments. Heretofore all the technical literature has had to be thoroughly investigated and the processes worked out from the beginning, for only very vague and incomplete information—in some cases misleading information—was available concerning most dyestuffs.

At the outbreak of the war only a few of the common colors were manufactured in England or the United States, in all not 10 per cent. of the total consumption of either country. The coal tar color industry, begun in England but developed in Germany, had become a virtual monopoly of Germany.

Both Great Britain and the United States were absolutely dependent upon Germany for dyestuffs needed in the enormously important textile industry, as well as in others. The dye industry was absolutely essential to the continuance of the textile business.

The cash value of imported dyes is no criterion of their importance. In England, for example, about \$10,000,000 worth of coal tar dyestuffs were annually imported; but the importance of these dyes cannot be measured by tonnage or money value. British industries in the textile and related lines, dependent upon an adequate and constant supply of dyestuffs, represented an investment of something over £200,000,000 sterling. The same conditions existed in this country. We have around 34,000,000 spindles and 730,000 looms; the number of wage earners engaged in the cotton industry exceeds 400,000; the capital invested is about \$900,000,000 and the annual output of goods is worth about \$1,500,000,000, including gray goods and colored. What has been said of the cotton industry applies equally to the woolen, silk, leather, paper and other dyestuff consuming industries.

On August 1, 1914, there was on hand in this country approximately four months' normal supply of German dyestuffs. Frantic efforts were made to import in large quantities—we were not then at war with Germany—but Germany had closed the door from the inside. Only one lot of about 7,000 tons ever came out, and that in the fall of 1914.

This was a serious matter; but it was meant to be more serious still.

It was not a temporary shortage which confronted

us; it was the permanent German policy of submitting us and England and all the world to an industrial slavery. Lord Moulton said, on December 8, 1914:

"I have learned the German methods of carrying on business. I know their ways of dividing all the nations up into watertight compartments by their system of selling dyes not to be exported, so that they can put up the price to one nation and down to another. I know the way in which even the two great rings, which may be competitors one to the other in Germany, are united against the foreigner. I say gravely that if peace were declared at this moment you in the English textile industry would be so much under domination of the German dye-producing industry that it could boycott you in the way of dyes, it could overcharge you for dyes and it could hamper that industry pending the time when it had the capital and works to challenge its very existence."

The same words will apply to our country.

Now why is the Du Pont Company in dyestuffs? The answer is obvious. As has been shown, the dye industry is very closely related to the manufacture of explosives. It was very easy for the organization to pass to this other work. But other Americans also accepted the challenge of the German boycott and set about making dyes for our country's use. The tremendous importance and significance of the Du Pont enterprise depends upon two things: (1) ability to meet the Germans in the matter of quality, and (2) establishment of the industry firmly in order that no after-the-war activities of Germans shall have power to disrupt our newly-established enterprise, which will set us free forever from dependence upon German dyes.

The effort of the Du Pont Company has been to build from the ground up, and to establish the dye industry upon a permanent basis from which it could never be dislodged whatever world conditions may be at the close of the war.

There are mountain peaks in most countries and in most histories; the mountain peak of the Du Pont Dyestuff Works is *indigo*.

Indigo is the great staple dye of the world. For centuries all of the indigo of commerce was obtained from the indigo plant, and the cultivation of these plants was carried on in a very large way in India.

Vegetable indigo decreased as the production of synthetic indigo increased. By 1914 natural indigo had practically disappeared from commerce.

The production of synthetic indigo in Germany in 1897 was regarded as the crowning achievement of the coal tar color industry, and time has shown that all of the early expectations have been more than realized. In 1914, after 17 years, Germany had a monopoly of the indigo business of the world and practically every consumer of indigo in the United States used the foreign product.

The achievement of the Du Pont Company in the erection of a plant having a rated capacity sufficient to

supply the entire needs of the United States, within the seemingly incredible time of 10 months, stands as an accomplishment second to none in the development of the coal tar color industry in the United States during the war.

The successful manufacture of synthetic indigo marks the beginning of the production of a series of fast colors, which are so essential to the various consuming industries. Trade standards of fastness before the war were based upon the use of such products. It is highly essential that manufacturers of the particular fabrics in which such colors were used should get back to their former standards as soon as possible. The effort of the Du Pont Company is to assist the textile industry to do this.

Dyes are among the most important "*munitions of peace*," to use the striking phrase of Lord Moulton. That far-seeing man has also said, "It is well to be wise at a great moment." This is the great moment in American industries.

The American people do not seek wars, military or economic, with anyone; but if wars must come, they ought to be prepared for them. The achievement of the Du Pont Company in explosives manufacture has been pointed out. They hope to equal that achievement in dyestuffs and in other related industries. Sentimental persons have often spoken and written as if there were something ignoble and base in even defensive wars when the object sought was to defend property. It might be defensible to fight for one's life, but not for property. They have also seemed to be especially enraged against trade, which is only the business and property of the individual writ large. But it is production, wealth in the best sense, which makes civilization possible. There is nothing ignoble in fighting to preserve an honorable trade. The Du Pont American Industries minister directly to an economic national defense. Our great neighbor and ally, Great Britain, considers the manufacture of synthetic dyes to be a "pivotal industry." Shortly after the outbreak of the war her Government took steps to secure the establishment on a permanent basis of the manufacture of dyes in England. A dye commissioner has been appointed, who gives practically all his time to this industry, and every care has been taken to keep this essential industry from any possibility of control by any foreign source after the war.

It is England's "great moment" in dyestuffs; it is ours, too.

Our productiveness per man is far greater than Germany's. There is no reason to fear her accumulated fund of experience in this line of manufacture, provided we, at this time, prepare to meet her at all points. The program of the Du Pont Company is a defensive program with a view to securing and assuring the absolute independence of the great American textile and other consuming industries, which had been so long subject to the autocratic will of Germany for their supply of dyestuffs.

Will the Gasoline Hold Out?

A. H. Berwald

NO careful motorist will start up a long steep hill without being sure he has "gas" enough to carry him to the top, yet the whole motor world is climbing a hill to which seemingly there is no end, without once asking, "Will the gasoline hold out?"

For some years the figures for new passenger cars, trucks, tractors, aeroplanes and other gasoline-driven units have been climbing abruptly. With the recent impetus of immense military requirements, production curves have, in many cases, gone straight up. Everywhere mammoth factories have planned vast increases in their construction program for the next few years, yet nature, which must supply the liquid muscle for all these man-made motors, has given no assurance that she will be as generous as this unquestioned faith implies.

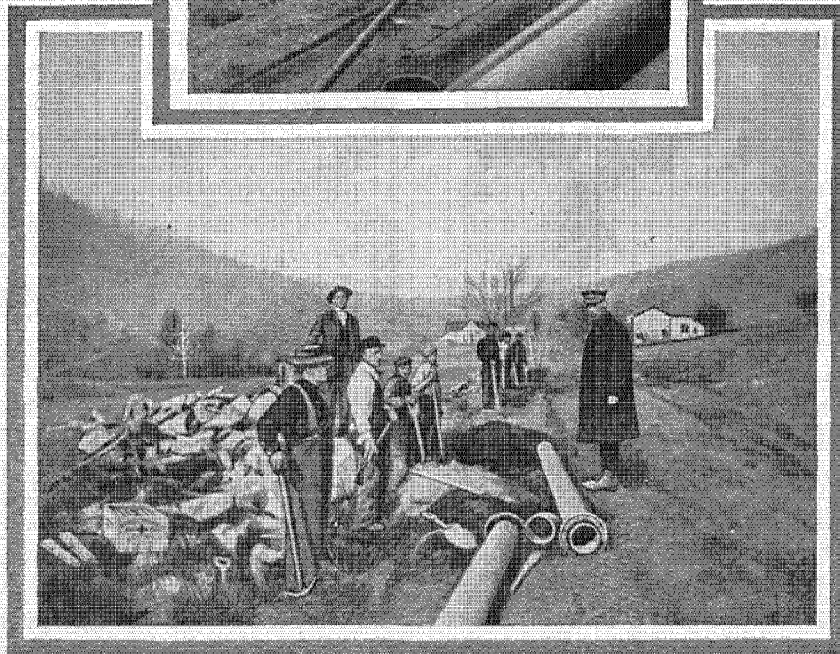
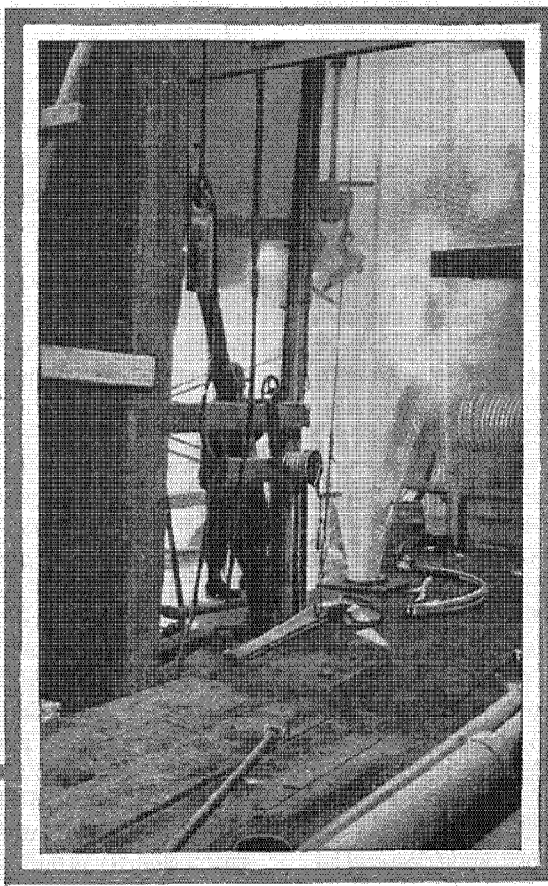
The gasoline supply depends mainly on the production of petroleum oil, "crude" oil, of which it is a distillate. The production of "crude" oil has been practically stationary for the last few years during which the multiplication of gasoline engines has been so spectacular, and while the oil industry is noted for its surprises and some wonderfully rich fields will undoubtedly still be developed, it is not reasonable to expect that the total production can be increased materially in the face of the consistent normal decline in the output of the wells already in existence and the progressive shrinkage of the areas still undeveloped. The production of "crude" oil is not keeping pace with

the requirements for gasoline, as is proved by the increasing cost of the same and by the "gasless" Sundays we have been observing lately.

Another fact of importance is that "crude" oil is no longer the elastic medium it once was with regard to its percentage yield of gasoline. That yield has now been stretched to the very limit to which gasoline usable in the present type of motors can be produced. "By cutting deeper into the crude," by new methods of distillation and by a great average lowering of its gravity, the percentage of petroleum oil marketed as gasoline has been greatly increased.

In the first years of the oil industry as little gasoline was collected as possible during distillation, for it was then a most troublesome by-product which refiners could not sell and the disposal of which caused a great deal of annoyance. Old Pennsylvania refiners tell how the law forbade running their gasoline into the streams, and how they dared not burn it for fear of explosions and of destroying valuable property. They love to tell how consistently their gasoline tanks, placed along nearby streams, would spring bad leaks when high water and a dark night made that accident opportune.

There came a demand for this by-product gasoline for various industrial uses, for stove fuel and lighting, and its price began to approximate that of kerosene oil which was the next heavier product in the order of distillation. With the perfection and rapid adoption of



Upper—"Drilling In" a Large Gas Well. Lower—Laying Pipe Line

gasoline engines the relative values of gasoline and kerosene were reversed and an increasing amount of kerosene distillates found their way into the gasoline tanks. Similar adjustments have been going on ever since and as the insatiable demand for gasoline placed a premium upon its production the gasoline tanks have filled faster and faster at the expense of other petroleum products.

But this process has reached its practical limits and any substantial increase of petroleum gasoline must result from an absolute increase in the supply of petroleum itself. Such an increase may come or it may not. Already its delay is reflected in the decreased stocks of gasoline in storage, a decrease which would have resulted in an acute shortage months ago, were not the situation saved by the addition last year of some 500,000,000 gallons of good gasoline from an entirely independent source, and at least that much more by late fall of this year.

The main purpose of this article is to tell the story of this *emergency* gasoline, a story that as yet very few laymen know anything about but in which lies the hope of the motor world for an adequate future supply of this vital fluid.

A large percentage of wells that produce petroleum also produce natural gas, but a great many gas wells do not produce petroleum. Natural gas has been used in this country since 1821 but the development of the natural gas industry, as we are familiar with it, has taken place for the most part in the last twenty years. This development has been so uniform and so devoid of sensational features that few people appreciate its present magnitude. The reader will be interested to know that natural gas to the value of \$120,000,000 was marketed in the United States in 1916, a sum greater by \$27,000,000 than the value of all the gold and nearly two and one-half times the value of all the silver produced in this country that year. In that year, 2,362,494 domestic consumers, in twenty States, used natural gas for heat and light and 18,278 industrial concerns used it for fuel. At the end of that year there were 38,000 producing gas wells and 13,000,000 acres of land under the control of gas-producing companies, and what is more pertinent to our story, these companies distributed in 1916 the stupendous total of 753,000,000 cubic feet of gas.

One of the chief difficulties of collecting and distributing natural gas through iron pipe lines had always been the condensation of certain invisible vapors in the gas, thus forming a seal or plug of fluid in low places in the lines which obstructed the passage of the gas. This condition was more troublesome in cold weather and in lines carrying gas at high pressures. Aside from providing drips at low places and vents through which this fluid could be blown out of the lines when necessary, no particular attention was given to the formation of the liquid or to its character and no attempts were made to save it.

During 1901 and 1902 it became noticed generally that the liquid which accumulated in gas lines was

virtually identical with the gasoline derived from "crude" oil and could be made to work in the same motors.

Laboratory analyses of various specimens of natural gas obtained from oil wells showed such gas to be saturated with the invisible vapors of heavy hydrocarbons, principally pentane and hexane, which were liquefiable under proper conditions of pressure and refrigeration.

In 1903 and 1904 the first serious attempts to conserve the gasoline content of natural gas were made and by 1909 several small plants were in successful operation. With the processes elaborated the pressures and temperatures necessary could be obtained by the use of machines and fittings of standard construction and capacities and as the business was exceedingly profitable the number of plants increased rapidly. By 1911 there were 176 plants in operation in six States, producing gasoline from "casing head" gas, that is, gas collected between the tubing and casing of wells yielding crude oil, and often referred to as "wet" gas because of its large content of gasoline vapors as compared with the "dry" gas from wells producing no oil.

The method of extracting the gasoline vapors from "casing head" or "wet" gas is comparatively simple and generally as follows: Pipe lines are constructed to the various oil wells and connected to large vacuum pumps. These pumps deliver the gas to a low stage compressor which compresses it up to between 40 and 50 pounds per square inch. It is then cooled down to a temperature of 60 degrees F., from which point it is taken into a high stage compressor and further compressed up to 250 pounds per square inch. It passes from this second stage of compression into a cooling system where the high temperature resulting from compression is reduced to 60 or 70 degrees F. After this cooling the compressed gas passes into a large expansion tank which is automatically controlled by expansion valves, thus allowing the gas to expand rapidly in a large area. This expansion lowers its temperature to from 10 points below zero to 20 points above zero F. The gases which have become liquid because of pressure and refrigeration are precipitated as gasoline.

The average yield of gasoline by this method is about $2\frac{1}{2}$ gallons per one thousand cubic feet of "casing head" gas, and about 70 per cent. of the gas, by volume, is left after deducting the quantity used as fuel to operate the plant machinery. The gasoline yield for some exceptionally rich gases runs up to 5 gallons per one thousand cubic feet, when practically all of the gas is consumed in treatment and for fuel.

Prior to 1916 the great proportion of natural-gas gasoline was recovered from "casing head" gas. "Dry" gas—from wells producing no petroleum—yields only a little over one pint of gasoline per one thousand cubic feet on the average, and the profitable application of the compression process is restricted to gas containing not less than one gallon per thousand cubic feet. However, the enormous volumes of "dry" gas available and the increasing value of gasoline led to

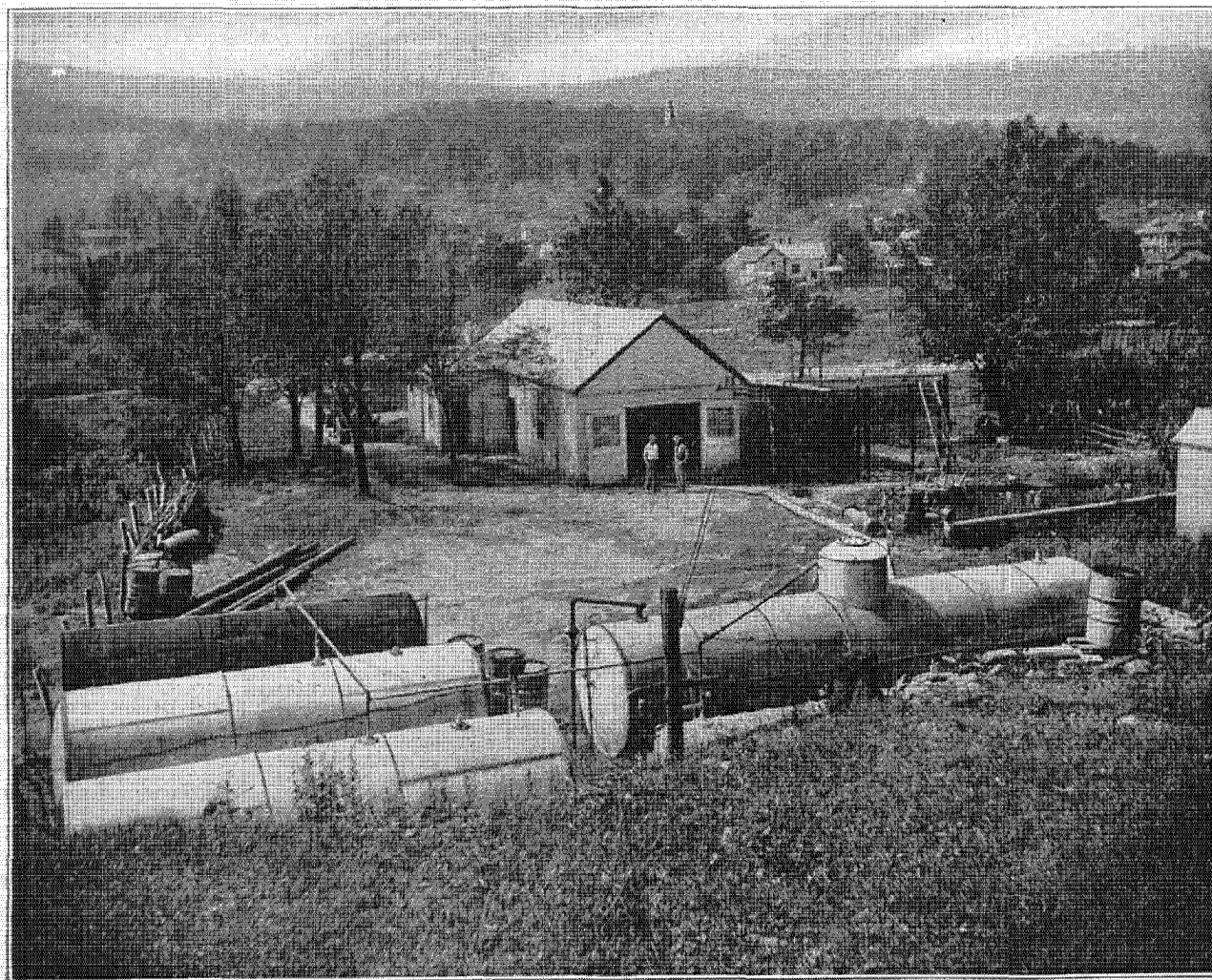
the perfection of a successful process, the absorption process, by which "dry" gas is treated very profitably.

The absorption process depends upon the well-known principle of the solubility of gases in liquids. It consists in bringing the gas to be treated into intimate contact with a body of oil heavier than gasoline. In percolating through this heavier oil the molecules of the latter act as a sponge, absorbing and holding the gasoline vapors present in the gas. The absorbed gasoline is then separated from the heavier oil by ordinary fractional distillation over heat. Mineral seal oil, which may be any of the heavier petroleum distillates, is generally used as the absorbing medium. In the largest plants the process of absorption and distillation is continuous and the mineral seal oil is in constant use with very little loss. A very large percentage of the "dry" gas treated is returned to the lines to be marketed and its average loss in heating value is only about 2 per cent., and this is more than compensated for by the elimination of all troubles from the liquid condensates which otherwise form in the gas lines, preventing the distributing companies from rendering the best service.

The 176 plants making natural-gas gasoline in 1911

were all compression plants and produced 7,425,839 gallons of raw gasoline that year. In 1916, only five years later, 596 compression and absorption plants in twelve States, produced 103,492,689 gallons, a gain of nearly 1294 per cent. in the annual output. In 1917 when the requirements for motor gasoline began to exert real pressure upon the new industry, the number of plants jumped to 886 and the production of raw gasoline to 217,884,104 gallons, over 100 per cent. in a single year.

Nor does this surprising record indicate the full extent of the contribution of this new industry in saving the gasoline situation—the actual contribution was about $2\frac{1}{2}$ times as great. Raw natural-gas gasoline is a very volatile and light-weight fuel, averaging about 90 degrees Baumé gravity. It is not satisfactory for use in this condition because it loses a great deal by evaporation in storage and handling, is not usually permissible for railroad transportation, and is inclined to be dangerous because it fumes very easily. It is also not as powerful as heavier distillates. It gives a sharp, quick explosion in a motor cylinder but seems to lack "push." It requires the addition of considerable quantities of less volatile, heavier and more powerful



A "Casing Head" Gasoline Plant. Storage Tanks in Foreground

fractions in order to make the most convenient and economical motor fuel.

Now, in the distillation of petroleum, after all the fractions that can be marketed as "straight run" petroleum gasoline are collected, there is still a large percentage of heavier distillates remaining which are too inert for use in the gasoline motors developed up to the present time. They need the addition of lighter, more volatile fractions to give them "pep," so that they can start a cold engine and keep it running.

By the "blending" of these heavier petroleum distillates with raw natural-gas gasoline a grade of motor gasoline is produced which functions properly and the total marketable volume of which becomes the total of the gas gasoline produced plus the quantity of otherwise unserviceable petroleum distillates which it enriches. As one gallon of raw gas gasoline to one and one-half gallons of heavy distillates is an average "blend," the 217,000,000 odd gallons of raw gasoline produced in 1917 was expanded to not less than 500,000,000 gallons of serviceable motor fuel, enough to provide over 100 gallons for each of the 4,810,917 cars registered in this country in 1917.

Four hundred and twenty-nine billion feet of gas was treated in 1917, about one-half of the estimated total production of gas for that year. This does not mean that it is only possible to double the production of gas gasoline, as a little less than eighty billion cubic feet of "wet" gas treated produced seventy-seven and one-half per cent. of the total gasoline recovered. It is by collecting and treating a greater proportion of the "wet" gas that is and can be made available that the immense possibilities for increasing the gas gasoline supply will be realized.

Undoubtedly the current year will show a big increase in the production of gas gasoline over 1917. The industry, and particularly the treatment of "casing head" gas, has become very attractive to capital. In spite of the present almost prohibitive cost of the pipe and labor needed to connect up the great number of small wells that feed the average plant making "casing head" gasoline, the volume recovered is so large and the price of gasoline so high that new plants are being

erected and old ones extended in every direction throughout the oil fields. In all cases the cost of the gas that is lost in the process is but a small fraction of the value of gasoline recovered. There is also a considerable profit derived from "blending," as the heavy petroleum distillates used are always several cents per gallon cheaper than the price they bring in the finished product. The controlling feature from the profit standpoint is that gas gasoline, although a true by-product, is sold at the price of petroleum gasoline which is necessarily high because it is one of the base products of a very costly raw material.

When materials and labor are again obtainable at somewhat normal prices, thousands of wells now beyond the reach of gasoline plants will be connected up. Other thousands, long since abandoned for oil, will be cleaned out and shot with nitroglycerin to improve

the flow of gas, which will then be utilized. Large numbers of new wells will be drilled on lands where the production of "wet" gas is assured.

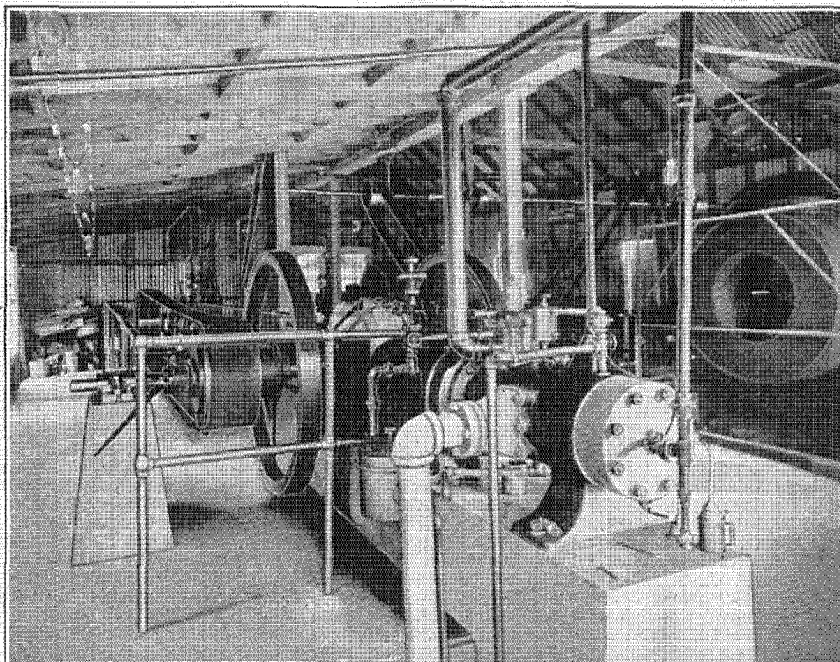
Taken altogether, the production of gas gasoline should increase consistently for many years and, unless the output of crude petroleum fails unexpectedly, the total supply of gasoline for motor uses should be adequate. In this connection it

must be remembered that motor units are becoming more and more economical of fuel. The Liberty Motor uses only forty per cent. of the gasoline consumed by some of the earlier airplane engines per unit horsepower developed, and automotive engineers are continually making every gallon of gas do more work.

It is also comforting to reflect that the gasoline supply has never failed yet. "Gasless" Sundays were really a safeguard against possible shortage; it having happened that a tremendously increased demand for gasoline incident to our increased war activities came at the height of the season of greatest gasoline demand for civilian purposes.

Now that we are safely past this period of peak-load and with natural-gas gasoline to help out in ever-increasing quantities, we may be reasonably sure that for some years at least the gasoline supply will hold out.

Photographs illustrating this article are reproduced through the courtesy of the Pure Gasoline Company, Bradford, Penna.



Interior of "Casing Head" Gasoline Plant

"Caw! Caw! Caw!"

C. O. Le Compte

THESE sounds strike terror to the songsters of the forest. No more surely did the cry, "The Uhlans are coming," startle the unfortunate Belgians during that fateful autumn of 1914, for the crows are the Huns of the bird world. It means danger to homes, and that arouses birds as well as men. Go into the bushes and utter these sounds, and at once all bird life is aflutter, the timid ones fleeing, while the braver ones like the jay and the red-wing black-bird come after you with ruffled feathers, instinctively to protect their kind.

CAW! CAW! CAW! These sounds are unmusical and harsh and hateful to our feathered friends and to us; yet not so long ago a writer in one of our leading sportsmen's papers claimed that crows are useful, and said he thought their calls sweet and musical. Think of it! A sportsman defending the *caws* and the *cause* of the crows! Such a man we can put down as ignorant of the bad qualities of the crow—ignorant of its destructiveness to game, insectivorous birds and crops; but I defy you to find a farmer in any country where crows are numerous, a game warden, or any guardian of preserves, public or private, who will defend the crow, or who has the least doubt about its being "an undesirable citizen."

The crow has the universal reputation of being a wily and wise bird—one in which the bump of cautiousness is well developed, as the phrenologists would say. There is a widespread belief among the people and I have heard it expressed time and again in all seriousness, that the crow can count up to five, but no further—that if five men go into a building or hiding-place near which crows are feeding and a single crow observes them, not a crow will go near the place until all five men have left; but if six men go into the place and five leave, the crows will return and

resume their feeding. It is a fact that they are exceedingly sharp and cautious, but it is surprising how easily they are fooled by anyone who can properly manipulate a crow call. Indeed, the calling in and shooting of crows by an expert is a revelation to many who, all their lives, have known and hated these little black devils of the fields and woods.

One day, at Stanford, Kentucky, my friend, an experienced sportsman, Dr. Penny, said to me: "Le Compte, I wish you would take my boy out shooting. I want him to get interested in the gun because it will take him into the open where he will get pure air and the outdoor exercise which I am sure he so much needs."

I said: "Doctor, there is nothing here that we can shoot this morning except crows. We will go out crow shooting, and while we are out we will try to locate a hemp field where we might shoot some doves during their afternoon's feeding flight."

"Crow shooting?" the doctor said ironically. "Why you can't do any good shooting crows. I know you can't, because I never killed more than one or two in all my life, and I always hated them, too, and wanted to kill them."

I told him that I had a crow-call; one that would charm them; one that would, in fact, make them leave their happy homes for me; but he said, "Pshaw! You cannot fool them. They are too sharp!"

Securing guns and loads, the boy and I got into his automobile, and as we were doing so the doctor shouted, "Shooting crows! Ha! Ha! I'll give you a dollar apiece for all the crows you kill."

We ran out of town a short distance. At the first stop, in a maple woodland, I used my crow-call, and soon called in a large flock of the birds, which perched in the surrounding trees. We began shoot-



The Hun of the Bird World



Crows Gathering for the Feast in Corn Field Fourteen Days after Planting

ing and brought a number of them to the ground. The remaining crows circled around us, flew down through the trees, endeavoring to help their dead and crippled fellows, and furnished us great shooting.

During those exciting moments a small boy ran down from a nearby house, greatly excited. He had a Flobert rifle, and he ran up to a big tree near us, poked his rifle out, and snapped it at a crippled crow that was flapping in a nearby tree-top. "Don't that beat all," he exclaimed in tones of the greatest disappointment. "I was going to help you, but I forgot my cartridges."

Being determined to impress the father, we picked up ten crows. We went out the road a little farther, making an occasional stop, until we had used all our loads and had filled the automobile with dead crows. We returned to Stanford, having been gone an hour, called out the doctor, and piled upon the pavement, in front of his drug store, thirty-two crows and one chicken hawk.

The boy said, "Now, Dad, fork over that thirty-two dollars."

Some time later I saw Dr. Oglesby, of Princeton, Kentucky (who is now nobly aiding our wounded heroes in France), and he said, "Farmer, I was up to visit my old home at Stanford the other day, and my old friend, Dr. Penny, told me how you and his boy beat him out of thirty-two dollars." Now, all this occurred five years ago, but only the other day I met

Dr. Penny at Corbin, Kentucky, and grabbing my hand, he said, "Here's the man who helped my boy to beat me out of thirty-two dollars." He also told me how, from that time on, the sickly boy took to the great outdoors, regained his health and strength, and is now one of Uncle Sam's husky soldiers.

One day at Stithton, Kentucky, I went out with a young banker of the place on a dove-shooting trip. We stopped at a stubble field where a few birds were found. After a short time, my companion suggested that we go farther down the road in search of better shooting. Before proceeding, however, we went to an adjoining tract of timber, where a bunch of crows were resting. We "called in" and shot four of them. I picked them up and put them into the buggy, remarking to my friend, when I noticed his questioning glance, "We may be able to use these to advantage later on."

Along the road a pretty home appeared, situated at the end of an avenue of beautiful forest trees. My companion remarked "There's a place where we don't dare to shoot. That woodland of his is crowded with squirrels and his stubble fields are alive with birds, but, believe me, that man is *POISON*. He will prosecute you to the fullest extent of the law if you shoot on his premises."

Now here was such a man as I had in mind when I put the crows into the buggy. Near the corner of the avenue I got out of the buggy and had my friend drive a short distance ahead. Hiding in a fence corner, I called in the bunch of crows that were in the avenue, and after bombarding them, I picked up the dead ones and started toward the buggy. The irate farmer was there by the time I was, mad and perspiring; but before he had a chance to begin his intended tirade he saw the crows I was carrying, and his attitude underwent a complete change.

"Shooting crows, are you?" he said. I replied, "Yes, shooting crows," just as if that were my only object in life. He said, "I am glad of that because the crows have done me so much damage. I want you to do me a favor. Go down to the back of these woods at the edge of a corn field. There you will find a bunch of crows that have destroyed a great deal of my young corn." We went there as directed, called in



C. O. Le Compte

the crows and shot a number of them, with the farmer an interested observer at a distance. Afterwards, we went to one of his stubble fields and had some splendid dove shooting.

This is only one of my many experiences which prove that the farmer hates the crows because of the damage they do and will give free range of his premises, waiving all prejudices against sportsmen to those who will help him rid his place of the obnoxious crows.

[This article is most timely, in view of the fact that the Du Pont Company will inaugurate in 1919 a national crow shooting contest for extermination of this enemy of game birds and crops.

Conditions of the Crow Shooting Contest governing contestants and award of prizes will be made public through the columns of DU PONT MAGAZINE and other leading publications.—THE EDITOR.]

Coal Mine Gases

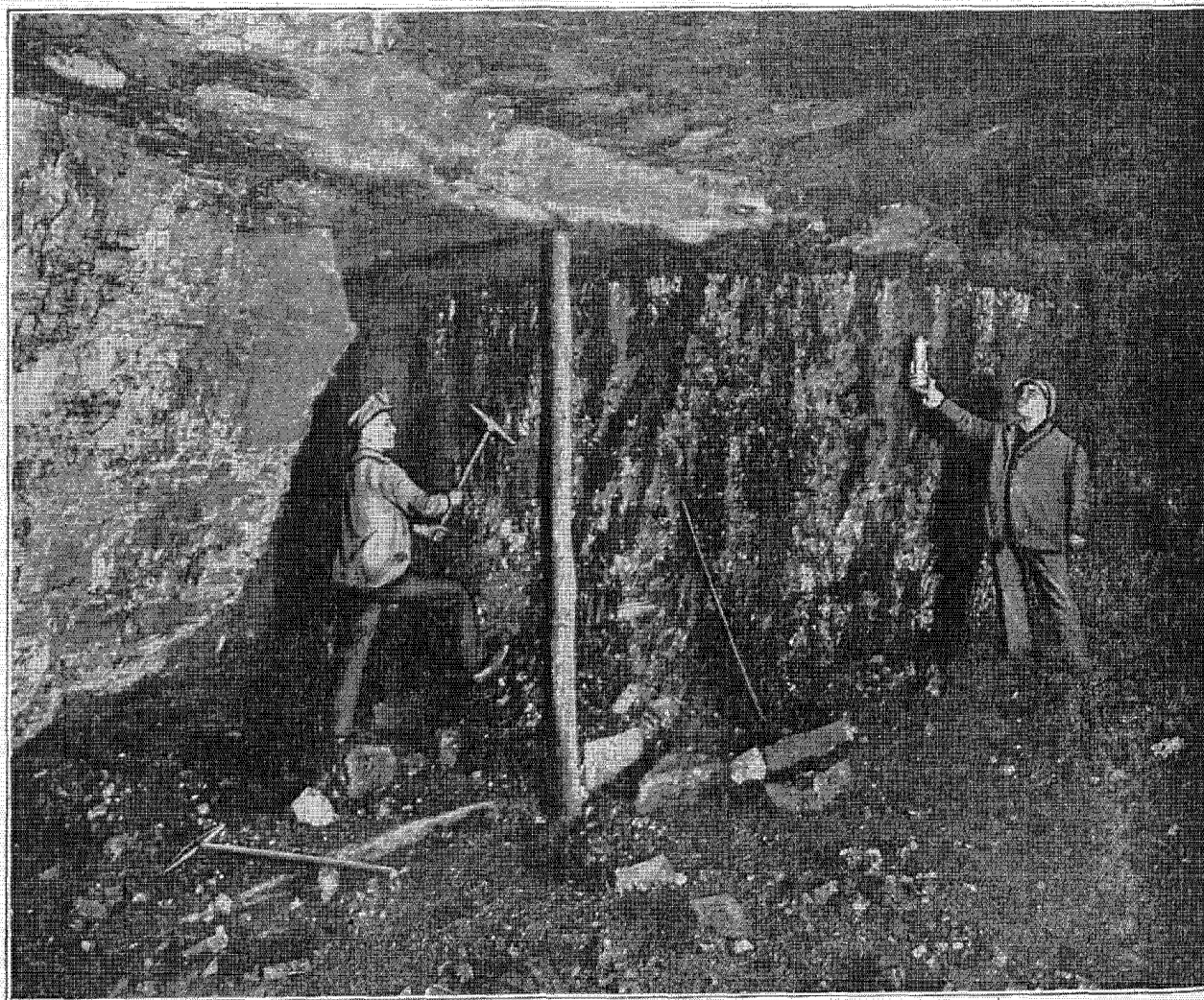
J. W. Koster

A LARGE disaster is a news item of live and sensational interest, and as such is "head-lined" in the daily press. Consequently, we are all familiar with the fact that explosions frequently occur in coal mines, and that these disasters often involve heavy losses of both life and property. Most of us also have a hazy idea that gas and coal dust play a prominent part in these explosions, but the majority of us not directly connected with the coal mining industry know little if anything about what these gases are and how they act. It is, however, a subject of considerable interest.

The air that enters the coal mines is, of course, normal air consisting roughly of four-fifths nitrogen and one-fifth oxygen. This air in circulating through the mine may be vitiated by one or more of a number of gases, principal among which may be mentioned carbon dioxide, hydrogen sulphide, carbon monoxide and methane. Several other gases are sometimes met, but rarely if ever in appreciable quantities.

Carbon dioxide, the most common impurity in mine air, is a combination of one part of carbon and two parts of oxygen, and is known by the miners as black damp. It is a colorless gas without any odor, heavier than air and is produced in a variety of ways underground. It is given off in the breath of men and animals to the extent of from one to five per cent. of the exhaled air. It is given off by the burning of the lamps and candles the miners use for illumination. It is produced by blasting with powder and explosives, and also by the slow oxidation of the coal and other combustible material in the mine. By far the greatest quantity, however, is given off by the coal itself, and in sections of mines which possibly are not actively working and where the ventilation is not adequate to dilute and carry off the carbon dioxide and at the same time to replenish the oxygen, carbon dioxide accumulates to such an extent that a candle either burns with difficulty or will not burn at all.

Carbon dioxide does not affect the human system



Testing for Gas in a Coal Mine

to an appreciable extent until it constitutes over one per cent. of the air. Above this percentage it affects the amount of work a man can do and causes him to breathe faster and shallower.

Hydrogen sulphide or "stink damp," while a poisonous gas, is fortunately seldom found in mines. It has a characteristic odor somewhat like rotten eggs, and because of this can be detected long before it is present in dangerous proportions. It is given off by the strata in some sections and small quantities also result in blasting with some types of explosives. It is also sometimes found in the mine air or after-damp after an explosion.

Carbon monoxide is a combination of one part of carbon and one part of oxygen, and is known by the miners as "white damp." It is the deadliest of all mine gases. It is colorless and odorless, and when present in the mine air to the extent of one-fourth of one per cent. would in a short time overcome a man.

This is because carbon monoxide is readily absorbed by the blood, and if a person remained in air containing even a small percentage of this gas, the absorption of oxygen would be prevented. Where the percentage of carbon monoxide in the mine air is high, as is often the case directly after an explosion, men lose consciousness very quickly and apparently without any pain or suffering. Frequently, after an explosion, the writer has come across dead miners who succumbed while in the act of eating their lunch or at work. These men had not been killed by either violence or fire, but through breathing the white damp.

Carbon monoxide is produced by mine fires and explosions, and also results from the improper use of explosives or from not using the right explosives. If this gas and other objectionable gases are given off by an explosive, a dangerous condition is present, one which calls for an investigation by a representative of the explosive manufacturing company to determine the cause and the remedy.

Carbon monoxide causes a lengthening or capping of a lamp flame, but unfortunately its effect on the flame is not readily visible until monoxide percentage rises to one and one-half per cent. or more, and man would collapse almost immediately in an atmosphere containing a far less percentage than this.

Small birds, as canaries, have been found very serviceable in this connection, and are now very generally used by rescue parties after explosions. The canary will collapse from the effects of carbon monoxide more readily than a man, so that the men know that as long as the bird keeps his poise they are safe, but that when he falls it is time to retreat.

Where the carbon monoxide percentage is high it is necessary that the exploring party be equipped with self-contained oxygen breathing apparatus. While carbon monoxide forms an explosive mixture with air it is not dangerous because of this property, as it is never found in normal mine air.

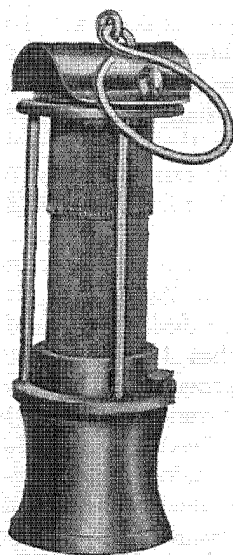
Methane, or, to give it as the miner does the generic term of "gas" or "fire damp," also forms explosive mixtures with air. In fact, the term non-gaseous mine is somewhat of a misnomer, for there is probably no coal mine which at some time or other does not generate methane. It is not until the percentage of methane reaches 5.5 per cent. of the mine air that a gaseous explosive mixture is formed, but methane is dangerous in much smaller percentages, since it is a combustible gas and may lengthen the flame from a blasting shot to such an extent that the coal dust will be ignited and an explosion started.

If, however, the methane is present in sufficient quantity to form an explosive mixture with the mine air, then the danger that the combination will be ignited and exploded by blasting is many fold greater than in the case of coal dust alone.

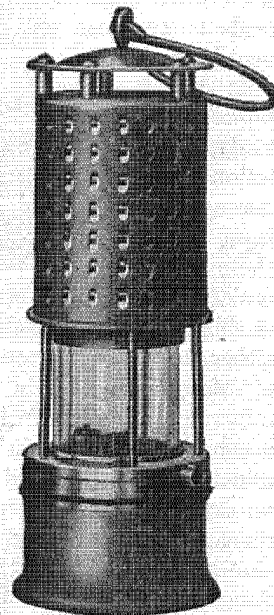
When methane is present in the mine air to the extent of one per cent. or more, it can be detected by means of an approved type of safety lamp, as for instance the American Koehler lamp, and mine officials, known as fire bosses or gas men, are required by law to make inspection of the mine for accumulations of gas each morning before the men enter the mine. The natural query now is that, knowing from experience and test that gas is present, why cannot the percentage be controlled by proper ventilation, so that it will not reach dangerous proportions? The answer is that it can be and under normal circumstances is controlled.

It might be proper at this time to digress for a moment and explain something about the ventilating system of a coal mine. Each mine, whether it be a shaft, slope or drift mine, is required by law to have at least two entrances, and at the mouth of one of these a ventilating fan is installed.

All mine travelways are driven in parallel pairs, and are connected at intervals, the distance between the intervals being regulated by law. As the entries, or tunnels, are advanced, these connections, or cross cuts, are closed by timber or brick bulkheads; that is, all except the last one. If air is then forced into one of a pair of tunnels, it must travel to this last opening, where it crosses and goes down the parallel tunnel.



Davy Lamp



American Koehler Lamp

The men doing the advance work are thereby assured of a supply of fresh air. If the air from one pair of entries were to be sent on to another pair it would be necessary to block the opening of one of the first pair of entries, and if this happens to be a haulage road or travelway, it is necessary to have this bulkhead in the form of a door.

Trapper boys are employed at these points to open the door when a "trip" of coal cars comes along, and without fail to see that it is closed after the "trip" has passed. In certain sections it is necessary for the outgoing air current to pass the incoming air current and at these points one airway is built directly over or under the other, giving in the former case an overcast, and in the latter case an undercast. The air nearest the coal face is naturally most likely to contain gas, and it is sometimes necessary to string canvas at the head of an entry to guide the air current up to the end and make sure that these dead air points are ventilated. It can readily be seen that no matter how well designed the system may be, the human element plays a vitally important part. The saying, "to err is human," is too often sadly emphasized when someone neglects to close a ventilating door, or puts up a canvas improperly or carelessly, and the ventilation is consequently deranged or shut off from a portion of the mine. Gas accumulates, and a miner walks into it with an open light on his head, or a black powder shot is fired, and in either case an explosion results.

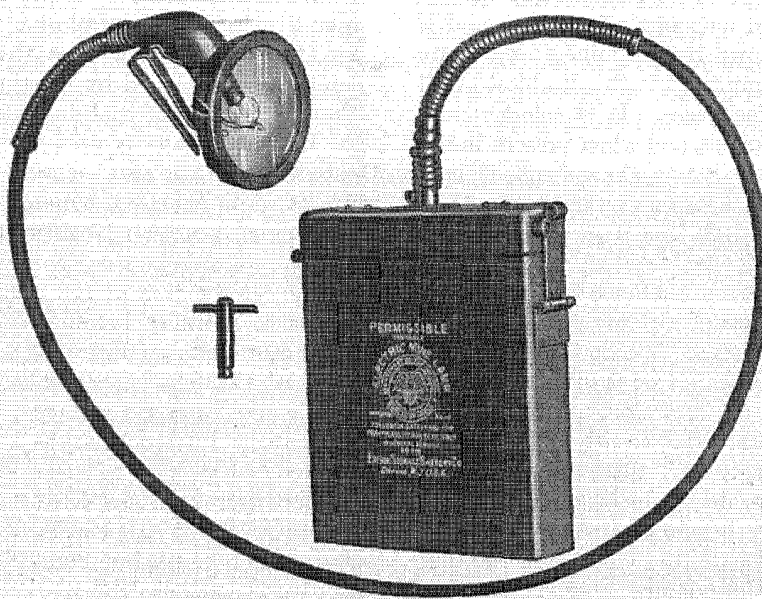
Many explosions in the past have been caused by miners wearing open lights walking into such gas accumulations, but in the last few years electric miners' lamps, designed to be safe, even if broken, in an explosive gas mixture, have been extensively introduced. There are said to be 100,000 lamps like that shown in the illustration in use in the mines of America.

Of course, gas accumulations may result from other causes, as for instance, a derangement of the ventilating current due to a fall of rock or to a sudden outburst of gas at the coal face, the latter a not uncommon occurrence in some sections of the country. Therefore, to take the fullest precautions to insure against explosions it is necessary to have not only efficient ventilation and discipline among the working force, but

also to use the proper type of explosive in the most efficient manner.

Black powder, being a long-flame explosive, is dangerous under all conditions in a gaseous mine. To replace it the Du Pont Company has developed a type of short-flame explosives which, after they have passed certain tests prescribed by the Federal Government are known as permissible explosives. To illustrate the difference between these two classes of explosives, take the case of a candle flame, which while sufficiently hot to burn the fingers if they are held in it will not burn them if they are passed quickly through it. The permissible explosive gives a flame of short duration, and is not so liable to ignite gas as black powder.

The intelligent mine owner determines the type of permissible explosive most suited to the coal in his mine, and then tries to obtain the safest explosive of that type. At the present time our government does not differentiate as do certain foreign governments between various permissibles as to which can be used with the greater degree of safety. The Du Pont Company recognizes there is such a difference and maintains a complete testing apparatus, a counterpart of that maintained by the government, and here the explosives they develop are subjected to particularly rigid tests



Miner's Electric Lamp

to insure their passing the government tests with a good margin of safety. If they pass these tests, they are then submitted to the government, so that any Du Pont permissible explosive has been double-tested. This must be a comforting thought to the mine owner and the miners in any particularly gaseous mine, especially in these war times where every mine is trying to get the maximum production.

Many of present coal mining practices are dangerous and are gradually being eliminated. Explosions, therefore, happen less frequently. Blasting is a dangerous operation which cannot be eliminated. The best we can do is to pick the most suitable explosive and use it in the manner recommended by the manufacturer. The Du Pont Company produces explosives which are most efficient and involve the least danger. It also gives the heartiest co-operation in solving the individual problem of mine operation in this direction.

Reflections on Fourth National Chemical Exposition

THE fairy tales and myths of yesterday are the facts of today. No story of "Arabian Nights" or mystical transformation of magic wand is comparable to the accomplishments of chemical industries during the past 100 years.

The transformation by Cinderella's godmother of white mice to milk-white steeds for the fairy coach made from a pumpkin, pales into paltry insignificance when contrasted with the miracles of the laboratory.

History sought for the superhuman in Moses's Rod, which caused a rivulet of water to trickle from the earth, but we unearth whole lakes of water and oil with our stick of dynamite.

Alchemy sought to transmute base metals to gold. Chemistry now changes stones to bread, and from lifeless clods of earth brings forth myriads of things to delight the eye and please the palate.

We no longer ridicule the alchemist who attempted to turn mercury to gold, for we see infinitely greater magic wrought by the chemist of today as he extracts from the foul, sticky coal tar the beauties of color never dreamed of, flavors unimagined and perfumes surpassing those of Araby.

In order to confirm this, one needed only to move in and out among the booths at the Chemical Exhibit and thus realize the magnitude of American accomplishments in chemical industry.

It was a demonstration that the chemical industry is most opportunely progressive, and that the front line trenches of the very much overestimated German chemist, which for forty years were held so tenaciously by throwing around themselves a barrage of mystic verbiage and a camouflage of superior intelligence have been taken, and all this in less than four years. Each hour enhances the value of our research and the dial of the clock points to new victories and new industrial acquisitions. America has achieved independence from the European world in her dye and potash production. She has had the attention of other nations directed toward her activities, as was indicated by the attendance of delegations from Canada, South America, Japan, and visitors from Australia, Sweden, Russia.

One of the features which attracted the eye and captured the soul of every American was the official bull's-eye, which was placed on all chemical products that were produced by American chemists on American soil prior to the engulfing cataclysm which closed the avenues from Europe.

The exhibit was of interest not merely to technical men and women, but it had in it the element of education which, though apparently new in the marketing of goods, for a number of years has been the policy of the Du Pont Company. This company believes that all products of merit warrant publicity through instruction.

The exhibit of the Du Pont Company was visited by tens of thousands of vitally interested men and women. The variety of products included a display of explosives; the leather substitute—Fabrikoid; pyroxy-

lin articles for hospital, home and general manufacture; paints, varnishes, enamels and lacquers; chemicals and mixtures for industrial, medicinal and laboratory uses; acids; alums; dry and pulp colors; pigments and dyes.

Chief among the exhibits were the products derived from the unattractive coal tar. No feature of the whole exposition was more striking than the



Corner of Du Pont Exhibit, Fourth National Chemical Exhibit

charts and exhibits portraying the progress along these lines. The chart (page 9) shows this chronologically and is not merely a diagram indicating what can be derived from coal and gas tar, but represents what has been produced from it. It also portrays what a variety of substances along allied lines have been manufactured.

A glance at the accomplishment during the years 1915-1917, when the great efforts of the Du Pont organization were directed toward the saving of the allied countries from Hun ravages, indicates a mastodonic achievement and verifies the statement that the fancy of the past is the reality of the present.

The chemist's conquest of yesterday merely presages the accomplishment of the future. The co-operative relation established between industry and science has evolved a factor so potent that it is impossible to make even a conjecture as to the ultimate issue.

A Tribute

IN its write-up of the Chemical Exposition held in the Grand Central Palace in New York, in September, the *Color Trade Journal* pays the following tribute to the Du Pont Company:

"In speaking of the Du Ponts it may be said that the dyestuff consuming trade has been looking forward anxiously to the developments which have been promised by this company. The name Du Pont stands for accomplishment, and when it was announced that this company was going into the dyestuff business on an extensive and comprehensive scale, great things were looked for. But the Du Pont policy is not to rush into things in a 'half-baked' way; when they made up their mind to go into the dyestuff business they also made up their mind to go into it thoroughly and from the bottom up. They tackled the indigo job first, as that was the most important, and they refused to be stampeded into putting their product out on the market until it was right and until they could produce it in quantity and of uniform quality. The opportunism of the moment did not appeal to them; they believed in laying their foundations firmly and building for the future. As a result the Du Pont Company is turning out synthetic indigo of a quality equal to the best German material at a price to the consumer that is fair and equitable. In the meantime their extensive plant at Deepwater, New Jersey, on the Delaware River, opposite Wilmington, is progressing as rapidly as circumstances and good workmanship permit, and we presume that as fast as the various dye products are perfected they will be put on the market. Under the able leadership of Mr. Lamont du Pont, Dr. Reese, Mr. Poucher and Dr. Chambers the Du Pont Dyestuff Department will no doubt attain the same high standard as the rest of the Du Pont enterprises.

"One thing which has aided the Du Pont Company very considerably in this connection was their acquisition of the dyestuff plant of the United Piece Dye Works at Lodi, New Jersey. The well-known products of this plant, developed under the guidance of Messrs. Albert and Henry Blum, have been life savers, as far as the silk industry of the country has been concerned."

On Leave

He told her of the battle
Where the German power fell,
How Yankee bullets whistled,
How he bore the powder's smell.
But when he tried to kiss her
On the sofa at his ease,
He found he really couldn't
For that powder made him sneeze.

Conserve food to feed Europe's starving millions.

An armistice or peace will not release us from our obligation.

Conserve Paper

THE production of paper has been greatly curtailed and its price has been substantially increased. There is an urgent need to conserve our present supply.

The chemicals, sulphur, potash and caustic soda, used in the manufacture of the powerful explosive T. N. T., are the chemicals employed in the manufacture of paper.

White paper is produced by the bleaching effect of chlorine gas which is needed in the manufacture of poison gas.

Do not burn paper—do not destroy it—use it.

Every office employee should co-operate to accomplish this end. While his or her individual effort in this direction may seem to accomplish little, the amount of paper that can be saved in a large office by the employment of non-waste methods will amount to a surprisingly large total.

The following suggestions may be helpful: Use half sheets for letters and file copies wherever possible. Write on both sides of the sheet instead of only one. Use for memoranda the backs of tickler and file copies and letters sent back to stenographers for rewriting. Used envelopes can be slit open and the inner side used for the same purpose. They can be fashioned into pads with paper clips. Letters within an organization can often be answered by jotting a reply on the original sheet.

These methods can be employed in almost every business office and others can be developed to utilize valuable paper which has heretofore found its way into the wastebasket.

When you waste paper you are wasting the lives of our boys.

Save the "scrap" in every scrap of paper.



Dynamiting a City Street

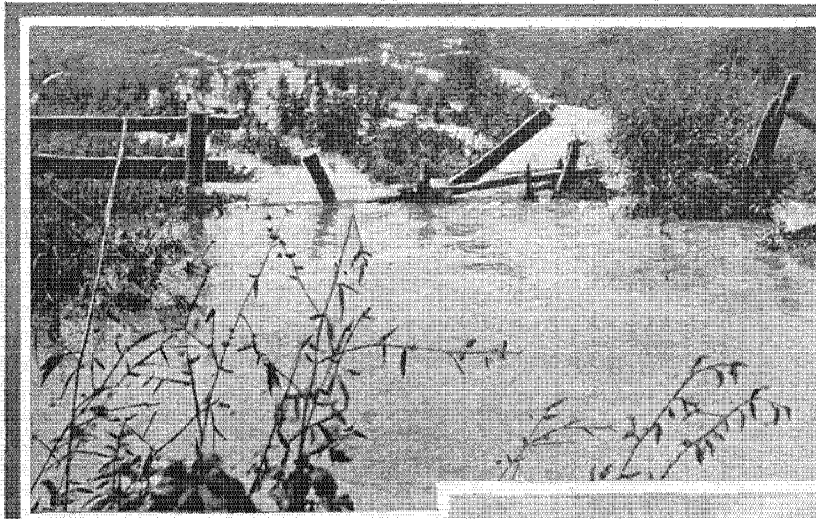
RECENTLY in the town of Warren, Pennsylvania, it was found necessary to remove a section of concrete pavement, 60 feet wide by 100 feet long, in grading the approach to a newly constructed bridge across the river on South Main Street. The work was efficiently performed by the use of dynamite with a minimum of labor and cost. Thirty pounds of Red Cross 40% Extra dynamite were used to blast out the concrete which was from 8 to 12 inches thick. To avoid binding the concrete, it was shot at angles and great care had to be exercised to avoid damaging the beautiful homes that line both sides of this thoroughfare and to protect from injury the many people who passed this point daily.

Instead of a regulation rope blasting mat, which, due to the closeness of the work would only have permitted the

shooting of one charge at a time, a special planking arrangement was used which permitted two blasts to be set off at once by battery, each shot consisting of three-quarters of a cartridge.

This mat was built of six oak planks, eighty-three inches long, sixteen inches thick and twelve inches wide. These were joined together by two six-foot planks eight inches wide and six inches thick. The contrivance was reinforced with ordinary boiler iron, each plank being thus lined separately.

The success of the work is attested by the accompanying illustration which shows the concrete broken into small sections and the adaptability of the mat by the fact that not a building was marred nor a single window broken in the vicinity. As blasting was restricted to certain hours, it required six days to complete the work.



Field Before Draining

Draining Wet Land

C. B. McGee, Caldwell, Ohio

I had a piece of land that was almost useless, because the channel was not deep enough to carry off all the water after a rain. This made the land too wet to use for any kind of crops. I bored holes spaced on an average of four feet apart and thirty inches deep.

I used one stick of 40% Red Cross Extra Dynamite in each hole, and primed with a No. 6 blasting cap attached to a piece of triple tape waterproof fuse. Tamping was not necessary, as the water



Field After Draining by Use of Dynamite

offered sufficient resistance. I bored and fired each hole separately, as there were several kinds of soil in the channel and the distance between the holes varied.

The force of the explosive removed nearly all the dirt, and the water cleaned out the loose dirt, making a nice clean channel, deep enough to carry all the water and prevent any overflow.

This land can now be used for agricultural purposes and it is the most valuable we have when properly drained.

The use of dynamite is the best method I have found for all kinds of ditching. The work can be done with less expense, as all the labor connected with its use can be performed without any hired help.

Paying the War Debt

NOTWITHSTANDING all her boasted efficiency, Germany has been lamentably weak in her policy of financing the war. She recklessly accumulated enormous war debts, confidently expecting to liquidate them with indemnities wrung from beaten foes. Instead she has imposed a tremendous burden on her people for generations to come. Not so the United States. Future generations of America will feel the burden of paying for the present war in a far less degree than those of any other warring nation. We are now paying direct from taxes a larger proportion of our war costs than any other belligerent. Greater economy has also aided us in paying our fighting bill as the obligations arose. We have bought Liberty Bonds from current savings rather than from accumulated capital. In addition, we have taken over from Great Britain the rôle of banker for our Allies.

Because we are free from the handicap of the tremendous expense of three years of devastating warfare which bears heavily

on friend and foe alike, and because we are far richer, we can and are financing our share in the war on a sounder basis than any of our Allies or enemies.

Part of our advantage was gained at the outset by a fortunate mistake on the part of the Treasury Department which overshot the mark in estimating our first year's expense budget and undershot it in estimating the income from new taxes. Delayed war preparations accounted largely for the former mistake, but the latter one was truly fortunate. Our new taxes amounted to about three billion of dollars, one-half billion over the estimate. Our war expense for the first year amounted to nine billion dollars, half of which we lent our Allies, leaving our deficit only a billion and a half. This is a remarkable showing.

At present, our war expense is much greater; in fact, is expected to mount to twenty billions this year. Some of this money will also be lent to our Allies, and eventually will be returned to us. Increased taxes are expected to raise five billions of this money.

Among our Allies, Great Britain has the next best financial system. Her estimates have closely approximated her actual expenditures and about 28 per cent. of her expense is met by money raised from taxes.

One-half of the money lent by the United States last year went to Great Britain, and they in turn lent it to others of the Allies, so that either directly or indirectly we are furnishing all the money needed by our Allies to enable them to "carry on." It was only fair that we should relieve Great Britain of a part of her burden, as our wealth is more than twice as great and our income four times larger than hers.

Of course, Great Britain and the United States will be in a far better position to finance the period of reconstruction following the war than any of the other combatants, and yet, the citizens of both countries will need to practice the most rigid economy from now on if the problems that will arise in their own and Allied countries are to be successfully solved.

Interior Painting

CHENEY cravats and Cheney silks are widely and favorably known. They are made in the big modern Cheney mills, located at South Manchester, Conn. This progressive company has left nothing undone to promote the efficiency and conserve the health of its employees. The latest approved machinery, proper ventilation and perfect lighting are the main factors in achieving these results, and are responsible in no small measure for the excellent quality of Cheney products.

To secure the best results from any lighting system in an industrial plant it is absolutely essential that the right quality and color paint be used on walls and ceilings. The Cheney mills use Harrison's Sanitary Interior Paste White exclusively. Mr. Thomas McGill, Jr., master painter at the Cheney mills, rose to his present responsible position because he knows every phase of mill painting. The following letter attests the excellent results which he has obtained during a period of years with this paint.

THE HARRISON WORKS,
PHILADELPHIA, PA.

Gentlemen:—I have been using Harrison's Sanitary Interior Paste White for six years, and have had the best results obtainable. We have used it as Mill White in our mills and as Flat Wall Finish in our schools, recreation building and tenement houses. We have never had to use more

than two coats to get a perfectly covered surface. This holds good for the Flat Wall Finish on new walls, also the Mill White on concrete, brick and yellow pine lumber. In our dye house the yellow pine lumber was dipped in Lyster Creosote, which turns the wood black. We covered this perfectly with two coats of Mill White made of the Interior Paste White.

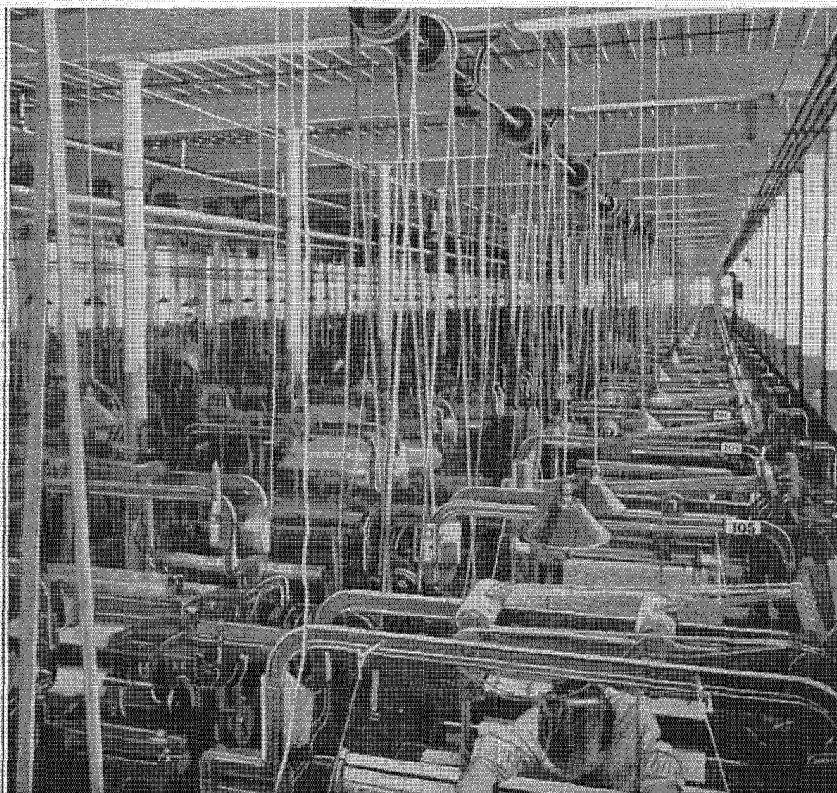
We have work that has been done over five years with Interior Paste White, which is in perfect condition today. If at any time any interested party would like to see any of this work, I will gladly show it to them.

As to cost, I will say that I have been able at all times to make my own Mill White and Flat Wall Finish at least twenty-five cents per gallon cheaper than the cheapest thing on the market, and have a piece of goods that was equal to the best and better than the most of the goods on the market today.

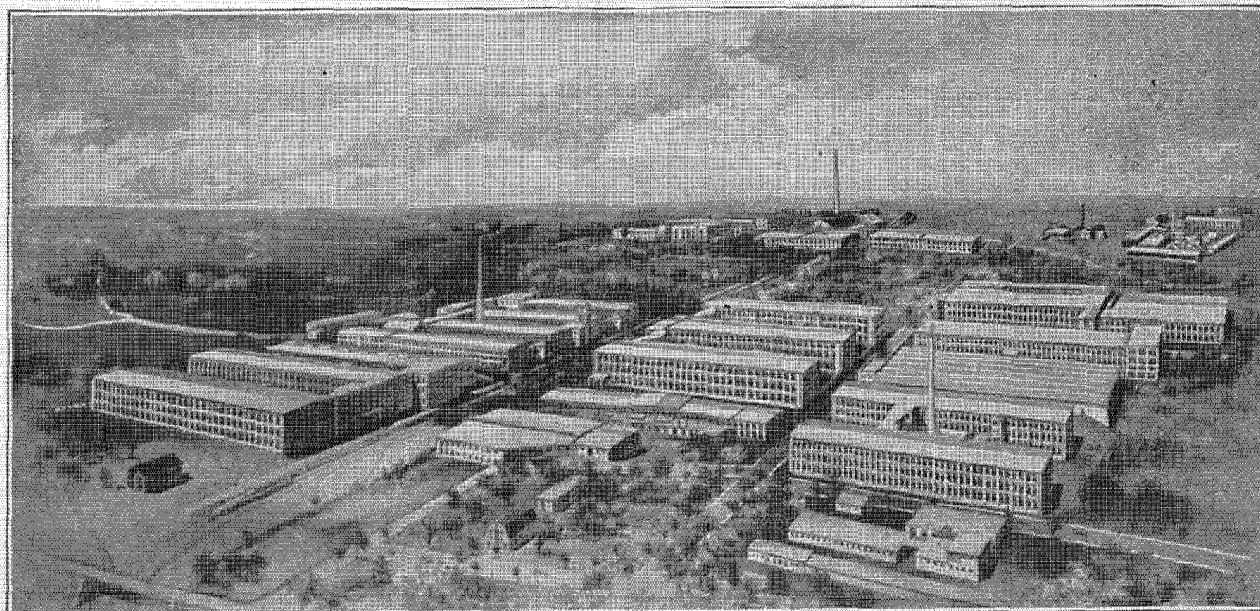
Wishing you success with Interior Paste White, I remain,

Yours truly,

THOS. MCGILL, JR.



Interior of a Cheney Mill Painted Throughout with Du Pont Mill Interior Paints



Cheney Silk Mills at South Manchester, Conn.

Results of Old Timers' Shoots

THIS has been one of the most popular and most successful features of the 1918 season. At the time this was written, a total of 307 applications had been received from gun clubs all over the country wanting to pay honor to the veterans of the sport by holding an Old Timers' Event. It is probable that additional applications before the end of the year will bring the total to over 350.

Estimated on a basis of the reports already received, the 307 shoots scheduled will show a total of 5841 entries. Of these the number of Old Timers participating is 2628 and the other shooters 3213. On the same basis a total of 426,604 targets will have been thrown in the shoots already scheduled, and later applications will bring the total for Old Timers' Events to well over 450,000—nearly half a million targets.

The Old Timers' Shoot has served to revive interest in trapshooting among many of the veterans who for one reason or another have not visited the gun club often in recent years—it has been the means of renewing acquaintances among the Old Timers, and of bringing together the older and the younger generations through their common interest in shooting—it has given the youngsters the benefit of the experience and wisdom of the veterans in the game and has helped the older men to realize that there is nothing like a regular afternoon at the

traps to renew their youth and keep them fit for their work.

The following extract from the story of one Old Timers' Shoot, as published in the *Sporting Goods Dealer*, is typical of the good time enjoyed everywhere by the participants in this event.

"At the affair held recently, there was a lot of genuine old-fashioned fun among the 'Old Timers,' where there was much personal rivalry exhibited. 'I used to beat you, John, and I can do it again,' said one Old Timer to another one, who had lost most of his teeth. The latter displayed a great expanse of toothless gums when he replied: 'Your lying, Jim, seems to have improved, but your shooting is still going to be under mine, as it used to be,' and he added as he shook his digit finger at his old companion, 'I'm goin' to show you up before everybody today.' Another old chap said to a friend: 'You've been stalling around for years about how you could shoot and living on your past reputation. We are going to make you prove it today. You're up against the real thing now.' 'Hey, Gus! How many more pairs of glasses are you going to put on?' yelled one wag to an Old Timer, who was out at one side polishing his lenses before he stepped up to the line. 'Enough to see that you break as many targets as you will claim you do,' came back the quick retort. Most of them called the targets

'Pigeons.' Many of them remembered the live pigeon shooting days of many years ago, and some of them had never before shot at the disks used nowadays. But they all did pretty well just the same, a few of them even making as good scores as some of the regular members of the club."

The Bayonet

From the corn fields of Nebraska,
And the gold mines of Alaska,
And the meadows and the mines of
Illinois ;
From the prairies of Dakota,
And the pines of Minnesota,
And the laundries which infest the town
of Troy.

From the grand old state of Texas,
Where men battle fleas and Mexes ;
From Wisconsin and from Kansas and
from Maine,
From Vermont and Loosiana, Ioway and
Indiana ;
From the mountains and the forest and
the plain.

They have gone to teach the German,
Educate the Fritz and Herman,
In the language of a young uncultured
land;
They have sailed across the briny
Deep to talk to Hans and Heime,
In the only language they can under-
stand.—*Chicago Herald and Examiner.*



Du Pont Float in Fourth Liberty Loan Parade, Philadelphia, Pa., September 28, 1918

Quarry Blasting With Electricity

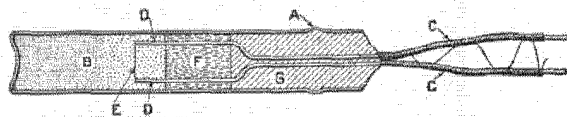
A. S. Anderson

ELECTRIC devices for blasting are of about the same convenience in using explosives as an electric starter is on an automobile. They eliminate most of the drudgery and uncertainty. The use of electricity in blasting refers to the detonation of the charge by means of electricity. A very small amount of current is necessary, and by passing it through a very sensitive electric blasting cap we are able to explode the charge from any position and at the desired time. We are

1st, in series; 2d, in parallel; 3d, in two or more parallel series. It requires at least two amperes of current to explode the electric caps in *one* series, to insure instantaneous ignition of all exploders. One and one-half ohms are necessary to force this current through each exploder in this series. That is, one and one-half times the number of caps in a series will give the necessary voltage. It is safer to use twice the number of caps to get the voltage. For each exploder or series of

two hundred exploders, depending upon the kind and size. They can be used only where the electric blasting caps are connected in series. That is because the amount of current produced is limited to about three amperes, while the larger machines will develop several hundred volts. When firing a charge with a blasting machine be sure that the machine is not overloaded, and test it frequently with a rheostat and exploders to make sure that it is up to capacity and in good working order. When a three-post blasting machine is used, one wire should always be connected to the middle post. When three wires are used the wire from the middle post should be connected to the middle of the series. Thus the resistance on both sides will be equal.

When a lighting or power circuit is convenient, it can be used to fire blasts. One must be sure, however, that the amount of current and voltage necessary to fire the blast is actually being delivered at the desired point, and at the exact time the blast is made. It is not sufficient merely to tap a line which can deliver a certain voltage and amperage. For instance, the generator may be furnishing power irregularly and not be actually delivering that power at the time the blast is made. If a line is furnishing



An Electric Blasting Cap in Section

"A" is a copper shell having a corrugation thrown out from the inside, which holds the composition plug more firmly in place. "B" is a chamber containing the explosive charge. "C," insulated copper wires entering the cap. "D," the bare ends of the copper wires, projecting through the plug into the charge. "E," a fine wire "bridge" soldered to and connecting the two ends of the copper wires, which is heated by the electric current, thereby firing the explosive charge. "F," the composition plug holding the electric blasting cap wires firmly in place. "G," the filling material.

also able by this means to explode a large number of adjacent charges simultaneously. This method, therefore, also eliminates most of the dangers of blasting and insures more certain and satisfactory results.

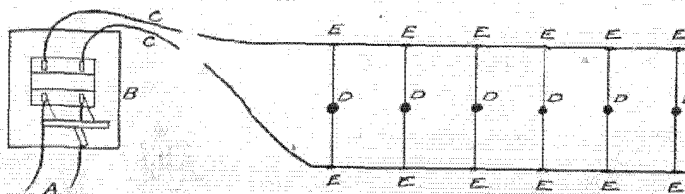
Units Used in Electrical Blasting

The detonator used is similar to an ordinary blasting cap with the exception that two wires enter through the open end, and the terminals are connected by a very fine platinum wire. This is imbedded in a loose ignition charge, similar to the pressed charge in the bottom of the copper shell. These wires are held in position by a composition plug and some melted sulphur and waterproof compound poured around them, to the end of this shell. Electric blasting caps are therefore practically air-tight and water-tight, and safer to handle than the ordinary open end blasting cap. This platinum wire has a resistance of less than 1 ohm and is therefore heated by an electrical current of about 1 ohm and 1 ampere. The heating or melting of this platinum wire ignites the charge and causes the cap to explode. It requires at least $1\frac{1}{2}$ ohms and 2 amperes to melt this bridge.

Wires and Connections

Because of the small amount of current necessary, small wires can be used to carry the current from its source to the exploders and between the various charges. No. 20 insulated copper wire is usually used on the exploders, and between charges. For the long distances between the source of power and the holes, larger wire is recommended such as No. 14, to eliminate unnecessary resistance. The exploders may be connected in three ways:

exploders two amperes should be used when they are connected in multiple. The voltage necessary for parallel connection can be determined by dividing by the number of series the voltage found necessary to force two amperes through the series which has the greatest resistance.



Parallel Connections

Kind of Connection to Use

The series connection must always be used when a blasting machine is employed to explode the charges. The parallel, or parallel series, connection is usually used when dry cells or electrical generator is the source of the electricity for firing the blast. When multiple series connections

two hundred and fifty volts and ten amperes to some lights or a motor beyond the point where the line is tapped, this can be safely short-circuited to fire a hundred and twenty-five exploders in one series, or five series of 625 exploders each. Such use of this current will not interfere with the operation of the motor or the



Series Connection

are used the various series should be as near the same resistance as possible.

Ways of Producing Current

Current for firing the blast may be obtained from three sources, the first and most common of which is the blasting machine manufactured for that purpose. They are built to fire from one to

lights, as it is used for too short a time.

Dry cells can be used for exploding electric blasting caps, but are not recommended as their deterioration makes their strength too uncertain. An ordinary telephone dry cell should produce 25 amperes and one and one-half volts, when new. The amperage gradually decreases. One cell will heat the platinum bridge of an

electrical exploder to a red or white heat, while two cells connected in series will melt it instantly. Two new cells will fire 12 exploders connected in parallel. For each additional exploder in a series it is necessary to add a cell. Smaller cells than this can be used as their voltage is the same, but the amperage is less. Extreme caution should be observed, when using dry cells, to make certain that the connection is not made until the desired time, when everyone is at a safe distance. Make sure also that the wires are not left connected to the cells.

Precautions to be Observed

1. Be sure that all the electric blasting caps are in first-class condition and of the same make, before inserting them in the charge. Use waterproof caps in water, and submarine caps in water over 30 ft. deep.

2. Be sure that each blasting cap is properly inserted into the primer cartridge and that it is securely tied so that it will not be pulled out.

3. It is best to place the primer in the charge so that the closed end of the cap points toward the center of the charge.

4. Use care in loading the holes to prevent breaking the wires or scraping off the insulation. Test frequently with the Du Pont galvanometer in loading large charges.

5. After the hole is loaded, coil up the protruding wires and cover with dry sacking or paper or dry earth to protect from abrasion and from lighting. Place an empty powder box over the loaded hole if it is to remain for any length of time.

6. Never load dynamite or exploders into a hole during a lightning and thunder storm. Refrain from loading an easily ignited explosive where sparks are flying from any source. Keep all unnecessary persons away while loading, connecting and firing blast.

7. Before connecting the holes remove all debris adjacent to them.

8. In connecting up the holes use care to insure proper connection, make good, tight electrical joints, cut out extra wire, and do not hurry the work but take time to do it properly.

9. If the ground is damp either raise the joints or tape them well, to prevent short circuits or grounds.

10. The leading wires used from the source of power to the end holes should be a well insulated copper wire about 14 gauge or equivalent to that. Try to place these so that they will not be injured by the blast and they can be used a great many times.

11. Test each circuit with the Du Pont galvanometer to make sure that it has approximately the correct resistance as shown in the table of resistances furnished with this instrument.

12. Test the source of power with the Du Pont rheostat, using two exploders connected in series as indicators, to make

sure that enough current will be furnished for the blast.

13. If a blasting machine is to be used be sure that all the exploders are connected in one series and that the number is not beyond its actual working capacity.

14. In operating the blasting machine do so with full force to insure the development of its capacity current. Always operate the machine two or three times before making the blast to be sure that it is working smoothly and to develop a little residual magnetism in the field coils.

15. When blasting from a power circuit it is best to have a two-blade switch which can be thrown in for a few seconds and then pulled out. Count to five or ten while the switch is in. Place this switch so that gravity will cause it to stay open. This switch should be in a lock box so that the switch can be locked open with the keys in the possession of the blaster.

16. When using dry cells they should be in a lock box or in the possession of the blaster who can personally make sure that the wires are not touching the cells.

17. When a three-post blasting machine is used, be sure to connect one wire to the center post when two wires are used. When three wires are used, connect center post to middle of series and do not make connection directly over a hole.

18. For detailed information on supplies for electrical blasting consult the Du Pont Blasting Supplies Catalogue.

Some Army Facts

An army corps is 60,000 men.

An infantry division is 19,000.

An infantry brigade is 7,000 men.

A regiment of infantry is 3,000 men.

A battalion is 1,000 men.

A company is 250 men.

A platoon is 60 men.

A corporal's squad is 11 men.

A field battery has 195 men.

A firing squad is 20 men.

A supply train has 283 men.

A machine gun battalion has 296 men.

An engineers' regiment has 1,098 men.

An ambulance company has 66 men.

A field hospital has 55 men.

A medicine detachment has 13 men.

A major general heads the field army and also each army corps.

A brigadier general heads each infantry brigade.

A colonel heads each regiment.

A lieutenant-colonel is next in rank below a colonel.

A major heads a battalion.

A captain heads a company.

A lieutenant heads a platoon.

A sergeant is next below a lieutenant.

A corporal is a squad officer.

The Amateur Championship Stake of America

(Concluded from page 7)

T. S. Comstock, who handled him in the recent trials of the Virginia-Carolina Field Trial Association and the Pointer Club of New York, was so much pleased with his performance, that he persuaded Mr. Robertson to part with him, and in the future will handle Mr. Hart as his own.

Among other dogs who distinguished themselves in this classic competition was Miss Kate W., a very nifty little setter owned by Mr. P. H. Powel. She proved herself a bird dog, and was placed third by the judges. Beau Whitestone, owned by Mr. Ford E. Young, of Washington, D. C., was very conspicuous on account of his range, speed and style, although he is also noted as a game finder.

Mr. Frank Reilly, of Medford, N. J., and Mr. Leon E. Seay, of Charlotte, N. C., judged the stake.

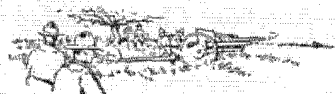
Several dogs who did not enter the Championship qualified in one or more trials, and amply proved their eligibility. Among these are Shore's Ruby Pearl, owned by Mr. Frank Reilly; Sport Hyki, owned by Mr. O. H. Aylor, of Laray, Va.; the famous Blue Diamond Frank, owned by Mr. A. D. Black, of Washington, D. C., and a rather remarkable pointer, Delaware Frank, bred by Dr. Shore, of North Carolina, and owned by Mr. Charles F. Eastman, of Wilmington, Delaware, who won a second and first in the only two derbies in which he was entered this season, although he had been in the trainer's hands but a few weeks before he was started on his career. White Mist, owned by Mr. P. H. Tamplatt, of Washington, D. C., who was placed over Delaware Frank in the National Capital Trials at Washington, D. C., also proved his quality.

All of the amateur sportsmen are looking forward to this year's Championship, which the writer believes will be the most interesting competition held during the field trial season of 1918.

The American Kennel Club will list the winner of the Annual Championship Stake at the Amateur Field Trial Clubs of America as the Amateur Champion of record.

To avoid any tendency toward commercialism, no cash purses are offered in the Championship Stake, but Mr. Samuel G. Allen, of New York, presented a most artistic cup made by Tiffany, to be won by the Champion. The honor of being placed first among the amateur winners is a greater incentive to the sportsmen than a purse, and the object of the association is to make the field trial game more attractive to this class of men.

Nominations in this stake cannot be purchased at any price, but are given to winners in the member clubs' trials as provided by the rules, and certificates are issued by the association to all recognized winners in the club trials.



Our Honor Roll

8247 Strong



Following is a list of employees of Du Pont American Industries who have entered the Army and Navy in the defense of Democracy. 7668 names have already been reported; this list includes 579 names; there have been no additional rejections, making a total of 8247. The Du Pont Company and their fellow-employees are glad to honor them. On their return to civil life, after their duties as soldiers have been performed, a hearty welcome will await them, and every effort will be made to place them in positions as good as or better than those they have left.

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

SALARY ROLL

Curney's Point

SMOKELESS POWDER

Appel, Edward C.
Dancer, Harry R.
Diffendall
Dill, Louis
Dunbar, Gerald W.
Foght, Paul W.
Gough, Joe E.
Griscom, Samuel B.
Jordan, Walter E.
Keen, Charles M.
Mackin, Basil
Madison, R. C.
Mason, F. E.
Myers, Norman

Wilmington Office

SMOKELESS POWDER

Young, Jr., Irving W.

Haskell

Crowley, Francis B.
Lyons, Jay J.
Moran, John J.
Palmer, Leland K.
Witty, Wm.

Hopewell

GUN COTTON PLANT

Bacon, George M.
Eason, John D.
Lynch, Jos. A.
Matley, A. Cox
Tilton, Ezra L.
Williams, Robert E.

Sales

Dougherty, Francis P.
Ege, Walter
Hill, H. L.
Horty, John F.
Humphreys, W. M.
Lawes, Reginald B.
McCormack, W. W.
Mahaffy, F. P.
Maloney, Ben
Pope, Harry A.
Seaholm, Junius M.
Steele, Lelroy B.
Talley, Francis W.
Updegrave, J. P.
Walker, Milton C.

Aud, C. & C. Art

Farrow, Hubert M.

Newburgh

FABRIKOID PLANT

McNair, Frederick

President's Office

McHugh, Frank A.

Barksdale

Allen, Roger W.
Jackowski, Joseph A.

Deepwater Point

COAL-TAR DISTILLERY

Willson, Thomas S.
Wyckley, Geo. F.

Jackson Laboratory

Dougherty, J. C.
Martin, F. B.
Minnig, H. D.
Moore, W. A.

Accounting Cost

Long, Otto F.

Penniman

Jennings, Casper W.

Ramsay

HIGH EXPLOSIVES PLANT

Kern, Martin D.

Purchasing

Blackburn, J. E.

Dye Works

Rowe, Arthur M.

Harrison

PAINTS AND CHEMICALS

Barnwell, John D.
Cotey, H. M.
Eldridge, Jr., Edgar S.

Eastern Laboratory

Adams, C. C.
Bell, K. E.
Gillespie, K. A.

Experimental Station

Berg, Howard F.
Phillips, Paul

Arlington

PY-RA-LIN

Traub, David C.

Engineering Department

Aaron, Aubrey A.
Adams, L. Paul
Alexander, Arthur E.
Allen, William F.
Allen, Jr., James C.

Allen, John

Allison, Arthur C.

Anderson, Jesse G.

Apple, E. Frank

Arant, Roscoe

Ausban, John L.

Baine, John T.

Baird, William H.

Baker, William O.

Banks, James Hall

Barney, James C.

Barry, Thomas V.

Beasley, Addison D.

Bensley, David S.

Benson, John Odell

Binkley, William J.

Bispham, Samuel

Blair, John M.

Bland, John Roderick

Bosarge, Albert S.

Boyle, William J.

Boyle, Hugh C.

Bozarth, Lester E.

Brandt, Jr., Lewis J.

Brewer, Wayne C.

Brooks, Arthur S.

Brown, Alfred E.

Brown, Harvey N.

Brown, James E.

Browne, Albert T.

Bunting, John J.

Burbank, Whitmer S.

Burrows, Wm. D.

Carlson, John

Carruthers, Don S.

Carter, James F.

Cassady, Mark Cook

Cattle, Elmer Paul

Chase, William M.

Choate, Charles H.

Choate, Thomas D.

Clark, Alexander S.

Clarke, Kenneth L.

Clayton, Herman A.

Coady, Louis D.

Cobb, John L.

Cobb, William E.

Coleman, George E.

Comegys, Charles P.

Comly, Charles H.

Cooks, Benjamin T.

Crookdale, Graydon D.

Cox, George J.

Crenshaw, James G.

Crowder, Jr., C. Walter

Crutchfield, Edmund P.

Daniel, Lawrence R.

Davis, J. Howard

DeBow, Benjamin F.

Delton, Henry W.

Denney, John W.

Dittig, William F.

Dotson, William C.

Doty, Leslie A.

Dunagan, John H.

Duncan, Jefferson Paige

Duncan, Samuel A.

Dungan, William E.
Dungan, William Emmett
Duke, Jr., Phillip W.
Dunkin, William W.
Douglas, Cullen E.
Drillette, Carl J.
Dyeus, Ray Earl
Edwards, Charles E.
Easton, Harold W.
Evans, Jesse D.
Evans, Paul H.
Everett, John S.
Ewing, Saulsbury D.
Farish, Curtis
Farris, Theodore N.
Fawcett, Frank
Fields, Walter P.
Fitzgibbon, Paul J.
Folk, Robert G.
Fulmer, Elbert P.
Fuston, Leo L.
Gass, C. Warden
Gatewood, Dallas L.
Gibbs, Dempsey L.
Glynn, James P.
Grayett, W. L.
Griffis, Thomas O.
Groner, Walter T.
Grossman, Hoard M.
Grossman, Richard C.
Grunwell, Paul C.

Hackett, James B.
Hagey, William Frank
Haley, Robert U.
Hancock, Charles T.
Hart, Harry F.
Hawwell, William E.
Hawkins, Joseph R.
Hawkins, Willard T.
Hayes, Reuben D.
Henderson, Oliver
Hesley, William A.
Hill, Clarence L.
Hoopes, Mildred S.
Hughes, James P.
Hutton, William E.
Hyde, Elmer Otto
Inscore, Clarence O.
Jacob, Harvey Edward
Jakes, Claude D.
Jamerson, Daniel M.
James, Joseph U.
John, George E.
Jones, Dallas D.
Jones, Eric C.
Kain, John F.
Keenan, William J.
Kelly, John S.
Kidd, Reagan B.
Kidd, William J. B.
King, Owen F.
Lancaster, Earl S.
Lancaster, W. Henry
Lank, William D.
Lapoutage, Leopold P.
Lawrence, S. Maurice
Lawrence, William H.
Lewis, Lee L.
Lewis, Leslie T.
Litt, David P.
Littlepage, Elmer S.
Lockett, Othniel W.
Logan, William S.

Norton, Rowland P.
Ogle, Fred H.
Pack, Thomas A.
Painter, Erskins G.
Painter, John W.
Parrish, Roger E.
Pettit, William J.
Perry, F. Stanley
Porter, Richard H.
Rains, George Myrton
Ragland, Jr., Wm. L.
Ramsay, Jos. G.
Reasonover, Wm. J. B.
Reeves, Ramon W.
Ress, Frank J.
Rice, Floyd R.
Richardson, Francis A.
Roach, Joseph G.
Roberts, Lytle C.
Robertson, A. Julian
Rogers, Frank J.
Rogers, Mervin L.
Routt, Samuel F.
Ruth, Albert
Sank, Harry C.
Satreth, Lorenzo A.
Scott, Clarence F.
Sevier, Lyman
Shea, Harold J.
Shes, John
Simpson, Adolph J.
Shoemaker, James J.
Smith, Wm. Harrison
Smith, William P.
Sonnenleiter, Albert H.
Spain, Clarence E.
Spencer, George F.
Stryker, Roy K.
Stafford, James E.
Stephenson, Claude B.
Stevens, Richard D.
Strobel, Robert W.

Stuart, Charles C.
Switzer, Richard M.
Tarpley, Frank M.
Tennis, Clyde Wm.
Tinker, Charles C.
Thompson, Charles N.
Thompson, D. Howard
Tedd, William Booth
Townsend, John H.
Townson, Lambuth R.
Tucker, Paul A.
Turner, Robert Gideon
Turner, Zeb V.
Tyler, John D.
Upton, William J.
Wallace, John N.
Warren, John G.
Watson, Homer W.
Weakley, William G.
Webb, Oscar G.
Wharton, 3d, Arthur D.
White, Jr., Michael F.
Whitehead, Boyce J.
Whitney, Harry G.
Williams, Lawson
Williamson, Mack G.
Wingate, Robert Edward
Wood, John Douglas
Woodroof, Richard F.
Woodruff, Aubrey

PAY ROLL

Curney's Point

SMOKELESS POWDER PLANT

Balechensky, Herman
Benz, Victor
Berry, Preston B.
Biggs, Elmer H.
Bormann, Eugene
Brennick, Frank
Cadori, Arthur B.
Callahan, John
Coghlan, Wm.
Cook, Charles F.
Cullen, Patrick
De Petro, Francesco
Du Bois, Robert
Farasca, John
Fraser, Donald W.
Gallagher, Theo.
Gerfin, Charles
Geyer, Robt. M.
Gordy, O. S.
Gray, William
Green, Harry
Hall, Geo. W.
Higmitt, Clarence E.
Hoskins, Howard
Hudson, Ralph
Johnson, Benj.
Justice, Thos. E.
Kazoff, Irving
Lamkin, Leo D.
Logan, Millard C.
Loupe, Gordon
McCarthy, Frank
Maene, Albert
Mallon, James P.
Mapp, Arthur
Oehlrich, Herman
Padron, Henry
Phicfler, Lewis
Phillips, T.
Pont, Juan
Roddick, Chas.
Roguemore, Thos. G.
Ryan, William
Sauerhoff, Emerson R.
Sheets, Harry E.
Smith, A. W.
Tams, Geo.
Taylor, Leslie
Thompson, R. D.
Tuley, Thos.
Wallace, Oliver
Walsh, Joseph A.
Williams, Harry

Arlington

PY-RA-LIN

Appello, Patrick
Axford, Clinton
Balt, George

Bechtold, Edw.
Brown, James
Bunbitt, Peter
Cambini, Amaddo
Cappitt, Jake
Carrissino, Dimenico
Christopher, John
Ciscone, Jerry
Colamdrino, Nicola
Del Guercio, Charles
Dicenzo, Joe
Divine, Vincent
Downes, Joseph
Gillick, William
Hill, Ralph
John, George
Kalinka, Adam
Longo, John
Lusyp, Luigi
McCann, William
McCarren, Daniel
McNally, Joseph J.
Natiello, Tom
Nicola, Donatona
Paul, Jr., Carl Peter
Penna, Frank
Perry, Joseph
Petrucelli, Anthony
Plata, Peter
Rubenstein, Jacob
Russo, Tony Del
Salewski, John
Samarin, William
Schmorr, Elwood
Serresky, Tony
Smith, Joseph
Stony, Gaspar
Sweeney, Edmund
Tata, Frank
Weiss, Angelo
Weiss, Martin
Yotantes, Bammick
Zonth, Barnes

Brandywine Mill

BLASTING POWDER PLANT

Ansider, John
Einsel, Geo. J.
Lynch, Frank
Quill, John A.

Cap Works

Cline, Benjamin
Harriott, Edward
Jules, Goux

Fairfield

RUBBER
Maurer Jr., Peter L.

Georgetown

ALCOHOL DISTILLERY

Atkinson, Theodore

Newburgh

FABRIKOID
Blaison, Pierre
Boice, Howard
Frederick, Schuyler
Laubacher, Joseph
Rhodes, Harry W.
Ronce, James

Parlia

SMOKELESS POWDER PLANT

Duggan, John
Flack, Paul
Gallaher, Herman E.
Jakevich, George
Joyce, John J.
Roman, William
Wappa, John
Zabito, Wladystaw

Poole Shops

MACHINE
Hainsworth, Clarence C.

Repauno

HIGH EXPLOSIVES PLANT

Jagers, John R.

U. S. Box Repair Plant

Handy, Joseph C.

Private Stults

William Stults, a former operator at the Deering Junction, Me., box mill, made the supreme sacrifice when the ill-fated *Ticonderoga* was sunk by a German torpedo on September 30th. Mr. Stults was en route for overseas duty with an artillery regiment when he met his death.

Lieutenant Frampton

Lieutenant William Kendall Frampton has "gone west," adding one more Du Pont employee to the list of heroes who have died "that Liberty shall not perish from this earth." He was killed in action "somewhere in France" last month.

Lieutenant Frampton was born March 14, 1893, near Preston, Md. He was a graduate of Preston, Md., High School and Goldey College, Wilmington, Del. Following his graduation from the latter institution, he entered the employ of the Union National Bank of Wilmington. In June, 1915, he came to the Works Supplies Division of the Du Pont Company. During 1916 he served with the Delaware militia on the Mexican border and he again answered his country's call in March, 1917.

Because of his intelligence and knowledge of military practice, he was sent to the Officers' Training Camp at Fort Myer, Va., where he was commissioned a second lieutenant. Later he was transferred to Camp Sevier, Greenville, S. C., and promoted to a first lieutenancy. He sailed overseas May, 1918.

Lieutenant Frampton was a member of the Wilmington Y. M. C. A., and lived at 619 W. 9th Street in that city. He is survived by his parents and three brothers, all of whom reside near Felton, Delaware.

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

If the name of an army or navy reading-room managed by any of the recognized organizations, either military or civil, is reported to the editor, with the correct address, the name will be added to the regular mailing list.

Letters giving news items are requested from the boys who have gone into military service. Good pictures can also be used to advantage. These must show no military details. Send them to Editor of DU PONT MAGAZINE.

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

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

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Wilmington, Delaware

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booklets and prices

The Soldiers' Mail

THE mail service for our army abroad has now been taken over by the army. It is handling a million letters a day that are received in France from this country, and about 300,000 letters a day that are mailed in France for soldiers in France. It has warehouses for sorting mail at French ports. It has railway mail clerks on some 2000 miles of French railroads. It has a central post-office at Tours, permanent post-offices at various points, mobile post-offices right up to the firing lines, and mail orderlies attached to each company of troops.

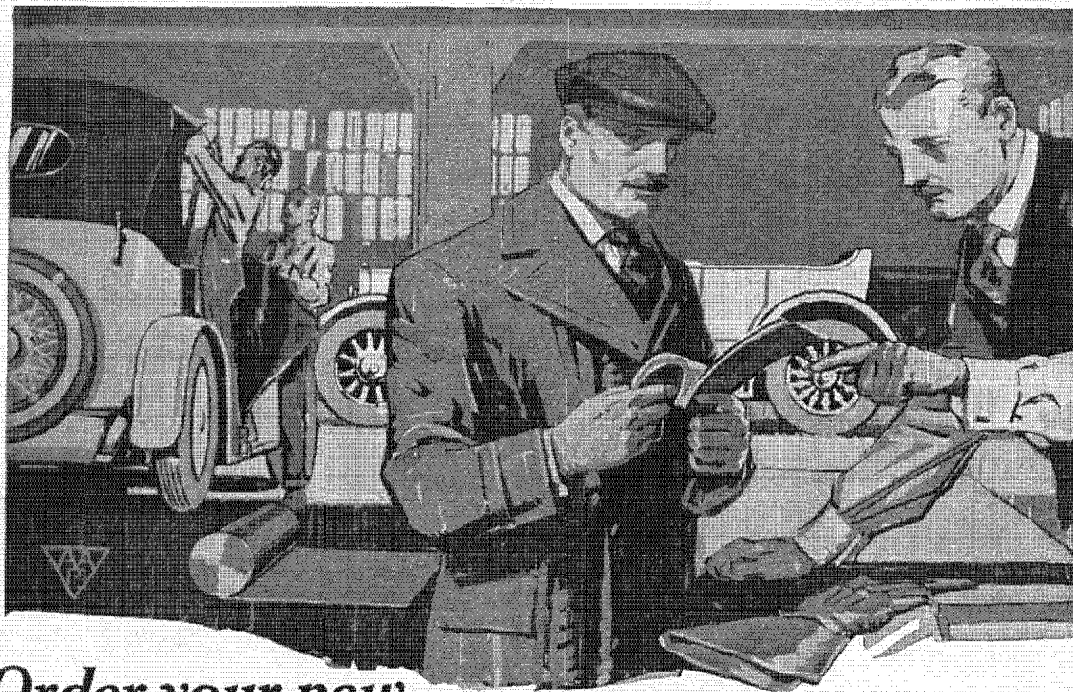
In the past, when the mail service for the army was under civil control, great delays were caused in the delivery of mail by the necessary secrecy concerning troop movements. Now, movements of the mobile post-offices are telegraphed in code to distributing post-offices and letters follow the soldiers as they march. All hospitals notify the central post-office of the identity of wounded soldiers received or transferred. The central post-office works with the central Record Division of the Adjutant General's office, where every soldier in the army is card-indexed, and

150 men are employed searching out addresses. A system has been devised by which delivery may be quickened to "replacement units" who have been scattered among widely separated troops. And various means have been found for overcoming delays due to lack of shipping facilities or congestion of mail at crowded posts.

Mail for some 50,000 soldiers in France is often delayed because the letters are inadequately addressed. In the future all such letters will be stopped at New York and returned to their senders. It is estimated that 300,000 letters a month have been delayed in the past because the men were in "replacement units." This "floaters' mail" is now being handled expeditiously. The delay due to censorship is being reduced.

The army authorities are aware that nothing sustains the morale of a soldier like letters from home. The mobile post-offices now keep up with the troops; the mail is received with the rations at the kitchen; and the whole reorganized postal service is devoted to providing that the doughboy's letters shall reach him as promptly and regularly as his meals.

DU PONT AMERICAN INDUSTRIES



Order your new Rayntite Top—now

Have its guaranteed protection against rain, snow and hail for the winter motoring season, if possible. At least make sure you will have it for next spring and summer. The top maker is a mighty busy man. He will be unable to fill all the orders offered him.

With new cars impossible to obtain, the millions of used cars must remain in service. So many of these require new tops to make them sightly and serviceable that only those ordered at once can be supplied. Prompt action enables the top maker to plan for labor and materials that will be difficult to obtain later—it insures getting the top material you should have.

**DU PONT
FABRIKOID**
RAYNTITE

In selecting a top material consider the reputation of the manufacturer and his guarantee. Rayntite Fabrikoid is a DuPont product. It is the *only* top and curtain material specifically guaranteed for one year, during which time we warrant it not to leak, crack or peel. Made in single and double texture and built to last the life of the car, it retains its shapely, smart attractiveness longer than any similar material.

When cushions need re-covering, specify Motor Fabrikoid. It is an economical and beautiful material with wonderful service qualities. Any good auto trimmer can furnish Motor Fabrikoid and do the work.

Orders placed now save money and disappointment later

Samples of Rayntite and Motor Fabrikoid sent on request

Du Pont Fabrikoid Company

Wilmington, Delaware

New Toronto, Canada

DU PONT

DU PONT AMERICAN INDUSTRIES

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

Fill in, Cut Out and Mail This Coupon

(Du Pont Magazine, December, '18)

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

Date

EXPLOSIVES

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

SPORTING POWDERS

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

PAINTS

- ☐ Antoxide Iron Paint
- ☐ Auto Finish
- ☐ Auto Paints and Enamels
- ☐ Barn Paint
- ☐ Bridgeport Standard Paint
- ☐ Bridgeport Wood Finishes
- ☐ Colors in Oil
- ☐ Concrete Paint
- ☐ Decorative Stains
- ☐ Dulite for Mills
- ☐ Enamels
- ☐ Ferro-Keep (Metal Paint)
- ☐ Floor Paints
- ☐ Floor Varnishes
- ☐ Flow Kote Enamel
- ☐ Industrial Paints
- ☐ Japans
- ☐ Marine Paints
- ☐ Railway Paints

- ☐ Red Lead
- ☐ Sanitary Wall Finish
- ☐ Shellac
- ☐ Shingle Stain
- ☐ Smokestack Paint
- ☐ Town and Country Paint
- ☐ Varnishes
- ☐ Vitrolac Stain Finish
- ☐ Vitrolac Varnish
- ☐ Wagon and Carriage Paint
- ☐ Wheeler's Wood Filler
- ☐ Wire Screen Paint

CHEMICALS

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

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

PY-RA-LIN

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

COATED TEXTILES

- ☐ Auto Truck Special Fabrikoid
- ☐ Book-Finish Fabrikoid
- ☐ Craftsman Fabrikoid
- ☐ Fabrikoid for Baggage
- ☐ Fabrikoid for Home Uses
- ☐ Fabrikoid for Railway Upholstery and Vestibule Curtains
- ☐ Fabrikoid for Upholstering
- ☐ Fabrikoid Sheeting
- ☐ Fairfield Hospital Sheeting
- ☐ Fairfield Rubber Cloth
- ☐ Fairfield Rubber Top Materials
- ☐ Hat Sweat Material
- ☐ Marine Special Fabrikoid
- ☐ Motor Fabrikoid
- ☐ Raynite Fabrikoid Auto Top Material
- ☐ Rug Anchor
- ☐ Shoe Fabrikoid

Name

Position

Your Address (If Personal)

Name of Concern (If Company)

Address of Company

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

What Du Pont products do you sell?

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

SPECIFIC QUESTIONS SHOULD BE ASKED IN AN ACCOMPANYING LETTER

DU PONT

BONDS for Investment

SHORT TERM NOTES
POWDER SECURITIES

LAIRD & COMPANY

Du Pont Building
Wilmington, Delaware

The Leading Shipbuilding Nation

THE United States is now the leading shipbuilding nation of the world, having risen from a poor third among shipbuilding countries prior to the war to the place of honor formerly held by Great Britain. It now has more ships under construction, more shipyards, more shipways and more shipworkers than any other power.

Under present plans, more than two-thirds of the tonnage which has been sunk by submarines since the beginning of the war will be replaced by American shipyards before the end of 1919. At that time the Emergency Fleet Corporation will have completed and delivered 2,595 new steamships, 237 tugs and 136 barges to take the place of the 4,000 steamships which have been sent to the bottom by German undersea pirates. Of this number 2,034 will be steel vessels, 888 wooden vessels and 42 concrete vessels.

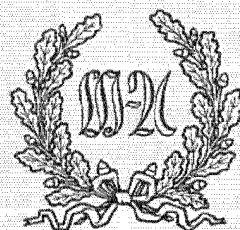
During the period from August, 1917, to September, 1918, a period of thirteen months, 574 vessels of 3,017,238 dead-weight tons were launched in American shipyards. The full significance of this achievement can be grasped when it is known that the greatest number of vessels of over 1,500 dead-weight tons ever launched in a single year in our shipyards was 38 in 1916 and that the tonnage above given represents four times the tonnage of all vessels of over 1,500 dead-weight tons built in this country during any four-year period before the war.

Even under the most favorable conditions this would be a record of achievement to be proud of, but when we consider the handicaps and obstacles to be removed and surmounted before actual shipbuilding operations could be given proper sway it becomes nothing short of wonderful. As an industrial accomplishment, it has never been equaled by any other nation and is another fitting rejoinder to the German charge of American inefficiency.

Can't Be Done

"A man betrays hisself by braggin'," said Uncle Eben. "When I hears a man tellin' 'bout how easy he kin drive a mule, I knows right off he ain't no reg'lar mule-driver."—*Washington Star*.

Schramm Compressors Drilling Rock



THERE is nothing spectacular about the *Waldorf-Astoria*. It is a hotel where comfort and luxury are unassuming—yet unmistakable.

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Fifth Avenue 33^d and 34th Streets, New York

L.M. Boomer President

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*—the white enamel of supreme refinement for homes of distinction.
For outside or inside use.*

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DU PONT



Can the Home Answer, AMERICAN

America now recognizes the mirage that lies in the word "imported"—the goodness that is of things American. The Du Pont American Industries invite you to acquaint yourself, in toiletware, with the rare beauty and usefulness that obtain in

Ivory Py-ra-lin

a masterfully contrived American product closely resembling elephant ivory, yet far more diversified, practical and inexpensive. It is easily cared for, in perfect taste, and enduring.

Ivory Py-ra-lin is the American gift suggestion. It may be had in single pieces as desired, or in most elaborate sets, at leading stores everywhere.

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