

THE DU PONT MAGAZINE



AUGUST 1928

WDT



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The DU PONT MAGAZINE

VOL. XXII

AUGUST, 1928

No. 8

THE RÔLE OF CHEMISTRY IN INDUSTRIAL DEVELOPMENT

*Reviewing the part played by applied chemistry in the
great drama of the world's progress*



CHEMISTRY, perhaps more largely than any other applied science, is responsible for the environment of modern civilized man, and, to the extent that man may be a creature of his environment, is responsible for his character.

Chemistry might be considered as fundamental and applied. Fundamental chemistry gathers together the experimental evidence and formulates laws which serve to harmonize, coördinate and simplify a great mass of the experimental results accumulated in many fields of the science. Applied chemistry, using the generalizations of fundamental chemistry and the theoretical knowledge of the subject, seeks to develop new processes and products for the amelioration of living conditions through the improvement in the health, comfort and prosperity of man.

The use of chemistry in the useful arts is as old as man, but recognition of the actual part it plays in the arts is a comparatively modern development. One of the most impressive characteristics of the past century is the rate at which man's knowledge of the world has increased

through his ability to interpret natural phenomena and analyze them in order to ascertain the underlying causes and laws. The actual application of industrial chemistry through the development of the so-called industrial research laboratory is comparatively recent.

By DR. CHARLES M. A. STINE

Chemical Director

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

The du Pont Company dates its interest in chemistry from the year when E. I. du Pont built his first black powder mill on the banks of the Brandywine

at Wilmington, Delaware. He laid great stress on the importance of properly purifying the saltpeter, the refining of which in those days was considered a complex chemical operation. Our chemical history, therefore, dates from 1802, and our first active chemist was probably Eleuthère Irénée du Pont himself.

Approximately \$200,000,000 a year is spent for industrial research in the United States. About two-thirds of this amount is spent by industry and one-third by the

Federal Government with its many scientific and technical bureaus and research agencies. Approximately 30,000 research workers are employed in the applied science and industrial research laboratories of the country. A recent bulletin of the National Research Council lists 1,000 industrial research laboratories which, by the way, is an increase of 100 per cent in a period of six years.

A review of the industrial progress of the past hundred years will serve as well as anything to give us a bird's-eye

view of the part applied chemistry has played in the development of our living conditions.

In thinking of scientific progress we probably think of the many contributions of the mechanical and electrical industries, such as the railroad, the telegraph and



*The first du Pont chemical laboratory was housed
in this old saltpeter refinery building,
near Wilmington, Delaware*

telephone and the radio, but the chemist as well as the engineer has made significant contributions to the electrical industry and to the application of power in manufacture and transportation which have produced such a revolution in our mode of living. Chemistry is at the base of such developments as rubber applied in the industries; Portland cement; high-speed steels; non-ferrous metal alloys, such as the aluminum bronzes; synthetic dyes; high explosives; plastics; artificial refrigeration; the sanitation systems and water supplies of practically every city of any size; many new drugs and pharmaceuticals of the most fundamental importance; moving pictures; cheap and abundant artificial illumination, to mention only a very few of the scores of striking examples which might be cited.

CHEMISTRY AND AGRICULTURE

Chemistry has contributed to agriculture in the solution of problems of primary importance—not merely fungicides and insecticides, such as our own Semesan and various sprays and powders and other chemical methods for the control of diseases and insect pests which diminish the yield of our essential food crops, but most important of all, the development of chemical fertilizers bids fair to constitute one of the most important developments of all time. The fixation of atmospheric nitrogen by chemical processes, through the utilization of chemical materials which we call catalysts, is far-reaching indeed in its effects, not merely upon the cost and availability of our food supplies, but it is bound to produce important effects upon the whole distribution of the population of the country. It is obvious that as the yield per acre goes up through the intelligent application of cheap and abundant fertilizers, the amount of time and labor which must be expended on the production of a given unit of foodstuffs diminishes.

We must not neglect to mention the development of anaesthetics and antiseptics; of plate glass and optical glass; of special porcelains for insulating purposes, and potteries and tiles for chemical manufacture.

Man's first important synthetic textile fiber, rayon, is the result of applied chemistry's effort to produce a product to supplement that of the silk worm.

The tungsten filament light has supplanted the candle, and the

incandescent light has taken the place of the oil lamp and the gas lamp. A cerium alloy ignites a little bit of volatile hydrocarbon material at the touch of my thumb. The cigar lighter is science's adaptation of the old principle of flint and steel for kindling fire; even the safety match of today must not be omitted from the category of modern scientific development.

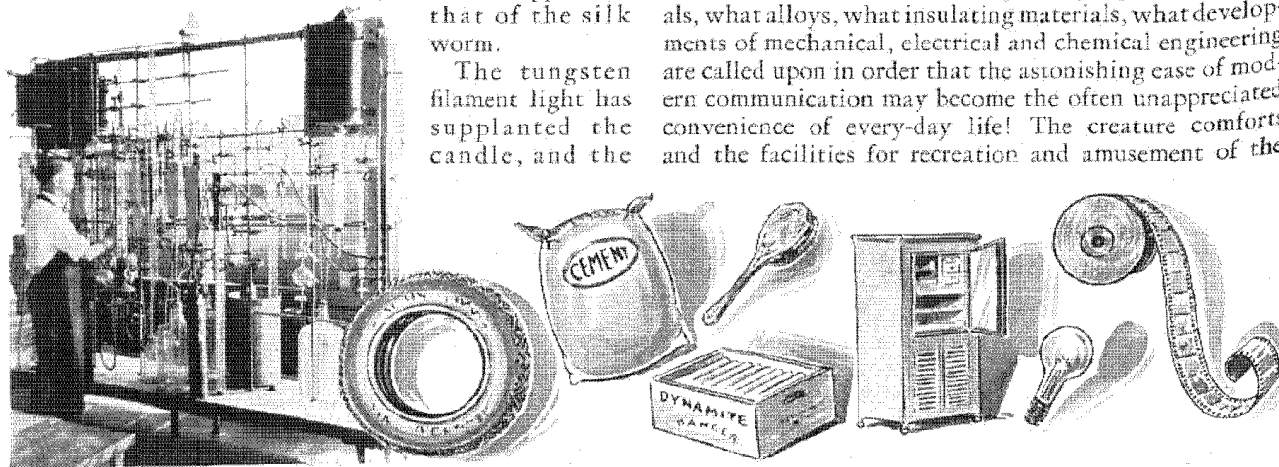
MODERN TRANSPORTATION

I have mentioned artificial refrigeration. In bygone days the foods available, even to the man with unlimited power to command distant soils and climates, were far more limited in variety, and to a much greater degree determined by the geographical location and the season of the year, than is the case today. The wholesale preservation of perishable foods has made possible the shipment of every type of product of soil and climate to any and every point of the world reached by modern transportation facilities.

We drive to dine in the evening at the home of a friend a distance which constituted a whole day's journey with a horse or a stage-coach some years ago.

A few seconds suffice to telephone from San Francisco to London; it used to require at least two weeks to carry only the one-way conversation by letter; and, before the development of modern transportation, at least two months were required. What an astonishing complexity of scientific developments is involved in the transmission of the human voice by wire or by radio from San Francisco to London in the space of a few seconds of time!

Incidentally, the telephone, although by certain standards not classed as an industry, is a classic illustration of industrial research employed in the service of mankind. In fifty years a single telephone has expanded into a concern rated as the largest individual corporation of the world, a concern which expends approximately \$13,000,000 a year for research—the American Telegraph and Telephone Company. It cost a little more than \$300,000,000 to build the Panama Canal, but it cost over \$500,000,000 to enlarge the telephone system of New York, New Jersey and part of Connecticut since the first of January, 1920. What metals, what alloys, what insulating materials, what developments of mechanical, electrical and chemical engineering are called upon in order that the astonishing ease of modern communication may become the often unappreciated convenience of every-day life! The creature comforts and the facilities for recreation and amusement of the



fortunate American citizen of 1928 are, to a large extent, the result of the application of science to the problems of living.

Let us mention a few of the industries in which chemical change played a predominant part and which yielded products chemically different from the raw materials employed, and which constituted the foundation of our present chemical industry. One hundred years ago they consisted of the manufacture of leather, iron, carbon-steel, salt, lead, certain varieties of glass, linseed oil, certain types of paper, building brick, crockery and porcelain, gunpowder, black blasting powder, lime—much of it wood burned—and the refining of certain oils of animal origin. As far back as 1608 an unsuccessful attempt had been made in Virginia to manufacture pine tar, and potash by the leaching of wood ashes, and glass. The production of glass, alcoholic beverages, salt, leather, iron and lead from some of our native ores were the industries first commenced and most widespread in the American colonies. They were chiefly confined to Pennsylvania and Massachusetts, though the great salt deposits of New York were discovered by the whites as early as 1654. However, it was not until 1787 that the manufacture of salt actually began. The extraction of natural dyestuffs and the manufacture of saltpeter, sulphur, gunpowder, paper, salt, and the carrying on of certain metallurgical operations were all encouraged by the Continental Congresses.

OTHER INDUSTRIES DEVELOP

In 1730 the first large sugar refinery was erected on what is now Wall Street, New York.

In 1790 white lead manufacture was begun in Philadelphia.

In 1791 anthracite coal was discovered in Pennsylvania.

In 1793, the year in which the cotton-gin was invented, the first unmistakably chemical industry, namely, the manufacture of sulphuric acid, was begun in Philadelphia by John Harrison with an output of 300 carboys per year.

In 1802 the manufacture of gunpowder by Eleuthère Irénée du Pont was undertaken at Wilmington, although powder of an unsatisfactory sort had been made in the country previously.

And so I might go on sketching the development of the chemical industry in this country, but we must content ourselves with the citation of only a few of the more important developments.

In 1830 Charles Goodyear discovered his process for

vulcanizing rubber, thus founding a new industry.

Petroleum was discovered in Pennsylvania in 1845 in drilling salt wells, but it was not until 1859, following the work of a chemist at Yale University, Benjamin Silliman, that a company was organized to exploit petroleum, and a well was driven to obtain oil for illuminating and lubricating purposes. This date really marks the beginning of an industry, the significance and importance of which would be difficult to overstate.

In 1869 J. W. Hyatt began the manufacture of celluloid, the first of the plastics, which today adds so much to the convenience and attractiveness of life.

CHEAPER LIGHT MADE AVAILABLE

In 1872 the manufacture of Portland cement began in this country. It is interesting to mention in passing that the largest candle factory in the world was at that time doing business in London with a capitalization of \$5,000,000. No stronger evidence of the benefits of research to the general public can be presented than to mention the fact that the cost of a given amount of light today is about five per cent of what it was fifty years ago.

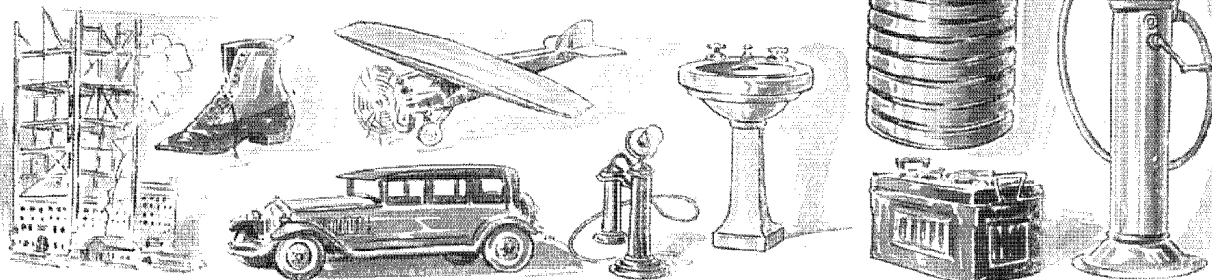
It is a long time since a prominent American chemist, Dr. Charles F. Chandler, coming to the defense of kerosene as an illuminating oil in order to ward off proposed legislation prohibiting its use, said:

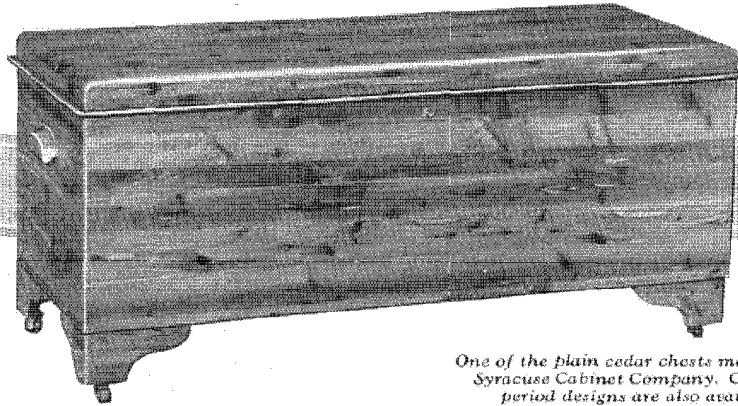
"An illuminating material which gives in a cheap lamp an amount of light equal to that of eight sperm candles, and at a cost of one-third of a cent per hour, is an inestimable boon to the world. It adds several hours to the length of the day and enables the working classes to devote the long evenings to the improvement of their minds by reading; or, where labors of the day must be prolonged into the night, it saves the eyes from the inevitable ruin which would otherwise ensue. The sanitary advantages of a clear, smokeless light are inestimable. It is safe to say that petroleum is one of the great civilizing agents of the nineteenth century."

I wonder what Dr. Chandler would say about the tungsten filament, nitrogen-filled bulb we unconcernedly switch on with a touch of the finger today!

It was in 1878 or 1880 that Edison and Swann simultaneously developed the first incandescent lamp. The

(Continued on page 24)





One of the plain cedar chests made by the Syracuse Cabinet Company. Chests in period designs are also available

PROTECTIVE CEDAR CHESTS

*They are moth-proof, of course, but they are also beautifully designed,
made only of the best materials—and finished in Duco*

ALTHOUGH the cedar chest industry in the United States cannot be compared in size with the automobile industry, for example, nevertheless a cedar chest is one of the most essential pieces of furniture in every home. The evidence of this is that the number of chests produced annually has reached a volume of very considerable proportions.

Most everyone knows that the United States Government has spent large sums of money to eliminate and destroy insects which are harmful to crops. It is also commonly recognized that the Government has appropriated large amounts to destroy mosquitoes, although most of the species found in this country are not malaria carriers. But it is perhaps not so well known that the Department of Agriculture has been for a long time and still is carrying on experiments and investigations to find the best way to combat such harmful insects as moths. The average person hardly realizes how many millions of dollars' worth of valuable garments, furs, woollens and other commodities are ruined annually by the larvæ of the common moth. Inasmuch as this destruction is not confined to any particular section of the country, the moth problem may be considered as general and of prime interest to every individual.

It is interesting to note that the moths which we see flying around in our houses do no damage. They merely deposit eggs. These eggs hatch within a period of from two to three weeks, and young worms or larvæ emerge. As they grow, they necessarily consume food and require garments for themselves. They make their own clothes out of our woollens and furs. Their appetite is so enormous that in a short time they will entirely destroy a valuable fur or perhaps even a choice heirloom.

By M. M. DREPKOFF
Syracuse Cabinet Company

It has always been known that red cedar possesses a tendency to destroy moths. Various experiments have been

made in private laboratories here and abroad, and the tests have proved conclusively that cedar has a pronounced destructive effect on moths.

As far back as 1922 the Department of Agriculture announced in Bulletin No. 1051 that cedar chests have a deadly effect upon the larvæ of young clothes moths. This bulletin further states that larvæ hatched from eggs within the chest die in most instances within two or three days, and that practically all of them die within two weeks. In a still earlier bulletin, No. 707, published in 1918, Government officials concluded that "the result of the tests made indicates that adult clothes moths and the young larvæ are killed when placed in a cedar chest."

Authentic tests conducted under Government auspices have proved conclusively the importance of the cedar chest to every housewife. Furthermore, the sales of chests within the past ten years have increased enormously. Styles, too, have changed considerably. Formerly chests of solid cedar and of plain construction were sold. Now many chests made of various woods other than cedar are popular. They are designed to match all kinds and types of furniture within the home. Some of them are lined with cedar; others have only a thin cedar veneer on the inside. Recently the Department of Agriculture made tests which indicated that in order to be effective against moths, a chest must contain at least 70 per cent of three-quarter inch red cedar in the body proper. Therefore, chests made with cedar veneer or thin cedar liners are not to be relied upon to prevent or destroy moths and their larvæ.

But the housewife, in buying a chest, has a safe and sure guide by which to go. The one thing that is necessary

for her to know is that regardless of the kind of wood used on the outside of the chest, to be effective against moths, it must contain 70 per cent of the three-quarter inch red cedar on the interior. It is also true that most of the chests on the market today are not so constructed.

The Syracuse Cabinet Company—one of the oldest chest manufacturing firms in the United States with headquarters at North Manchester, Indiana—is making a line of chests constructed with genuine walnut on the exterior and with a lining of solid cedar. They are made to match any piece of furniture in the home—in plain, period and modern designs. Furthermore, all chests manufactured by the Syracuse Cabinet Company are finished with Duco, the best finish we can obtain.

Our company has found that when dealers display and offer our chests finished with Duco, it is not necessary for them to explain to their customers how this finish is put on, or whether it will give service or whether it will be durable, because the customer usually knows as much about Duco as the dealer himself. The name of the Syracuse Cabinet Company is identified on every chest leaving the factory; so also is the Duco trade-mark. Due to the modern production methods used in our plant, high-grade walnut chests with cedar interiors are available at a price within the reach of every housewife and bride-to-be. A cedar chest, therefore, is not a luxury. It will pay for itself in one season through the savings effected by preventing the destruction by moths of valuable garments. A properly constructed chest, therefore, becomes a necessity rather than a luxury.

Upon entering the North Manchester plant the first thing that impresses the visitor is the natural aroma of the cedar in process of being worked. The wood is shipped in carload lots to the Syracuse

Cabinet Company from the mountains of Tennessee. It is necessary to have it kiln dried in order to take out the moisture and to eliminate warping afterwards. Cedar lumber must be dried by a process entirely different from any other in order to preserve a sufficient amount of the natural cedar oil in the wood.

After the cedar boards are removed from the kiln, they are sent through modern, power-driven, electrically operated machines where they are cut into various lengths, planed, ripped, edged and glued into panels. They are then sent through the veneer department, and genuine walnut veneer is applied with waterproof glue properly seasoned and scientifically handled. After these panels are sanded, polished and inspected, they are ready to be assembled.

Only modern methods of production are used in the Syracuse Cabinet Company's plant. All chests are assembled on a unit basis. Skilled craftsmen are employed, each one having been trained to do his particular work well and efficiently. In the assembling department beautiful panels, overlays and carved moldings are put on, and soon a chest appears ready for the finishing department. However, before passing to this department, each chest is again thoroughly inspected.

In the finishing room various decorative effects are obtained. Some chests are shaded and high-lighted and, as stated, all are finished in Duco. The Duco finish not only protects but also enhances the inherent beauty of the wood. The finish is moisture-proof, durable and ready for lifetime service.

The Syracuse Cabinet Company's chests are sold by good dealers throughout the country. They are recommended by department stores and leading furniture houses, because of their superior construction and the high-grade quality of all materials used in their manufacture.



Three styles of high-grade cabinets, all with cedar interiors. The one at the right has a secret drawer near the top.

DYNAMITE BUILDS THE MODERN WORLD

In constructing tunnels, highways, skyscrapers, subways, dams and other up-to-date facilities, explosives are indispensable

"TIME is money" is the slogan of this generation which is speeding up transportation. Travel must be so direct that not even a mountain may be allowed to divert its path by forcing trains around its sides or up over its peaks. What if the right of way of the Iron Horse must be cut through solid rock? Dynamite can do it.

The Moffat Tunnel, the dream of the man whose name it bears, was recently blasted through five miles of rock of James Peak in the Rocky Mountains. This conquering job of the explosives engineer and of those who followed him has eliminated one of the worst high passes in the continental divide in Colorado.

It has shortened train travel between Denver and Salt Lake City, 173 miles. By using the tunnel the railroad also cuts off steep grades and brings transportation inside the mountain where it escapes the dangers and delays of the heavy western snows. Month after month eight-hour shifts of men worked night and day excavating with dynamite and mucking machines. One-half million cubic yards of rock were taken from the mountain in order that the railroad might meet the ever-increasing demand of the modern world for speed.

The Cascade Tunnel now being built on the Great Northern Railroad between Scenic and Berne in Washington state will be the longest railroad tunnel in America and the fourth longest in the world. It pierces the wild heights of the Cascade Mountains for nearly eight miles and cuts off much of the 3,000 foot rise and fall which the railroad now travels in 140 miles of its route. In boring several stretches of this new pathway time records have been broken, for at one stage of the work 1,157 feet were drilled through hard granite in 29½ days.

The usual method employed by the engineer of this job

IN a contest recently conducted by the Institute of Makers of Explosives among the Washington Branch of the League of American Pen Women, the accompanying story by Victoria Faber Stevenson was the prize winner. It mentions a few of the construction problems dynamite has helped to solve in present-day engineering.

—The Editor

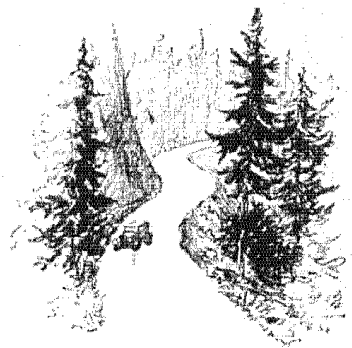
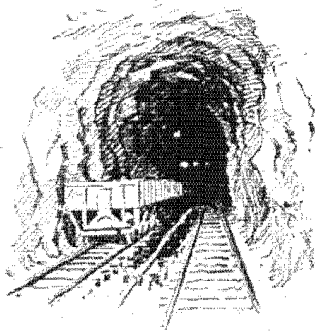
is that of boring two rings each of twenty to thirty holes, nine feet deep and one and one-half inches in diameter with drills mounted on movable carriages. After these borings are loaded with explosives and the drills are moved back 2,000 feet, the

holes are shot in five separate blasts. When this procedure is repeated five or six times and the debris removed, the tunnel is advanced from forty to fifty feet. With four men and an electric mucking machine removing as much of the blasted rock in a day as took a dozen men and a string of mules in the old days, speed is to be expected. The fact that explosives crews are working on twenty rock faces at the

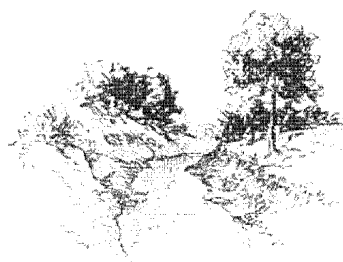
same time; that they are constantly supplied with fresh air from the outside; that compressed air drills are used and that abundant electric power is supplying light and energy for the work, explains why the tunnel is progressing so rapidly that it will probably be finished this year.

According to recent statistics America has more than twenty-two million motorized vehicles. These motor cars would never have been made had there not been a network of smooth, hard roads extending over the nation to invite motor travel. In other words, America would not be on wheels if it were not for its good roads. It is interesting to know that the mountains of crushed stone in the cement and other road materials was furnished by dynamite. Sometimes a single blast shatters a quarter of a million tons of rock for the concrete bridge builder or for the road engineer. Quarries are so generously distributed throughout America that 60,000,000 pounds of dynamite are used in them annually.

The value of the crops which were raised on the irrigated lands of the United States last year was over \$72,000,000. These desert regions were made to bloom because they were supplied with moisture. In the great irrigation projects of the West the



ivers are not allowed to waste by flooding their banks in the spring, but the waters are held in vast reservoirs so that they may be supplied to the crops through the irrigation ditches during the season when there is no rainfall.



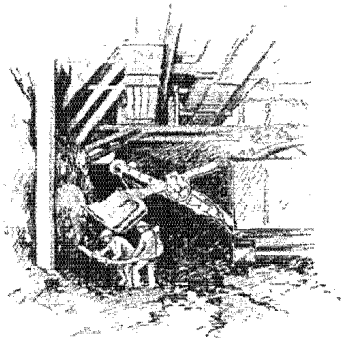
The huge dams which have been built across the rivers to form these storage basins have been constructed after tons of explosives have prepared their foundations and after tons of dynamite have quarried the stone to be used in their masonry.

Should Boulder Dam be built, dynamite would not only be one of the first necessities on the project but it would be required to furnish a constant supply of stone for cement and concrete. According to some proposed plans the volume of water to be stored will be of sufficient quantity to cover an area as large as the District of Columbia to a walled height nearly as great as that of the Washington Monument. In such a project the colossal dam will extend 700 feet or to a depth of 150 feet below the river and to a height of over 550 feet.

One might say on first thought that New York City proper does little building, because it has no available building lots. As a matter of fact the city is still growing within its old limits, for larger homes, offices and factories are taking the places of those formerly built. Yesterday's skyscrapers are being demolished for higher construction. Old solid rock foundations, part of the very structure of the island, are being excavated to support larger and heavier buildings. Dynamite, therefore, is the first step in building the skyscrapers and the muffled sound of the explosions announces that a new apartment house, hotel, office building, or factory is about to rise perhaps, thirty, forty or even fifty stories in the air.

Last November the world's largest and longest vehicular tunnel was opened. This \$48,000,000 driveway with its tubes for east and west travel extends under the Hudson River. By it the great metropolis of New York, an island city, is connected by dry land with its neighbor, Jersey City. How could this tube have been dug for the 18,000,000 cars which it is expected to carry the first year, if it had not been for the dynamite family? From the New York end of the tunnel more than 17,000 cubic yards of rock were removed by the use of explosives.

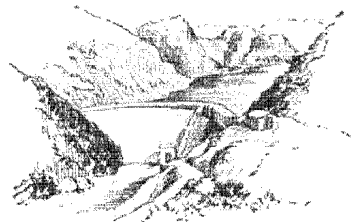
Subway building under the streets of New York is an old story. Not only have explosives cut miles of paths for such street car travel, but dynamite is still at work blasting out underground roads. Extension lines are now being added to the subway so that the



increasing number of people in the newer and outlying sections of the city may the more quickly ride to and from their daily work.

San Francisco is following New York's plan in preparing for the transportation needs of the future. The city fathers are looking forward to the time when those parts of the Sunset District which are now sand-dunes will be transformed into a beautiful suburb. In order to hasten that day, the western city is building a tunnel from its outskirts to the business section, so that a double-track railway may run beneath the hills to link the two localities. Every time the drift round of seven to eleven holes, each filled with from ten to fifteen pounds of dynamite, is exploded, enough broken stone is cleared away to add five and a half more feet to the tunnel.

Today the world is seeking power which shall furnish cheap heat, light and the energy for running large industrial plants. It is for this reason the United States is aroused to the possibility of Muscle Shoals. If that



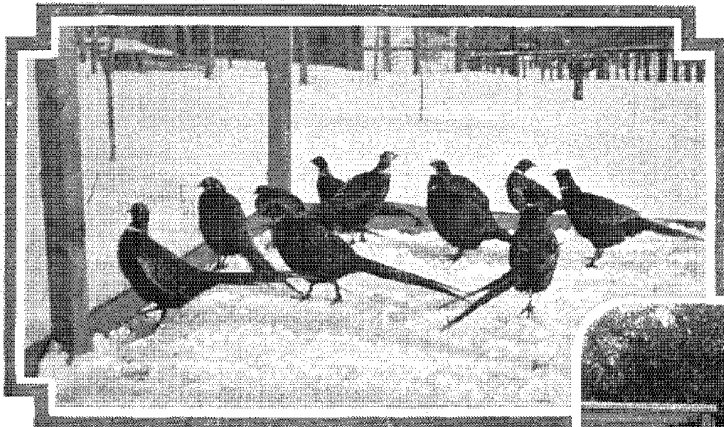
project is fully carried out, millions of electric horse power may be furnished by combining the force of the Tennessee River with electric plants.

One of the largest projects of this kind which has yet been undertaken is that under construction in Conowingo, Maryland. This hydroelectric plant will furnish one-half million hydroelectric horse power when the energy of the waters of the Susquehanna is linked with the power house on the project. Power from this hydroelectric development will be available at Plymouth Meeting, sixty miles away and will be conducted to Philadelphia and near-by districts and nearly fifty miles north to Seigfried. Engineers estimate that nearly a million and a quarter pounds of dynamite will be used on the whole Conowingo project, for great quantities of explosives have already

been used in blasting out the solid rock bed of the river and in other excavations necessary in preparing the foundation for the dam. This huge piece of masonry, seven-eighths of a mile long, has been built across the river to impound the water in a lake fourteen miles long. The very stones in its concrete and cement make-up were furnished by dynamite. Explosives also blasted the spillway and the foundation for the power house, and blew up a whole hillside in order that sixteen miles of railroad might be relocated.

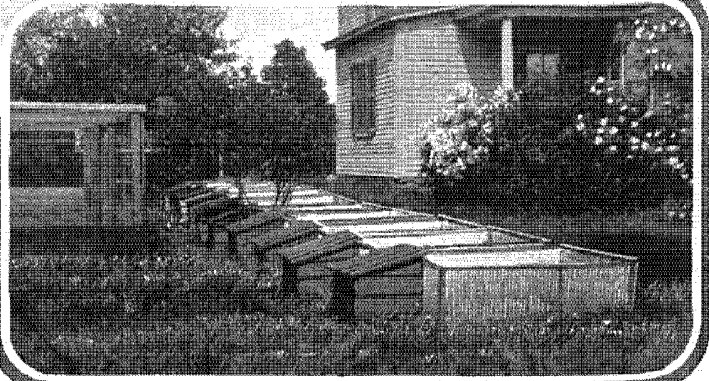
Boston finds that its water supply must be increased. To this end the city has started on an engineering feat which will add 214,000,000 gallons of water a day when the work is completed in 1944. In this new development waters of Ware River and Swift River will

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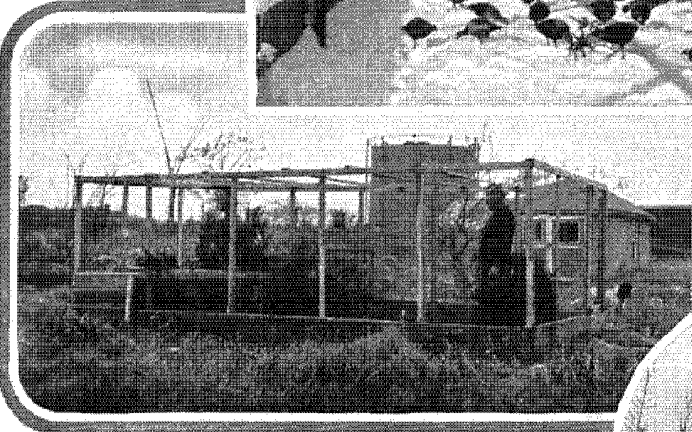


Above—Part of the breeding stock of pheasants of an enthusiastic sportsman who maintains a small game farm near his home in a suburb of Boston, Massachusetts

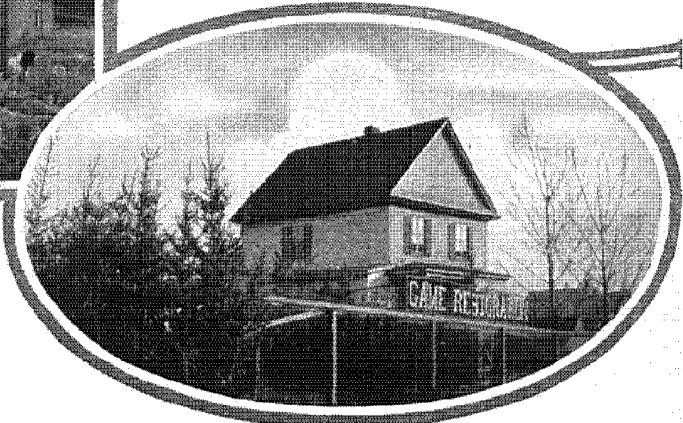
Right—Game breeding does not necessarily require an isolated place. As this picture shows, the breeding pens and yards are only a short distance from the house



Left — Feeding time at the game farm at Wakefield, Massachusetts, enabled the photographer to take this picture of the pheasants in their pen without a single flurry



Above—Now see where another sportsman of Walpole, Massachusetts, raises pheasants on a vacant lot near the city gas tank. Why not raise game birds in your own back yard?



Below — The house on the property at Wakefield, where game farming is a profitable local industry and one affording much pleasure to its owner

THE SPORTSMAN'S PART IN WILD LIFE RESTORATION

*Actual participation in fish and game propagation work
is needed to produce the most effective results*

THE basic objective in wild life conservation and restoration is a constructive, businesslike, nation-wide, long-term program. Continuity of policy is a prime requisite. On these points all conservation leaders agree.

Lack of a broad program, followed consistently throughout the years, is responsible for the deplorable conditions existing in some states today. In fact, frequently changing policies and methods have been almost as destructive to wild life as market hunting and fishing, stream pollution, deforestation, unwise drainage and all the rest. No business could hope to survive the ever-changing policies that have taken place in our conservation activities; neither can we restore wild life to our forests and streams by pursuing such methods.

Another factor has been the apathy of sportsmen toward conserving resources which they erroneously believed to be inexhaustible, but it is gratifying to note in recent years a tremendous change of attitude toward wild life conservation.

Perhaps the shortest route to this goal is the actual raising and rearing of game and fish by the sportsmen themselves for liberation in places where they hunt and fish. Hunters and fishermen everywhere are beginning to see the possibilities of this work, and, as individuals, groups and clubs, they are now taking an active hand.

Our state game departments are doing splendid work along this line but they must have help from all interested in the outdoors to facilitate the program.

Certain species of game can be successfully raised by individuals or sportsmen's clubs on small areas of land and at little expense. Among the game birds the common pheasant is the logical choice for breeding, and at present promises most successful results. Of all the upland game birds, pheasants are easiest to raise and rear. These birds are most largely produced by both state and private game farms; they have proved their adaptability to the climatic and other conditions in large areas of the United States. From the standpoint of the agriculturist, pheasants are very valuable birds. Weed seeds, insects and worms of all kinds constitute forty to sixty per cent of their food, and waste products fully fifteen per cent of the balance.

Pheasants are not antagonistic toward native grouse or quail. Two of these birds will furnish an ample supply of splendid game flesh for the average family, and finally,

By J. H. OTTERSON

while the pheasant is not the equal of our grouse or Bob White quail, as a game

bird it furnishes satisfactory sport to thousands of hunters who must content themselves with this bird or nothing.

It is obviously impossible here to give detailed instructions on pheasant breeding. Nor is that necessary. Authentic information* is readily available to all who may be interested. And all sportsmen living in sections of this country suitable for these birds should be interested.

The experience of sportsmen who are actually engaged in this work, at present, has demonstrated that it is neither difficult nor costly to produce enough pheasants on small areas to decidedly improve local hunting conditions by introducing new blood among the native birds, and by numerically increasing the local supply.

It has been said—"As in the case of poultry, the number of persons who can rear pheasants by the thousand is limited when compared with those who are able to raise a small number. Therefore, to maintain the pheasant, the supply must come from a large number of small breeders rather than from wholesale production on a large scale."

From a purely financial standpoint, pheasants are better birds to raise than chickens; they mature more rapidly, cost about the same for feed and only a little more for care. There is a good market every year for eight-weeks' old pheasants at a price of about \$3 a bird. In winter the demand for breeding stock, one and two years old, is in excess of the supply. Pheasant eggs will usually bring \$4 and sometimes even more a setting.

Each year sees additional sportsmen's clubs and individuals taking up the breeding of pheasants for their covers, and they have to obtain eggs or birds in order to make the start. Again, clubs and breeders who are already engaged in this work usually like to secure fresh stock frequently to preserve the stamina of their birds.

In many states sportsmen employ farmers to rear pheasants for them, and it has been found that farmers' wives take much interest in this work, and they doubtless use it as a pin-money producer. Good sportsmen and lovers of the outdoors—and that includes about everybody—must help to maintain our fish and game supply, if future generations are to enjoy the privileges we have had. Sensible laws and their enforcement, game raising and game keeping are duties which we should steadfastly perform, and we can all find opportunity to do our part to conserve and restore wild life.



*Write to Supt. of Public Documents, Government Printing Office, Washington, D. C., for Farmers' Bulletin, No. 1521, entitled "Propagation of Game Birds."

THE DICTAPHONE IN COLORS

Both dictating and transcribing machines are now being offered in a full range of color finishes

BEAUTY inevitably offers a distinct personal appeal, whether it be applied to the private office, the club or the home. In every phase of modern life the public is demanding beauty as well as utility.

Perhaps no other one thing in our daily life is so evident as the increasing interest in color as a means of beautifying the things we use every day. From automobiles to washing machines; from furniture to tools; from trolley cars and busses to vacuum cleaners; from neckties to kitchen utensils; from cameras and radios to lighting fixtures—on almost everything we find color being applied. The result is a change in our conception of articles from just plain utility to things it is a pleasure to handle, to use and to have about us.

When the demand for color spread to the world of business, the first office appliance to be offered in bright hues was the New Model 10 Dictaphone. Color first approached the office appliance field through the portable typewriter, which is not, of course, an office appliance.

Colored Dictaphones are finished in five different shades, specially prepared in permanent, genuine Duco finish. These colors were selected after some eight months of study, supplemented by expert advice on just which ones

By E. H. HOPKINS

would be most practicable to introduce into business offices.

The special names of these five colors are: Dictaphone Maroon, Brown, Green, Beige and Blue. The same standard black finish will be continued as before.

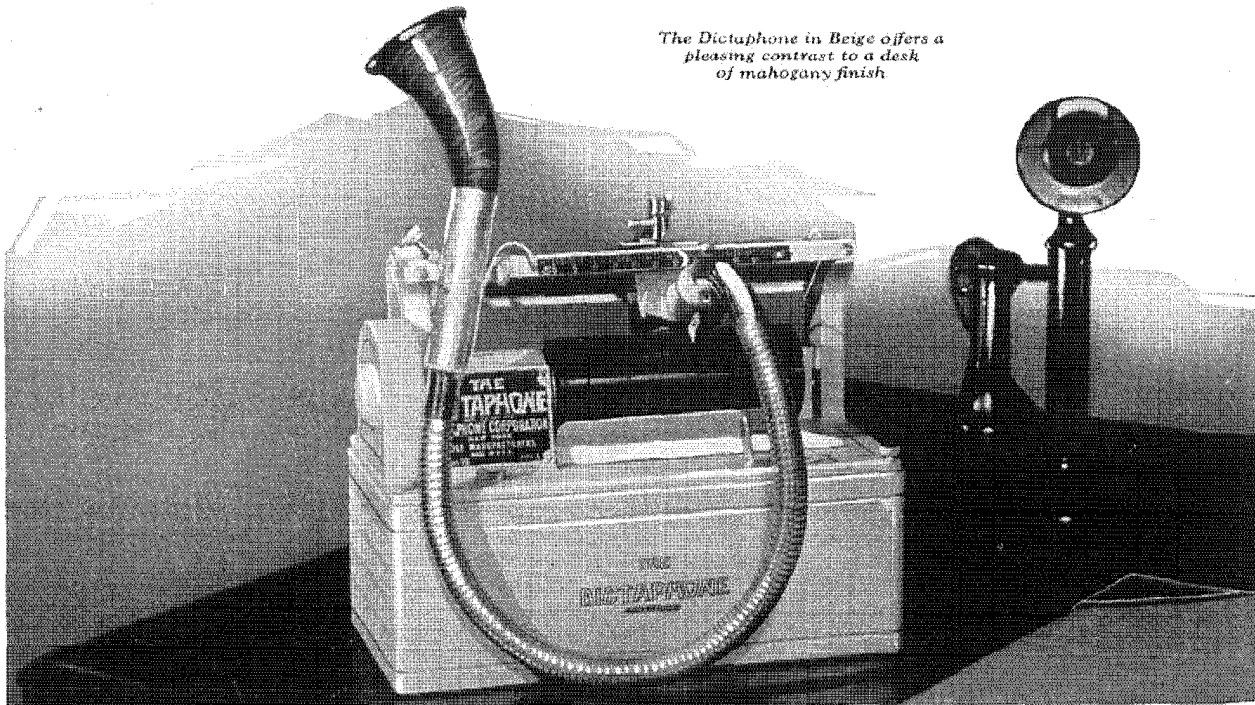
These finishes are not special order propositions. They are in stock both in the field and at the factory and are already showing the effectiveness of this newsales appeal.

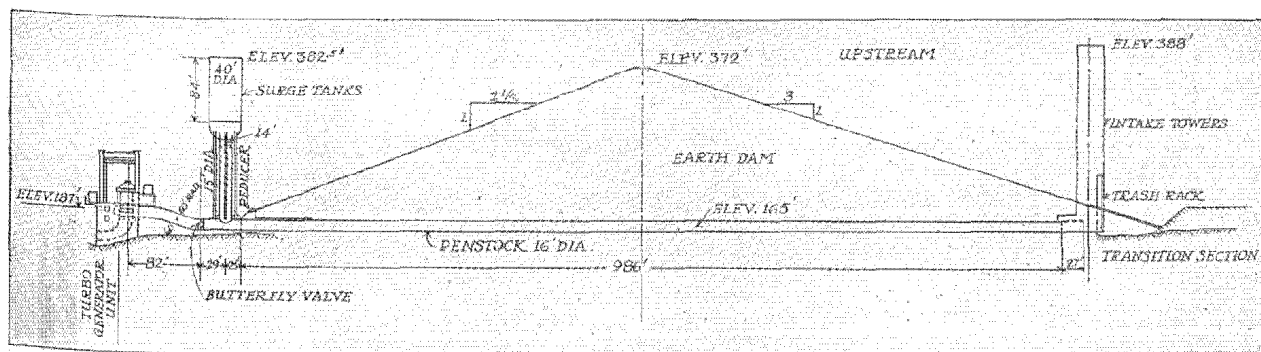
The executives who take particular pride in the appearance of their private offices and those organizations such as banks, insurance companies, public utilities and investment houses, which maintain their offices as show places for the public, are prospects from which growing interest is being shown. Business men who maintain a Dictaphone at home also find color an appealing factor.

This line is being advertised in color, and the sales force is being equipped with illustrative books containing large pictures of the Dictaphone in the five colors in which it is offered. The text suggests what color will best fit into the general decorative scheme.

Thus, in adopting Duco, the Dictaphone Corporation recognized the necessity of using a superior finish and the need for care in the scientific selection of shades that blend best for interior decorative and utilitarian purposes.

The Dictaphone in Beige offers a pleasing contrast to a desk of mahogany finish





Details of the plan of construction followed in the Saluda River Dam work

SOUTH CAROLINA'S BIG DAM

*A gigantic barrier is now being built on the Saluda River to back up
750 billion gallons of water for hydroelectric power*

THE largest earth dam in the world is now under construction on the Saluda River, about twelve miles from Columbia, the capital of South Carolina. Eleven million cubic yards of earth will be poured into the dam to back up the water. And the lake thus formed will be a great inland sea covering seventy-six square miles—a surface larger than the area of New York City. A power station to be erected on the site will have an initial installation of 200,000 horse power, with an ultimate capacity of at least 300,000 horse power. The annual output of the hydroelectric giant will be about 360,000,000 kilowatt hours.

This mammoth development is being built by W. S. Barstow & Company, Inc., of New York, for the Lexington Water Power Company, a subsidiary of the General Gas and Electric Corporation. The Arundel Corporation of Baltimore, Maryland, has the construction of the dam from the Barstow interests.

Work was started in September of last year and is scheduled for completion in September, 1930. The project has been divided into four main sections. Building three miles of railroad from the main line of the Columbia, Newberry & Laurens Railroad to the site of the dam—a two months' job—was the first task. Next came the

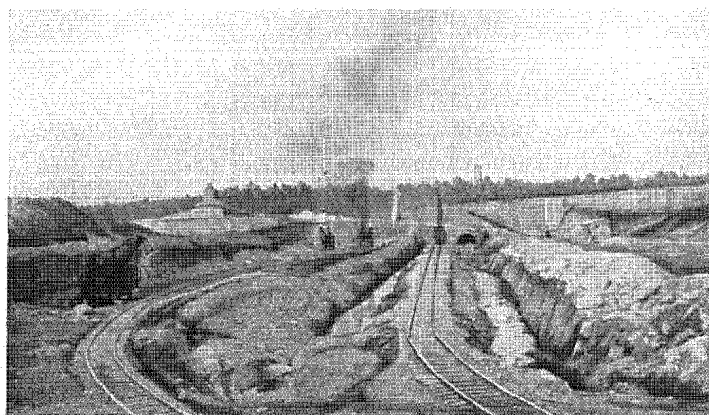
By F. J. MESSICK

excavation for the penstocks, which required five months' time. Pouring 75,000 yards of concrete into the penstocks and the arch conduit will take three months, and the earth fill work will require two years.

A greater portion of the work so far has been the placing of four large steel pipes—sixteen feet in diameter—which will divert the river during the period of construction and will later act as penstocks for the power station to be built in connection with the development. Each of these pipes is almost 1,000 feet long. Work is also being carried forward on an arch conduit which will be large enough so that two additional water wheel units at least equal to those now being installed can be connected to it later. It is in these penstocks and the arch conduit that the 75,000 yards of concrete must be poured. For this part of the work a great amount of equipment, including three narrow gauge gasoline locomotives, nine one-yard cars, mixers, trestle, chutes, towers and moving forms, has been provided.

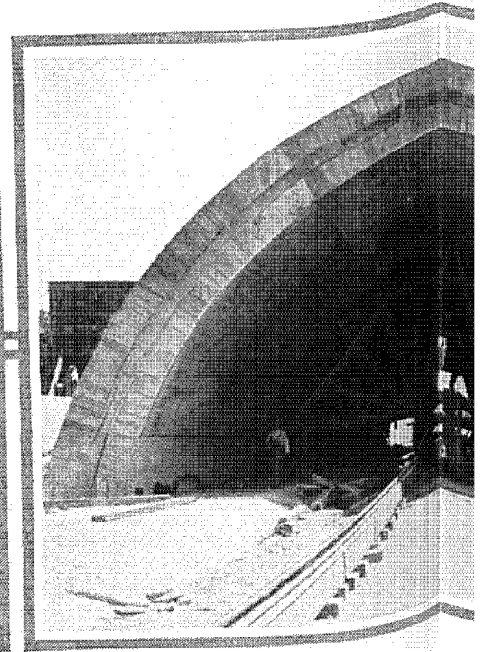
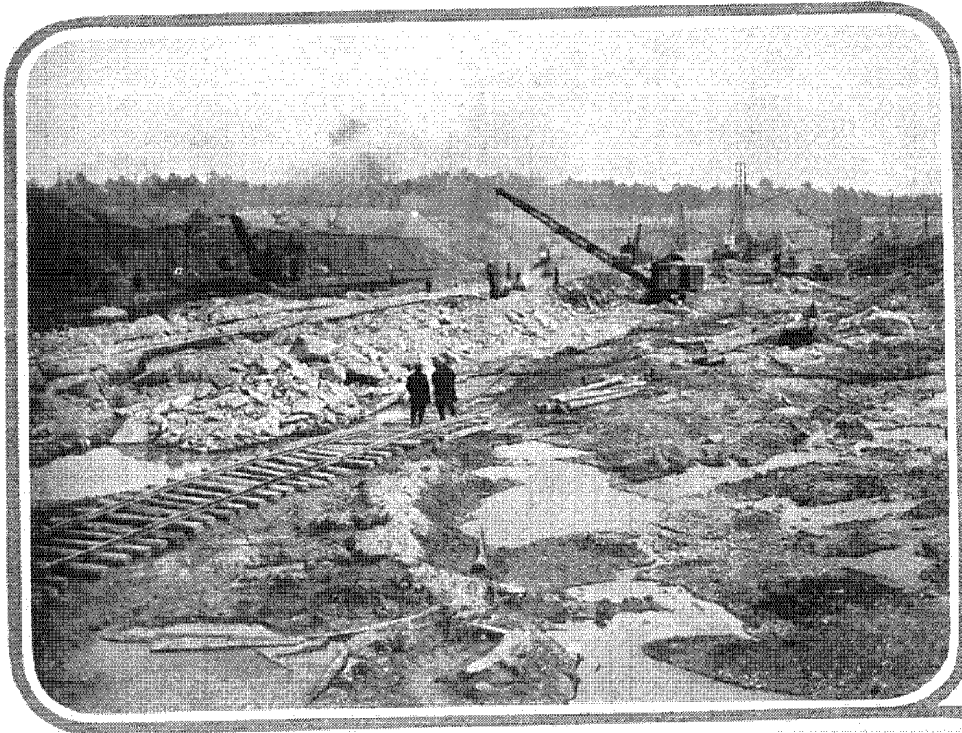
In the excavation for the penstocks, 33,000 yards of rock had to be removed. Here, particularly, explosives proved to be invaluable.

Construction was recently started on five intake towers,



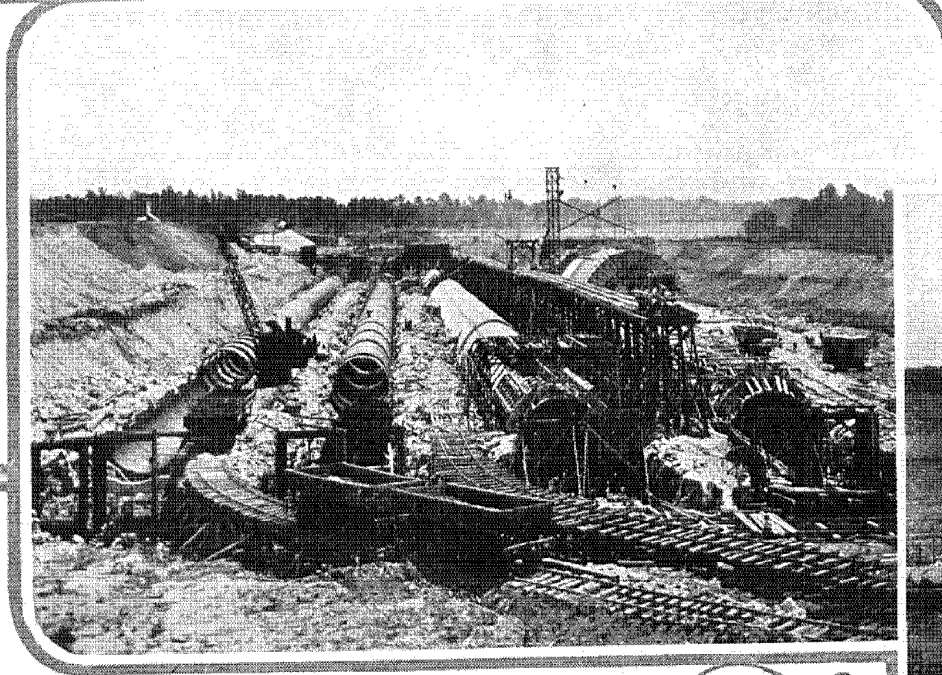
During the early stages of the excavation for the penstocks. Here explosives aided in the removal of 33,000 cubic yards of rock

WHERE THE LARGEST EARTH DAM IN T

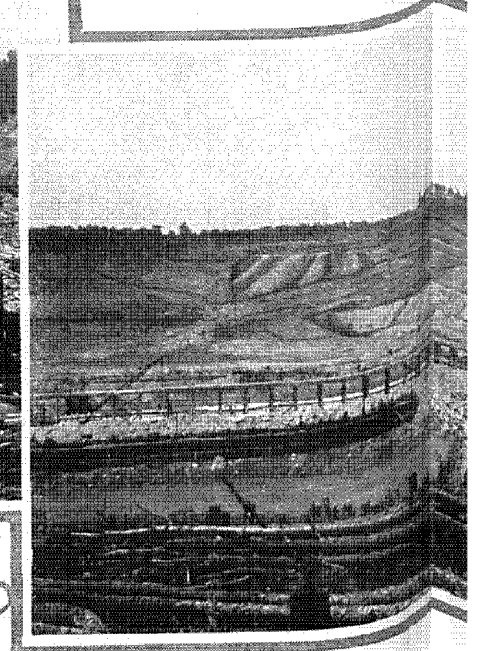


Left above—Excavating for the penstocks, the second division of the construction work

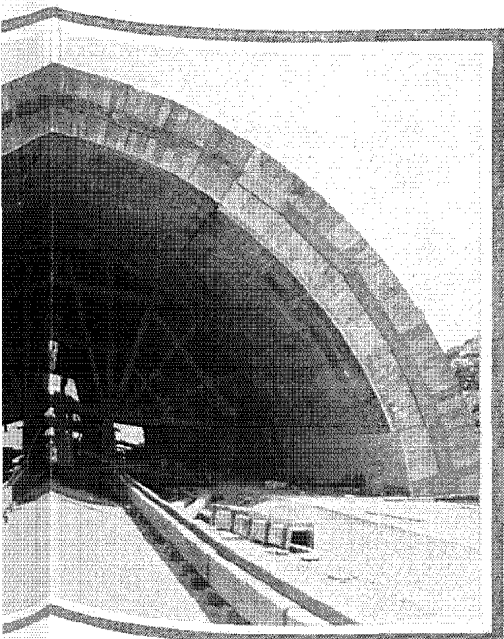
Above—The 48-foot arch conduit will be used to divert the river during the building of the dam



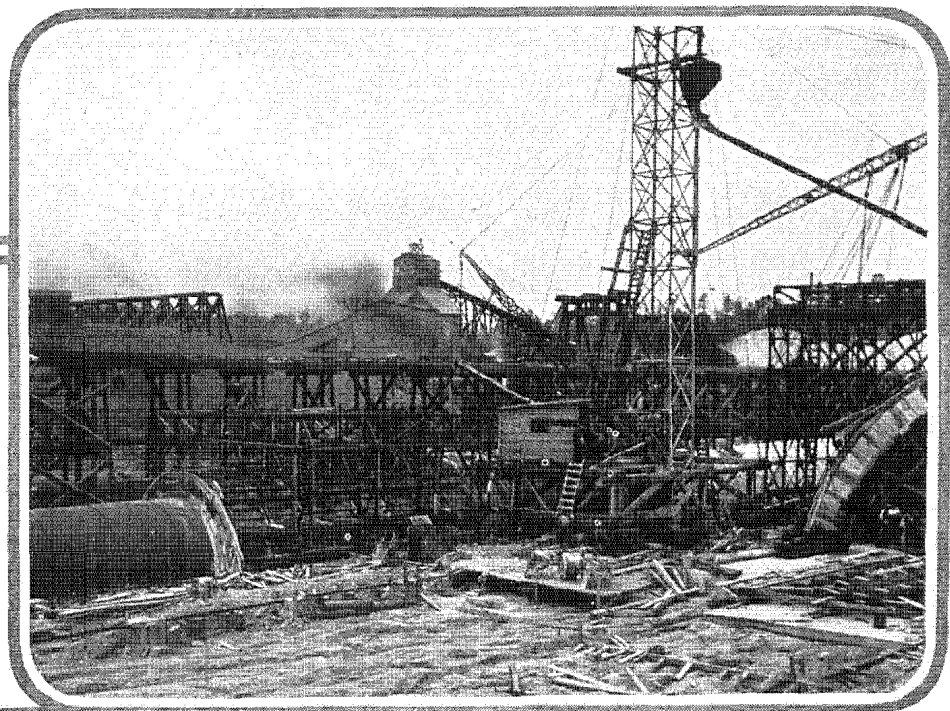
After the four penstocks were placed. Note in the right background the location of the arch conduit



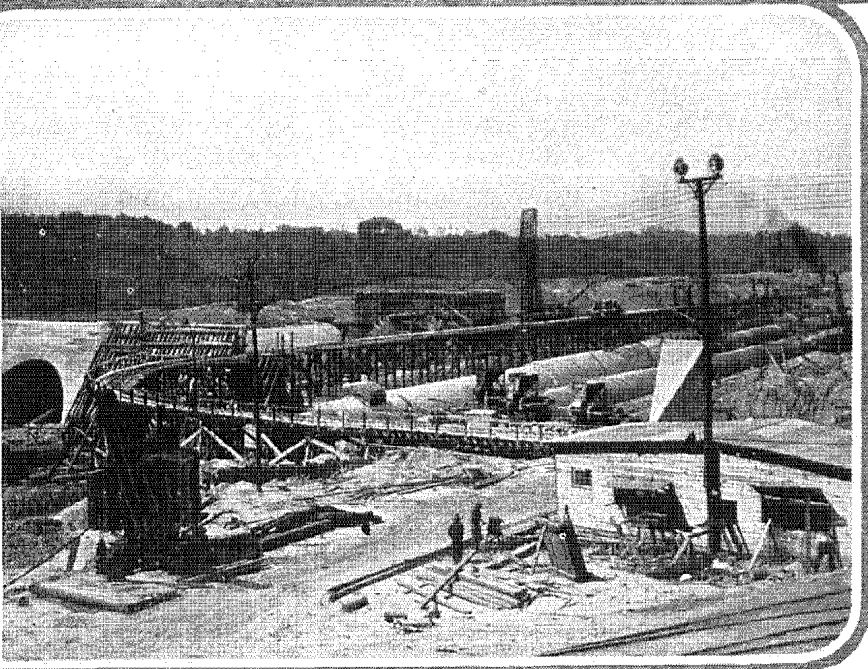
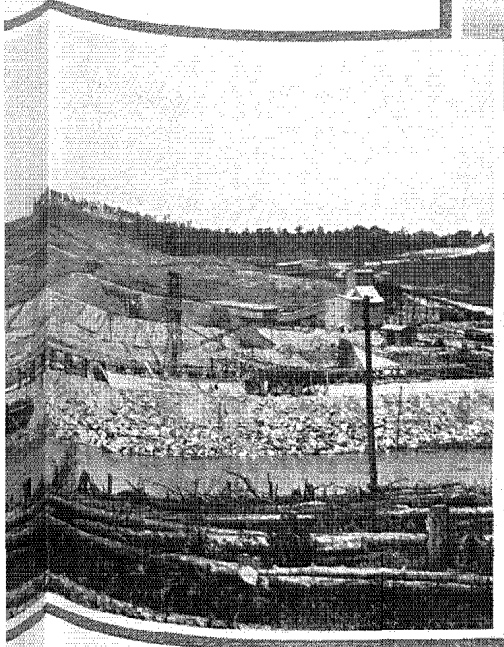
IN THE WORLD IS UNDER CONSTRUCTION



Right above — Concrete towers and trestle prepared for the pouring of 75,000 yards of concrete



Below — A panoramic view of the site of the Saluda Dam, from a photograph taken last May



Equipment in readiness for the concrete work—trestle, tower, moving forms, locomotive and cars

each to be about 230 feet in height. Four of them will be approximately 30 feet in diameter, and each will be connected to one of the steel pipes and will be covered with concrete. The fifth tower, which will be 40 feet in diameter, will be connected to a concrete diversion conduit having an inside diameter of 48 feet.

Steam shovels and locomotives are now busily engaged in excavating and transporting dirt from a borrow pit to the fill for the upstream third and downstream third of the dam. Much clearing in the area is also being done.

When completed, the Saluda Dam will be 208 feet high, about a mile and a half long, and the maximum width at the base will be nearly one-quarter of a mile. The improved highway across it will be about 28 feet wide. The dam itself covers a 92-acre area.

It will be of the semi-hydraulic fill type, in which the middle third will be formed by washing in fine earth to form the core, which will be more impervious to water than concrete. As an indication of the immensity of the job, twenty-five miles of trestle must be constructed for the work on the 11,000,000 cubic yards of earth fill. About half of this amount will be puddled from the trestle with four 100-horse power electrically-driven pumps, which will be carried up with the fill on large barges in the pool formed by the puddling operation.

Aside from the earth fill, the dam will require 10,000

cubic yards of rock for the downstream toe and 75,000 yards for riprap on the upstream face. When finished, it will become part of the surrounding hills, forming the safest kind of dam known to engineering for the conditions existing at the site.

The tremendous storage capacity created by the artificial lake is the outstanding feature of the Saluda River development. The size of the lake has already been compared with the area of New York City. Its top surface will be twice as large as Lake George in New York State; in fact, it will be the largest lake, natural or artificial, south of the Mason and Dixon Line and east of the Mississippi River, with the exception of Lake Okechobee in Florida. Its shore line will extend 450 miles. It will be more than 40 miles long and 14 miles wide at its widest point. In a year of average stream flow, the lake will be filled in six months with 750 billion gallons of water.

The power station at the dam will be 80 feet wide, 250 feet long and 100 feet high. Four surge tanks, 217 feet high and 40 feet in diameter, are to be constructed just above the plant.

Representing the Arundel Corporation on this job are the following: H. O. Firror, general superintendent; Martin Firror, assistant superintendent; A. C. Bruce, resident engineer, and George F. Bacot, superintendent of the concrete construction.

THE TALE OF A SHIRT

"HERE I am, a veteran of one hundred and one trips to the laundry, somewhat the worse for wear, but still sweet and smiling.

"I am a shirt. My owner is a traveling man who bought me in a haberdashery many months ago. A sales clerk recommended me to him . . . said I was of cotton and rayon and was an exceptional value for the money.

"Since then my life has been spent on the road and in laundries where folks rubbed soap in my eyes, boiled me, put me through the washers, squeezed me through hot rollers and many other devices that are necessary, if not nice. But I've stood the gaff!

"A few weeks ago, after being laundered for the 100th time, my owner took me over to the Du Pont Rayon Company offices in New York City where I was subjected to a thorough examination under a magnifying glass. One man looked at the edge of my cuff a minute, then said: 'Let me have this shirt photographed.'

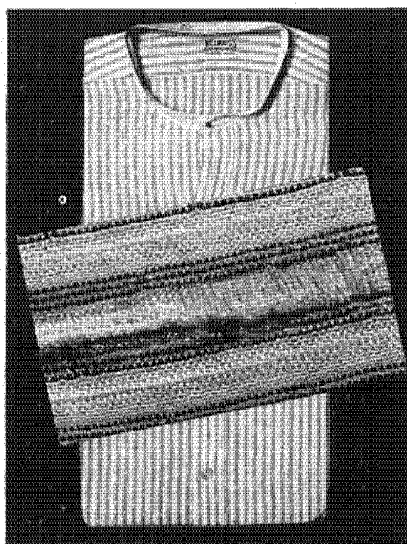
"Shortly afterwards I was sent to

the laundry for the 101st time, and when I got back I had my picture taken twice. I like the general view; the others prefer the close-up, magnified view of the edge of my cuff, for it shows that the cotton warp has broken, while the rayon is still good. That's where I got most of my hard knocks both in service and in the laundry. Every shirt does.

"I don't like to leave my master, but I've got to. He is going to buy another rayon-cotton shirt to take my place. Incidentally, I've heard him praising rayon-mixed shirts to any number of his friends — and I know that thousands of my cousins, made of du Pont yarns, are having a grand time fooling Old Man Wear-and-Tear. They've got to be good to do that!

"You ask whether I've made any plans for the future? I haven't. But some have been made for me.

"From now on I'm to be just an exhibit, which isn't much fun, but life is like that. I suppose it will do me good to have a rest. Everyone says I've earned it."



The shirt with section of cuff magnified



One of the attractive Rug Anchor displays featured recently by the D. N. and E. Walter Company of California

IS YOUR HOME REALLY SAFE?

*Not if the rugs slip and slide on the floor. You can keep them
in place easily by using du Pont Rug Anchor*

"SAFE at home"—how often we use that phrase—but are we? The statistics of insurance companies show that millions of dollars have been paid out for accidents that happen in the home, and listed well up among the various causes are falls from tripping or slipping on rugs. One insurance company alone has reported paying claims of over \$300,000 on account of such accidents.

The combination of a slipping rug and a hardwood floor has always been recognized as a danger in the home, but until the introduction of du Pont Rug Anchor, as Mark Twain once remarked about the weather, "nothing had ever been done about it."

The use of du Pont Rug Anchor has, however, made it possible to eliminate this danger, for a rug laid over this material will not budge; it cannot slip, slide or creep, no matter how small the rug or how slippery the floor. At the same time, neither the floor nor the rug is harmed or

By F. W. HOTCHKISS

marred in any way. Du Pont Rug Anchor is a specially prepared fabric

which is laid, coated side down, under the rug. It is out of sight, the rug lies flat, and once in place, it stays there.

Dealers in floor coverings have long recognized the service du Pont Rug Anchor renders in the home. The D. N. and E. Walter Company of California has brought this service to the attention of its customers in a novel and attention-getting way, as shown by the above illustration. This display is being shown in the San Francisco, Los Angeles, Portland and Seattle branches of the company.

Two rugs were laid side by side on a hardwood floor, one unprotected and the other protected with du Pont Rug Anchor. The comparative safety of the two was pointed out by display cards.

The better dealers in floor coverings throughout the country sell du Pont Rug Anchor and will be glad to demonstrate this specially prepared fabric.

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AUGUST, 1928

No. 8

"...DOWN TO THE SEA IN SHIPS"

THE whaling fleet clears for the Arctic seas! And the women of the village, with eyes brimming with tears and hearts heavy with dread, watch their loved ones sail out through the channel to battle with winds and waves and endure the hardships of their calling.

One by one the ships grow dim, become mere specks on the horizon, and then disappear from sight. The crews may be gone six months, perhaps two years, possibly forever. No wonder the folks left at home view the scene with misgivings mingled with hopes and prayers that a kind Providence will guide these seafaring men and soon bring them back safely with a rich cargo of oil.

No longer does the flower of New England youth go down to the sea in ships to keep the lamps at home burning with the oil of whales. Times have changed. Science, invention and industry have moved ahead. New methods, new discoveries have created new professions to replace the old, and new products have come to make the world a better place in which to live.

In this number, for instance, you will read of high explosives aiding in the construction of a gigantic dam which will help to supply cities and villages with hydro-electric power and light; of swamp land reclaimed for agricultural use; of icebergs blasted to free shipping from a great peril.

You will read of Duco-finished cedar chests for moth-proof storage; of Rug Anchor making floor coverings safe to walk on; of du Pont rubber fabrics made into bathtubs for babies. You will learn how adjustable optical frames and stylish sport hats, with sun visors, have been improved by manufacturers using Pyralin; how the new moisture-proof Cellophane serves as a protective wrapper for cigars; how shirts made of cotton and rayon withstand wear and the laundry, and how Fabrikoid serves both to bind the published works of famous authors and to cover the handles of garden tools. All of these improved products have come into general use since the days when whaling ships put out to sea.

The cover illustration this month is from a painting by Harvey Dunn. It suggests a phase of old-time industry for comparison with conditions as we know them today.

DYNAMITE BUILDS THE MODERN WORLD

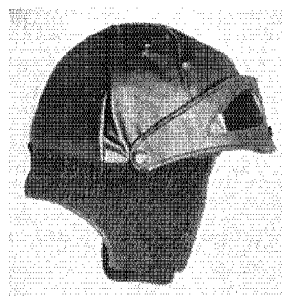
(Continued from page 7)

flow into the city reservoirs. The first half of the project, which has already been started, includes the sinking of eight shafts and the construction of about thirteen miles of horseshoe-shaped tunneling about twelve feet wide. The explosives engineer of today attacks such tunneling with confidence, for he is equipped to solve the many problems which are peculiar to each job. In this Boston work six of the shafts were planned for the purpose of providing headings for driving the tunnel. It will not be sufficient that dynamite merely break up the rock under ground in order to prepare a path for the great waterway. The explosives engineer directs that on this job the holes shall be drilled in the rock and shot in such a way that the blasting will not crack the stone in such small pieces that they must be shoveled, for shoveling can not be economically done on this project.

Surely dynamite is a wizard with a magic power to break down great cliffs at one blast, to shatter rock masses into small pieces, or to cut up huge stones into blocks of desired size. The explosives engineer realizes that to use this magic to the best advantage he must not only have scientific knowledge and experience but he must have vision and sound judgment. It is by his command that explosives are building the modern world.

THE LATEST AERO CAP

SOME months ago we published a short article describing the Reliable Aero Cap, the product of a Milwaukee manufacturer. At that time we mentioned that the outer surface of the cap was made of light-weight, waterproof and durable Fabrikoid, and that the lining was a warm knitted material — an ideal combination for the purpose.



And now to this cap has been added a new feature — goggles. Motorcyclists and others requiring eye protection wanted them. As the accompanying illustration shows, the goggles can be raised out of the way and secured by a snap-fastener, just

as the earflaps can be buttoned on the crown when not in use. Either or both can be brought into position for use in a jiffy, when needed.

The windows of the goggles are made of amber-colored transparent Pyralin, which insures visibility without glare. Because this material is non-shatterable, flexible and practically unbreakable, it meets the requirements perfectly.

The Aero Cap is patented and made by the Reliable Knitting Works, 21st and Lloyd Sts., Milwaukee, Wis.

LET BABY BATHE SAFELY

In the "Motherdear" bath. Two du Pont products—rubber fabric and Duco—feature in the construction and finish of this tub

NOT so long ago the cradle was the recognized symbol of babyhood, but new ideas and theories regarding the correct care of babies created a demand for new furnishings for the nursery, and so the cradle has passed on into the category of antiques. If a selection were made from the numerous up-to-date articles recently created for baby's welfare and comfort, none would fit so well into the niche left vacant by the cradle as the infant's bathtub.

The daily bath is an important part of the program of the modern baby and must be given with due care for his safety. Every precaution must be taken to prevent the possibility of water entering the child's ears, nose or mouth. When using an ordinary tub the mother is practically limited to the use of one hand for bathing, since it is necessary to use the other to support the baby and prevent him from slipping; and if baby happens to be at all temperamental, that is often a rather complicated job. And so inventive genius has directed its attention towards creating a safety bath for babies that eliminates the deficiencies of the old-fashioned tub and provides the mother with an arrangement that is thoroughly practical, efficient and safe.

This new tub is known as the "Motherdear" Safety Baby Bath. Its principal feature is a safety hammock made of special soft canvas that will not chafe the tenderest skin. It is suspended in the water and can be adjusted at just the right angle so that the baby's body is immersed but his head remains well above the water-line. Because the child reclines in a semi-sitting position and is held in place by a safety guard, there is no danger of his slipping down into the water, and both arms of the mother are free for bathing. This hammock attachment is easily removed and cleaned, so that it is absolutely sanitary.

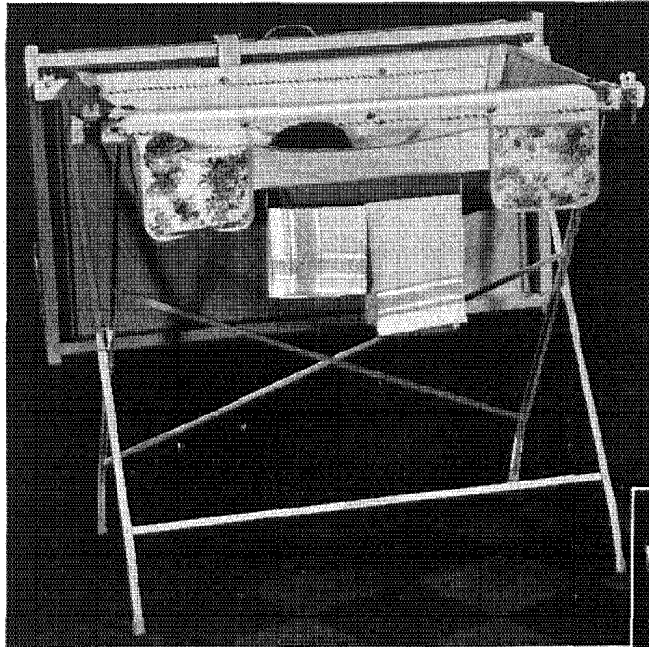
Combined with the "Motherdear" bath is a dressing

table suspended at the rear. It can be easily pulled over the tub and locked in position with one hand when needed. This provides an excellent table where baby can be dried, powdered and dressed. Numerous pockets for powder, pins and the like are provided that take care of the various bath accessories.

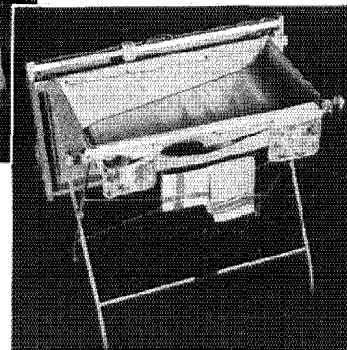
Important, too, is the fact that the "Motherdear" bath when not in use can be easily folded like a card table and stored away in a small space.

In the construction of this modern bath only the finest materials are used. The frame is of half-inch angle steel, finished in ivory; baby blue, baby pink or apple green shades of du Pont Duco.

The tub itself is made of a very heavy grade of white du Pont rubber fabric, rubberized on both sides. The dainty pockets for accessories are also made of rubberized cretonne processed by



The Safety Bath with its convenient arrangement of roomy pockets for accessories. At the right it is shown with the adjustable hammock in place



the du Pont Company.

This combined use of Duco and du Pont rubber in the construction of the bath assures the purchaser the utmost in service and an unusually attractive piece of equipment for the nursery.

The tub is built with ample proportions. It is 35½ inches high, 34 inches long and 18½ inches wide. The depth is 10½ inches.

The "Motherdear" Safety Bath is handled by leading department stores, baby shops and furniture stores throughout the country. It is manufactured by Acme Safety Products, Inc., at 300 Water Street, New York City.



The bindings of the "Greatest Authors" set are colorful in shades of red, blue, green, brown and purple

FAMOUS FICTION IN FABRIKOID

The works of ten of the world's best writers are now included in a set of "Greatest Authors," beautifully bound in colors

LIBRARIANS tell us that never before have they had so many calls for really good books. While books on science are getting more attention from the layman reader, and poetry reading is increasing, the really spectacular jump in reader interest has taken place among the better fiction—such as Shakespeare, Victor Hugo, de Maupassant and Dumas, to mention a few.

Was there not a time, and not so long ago, either, when these authors were considered stuffy, highbrow or "good stuff but dull?" Something has happened to the reading taste of the great public. People are beginning to discover that Shakespeare can be as romantic and entertaining as their favorite author in a current monthly magazine; that Poe can outdistance any modern in the writing of a tale of horrors; that a short story by Kipling is just as interesting as those in our contemporary journals, and that a Dumas novel gives one more than an average thrill even in this age of surprises.

It is to serve this growing popularity for the best writers that P. F. Collier & Son Company has published a ten-volume set comprising the works of ten famous authors—two volumes of complete works and eight of tasteful selections.

A volume is devoted to each of the following: Balzac's novelettes, de Maupassant's short stories, Dumas' short stories, selections from Victor Hugo, Conan Doyle, Kipling, R. L. Stevenson, Oscar Wilde, and the complete works of Edgar Allen Poe and Shakespeare.

It will be noticed at once that every author selected can tell a good story. That seems to have been the test of selection—"can he tell a story well?" After all, what more

By MOUNCEY FERGUSON

do you ask of a fictionist? You read him to be taken out of yourself and away from your environment. Who hasn't forgotten sleep following D'Artagnan? Who hasn't felt the streak of horror in life after reading Poe? Or smiled with Balzac at some comedy of manners?

These ten volumes are a fine collection of excellent fiction which promises hours of enjoyment to those not acquainted with all of the authors represented, and a happy reunion to those who are.

They do not occupy much space in a library; in fact, that is one of the motives in publishing this set. These ten books represent the skillful condensation of ninety-six volumes, which was accomplished mainly by judiciously selecting the cream of each author, and printing on very thin paper. Each book is crown octavo, with a $5\frac{1}{4}$ by $7\frac{3}{8}$ -inch page.

The effort to make the volumes compact has not interfered with the beauty of appearance so necessary in a library edition. Each book is bound in du Pont Fabrikoid, with the title and a distinctive design handsomely gold stamped on the backbone. Two notable features are worthy of mention: The author's signature is reproduced in facsimile, gold stamped, on the front cover of the volume containing his work; and each book is bound in a different color of Fabrikoid. This breaking away from uniformity of color in a set is quite a novel idea, offered partly as a concession to the vogue for color and partly because the different colors add greatly to the general appearance of the set.

Anyone interested in these "Greatest Authors" should write P. F. Collier & Son Company, 250 Park Avenue, New York City, for further information.

"...BUT A GOOD CIGAR IS A SMOKE"

And those wrapped in the new moisture-proof Cellophane retain their freshness and aroma for a long time

By BUCKLEY C. ROBBINS

IN Rudyard Kipling's oft-quoted line there can be read a double meaning. He is romantic when he says, "A woman is only a woman, but a good cigar is a smoke," but practical in the sense that only a good cigar is a real smoke.

Tobacco—an American plant—was found by the same man who discovered America. It is called "the kindest admixture of chemicals that Nature has ever made," and plays a part in the life of most of us. It is so gently stimulative and so mildly soothing that it acts in either capacity, according to the requirements of the moment. It is a comfort, a solace, and a need in times of rest, pleasure, or pain; and at all times it is strictly American, born and bred.

The cigar in its rich brown solidity is one of the most pleasant forms in which tobacco is prepared. A good cigar is a bond between men, a relaxation, a pleasurable "weed" that fills up conversational voids with puffs of blue-gray in the air, pleasant to watch as they curl upwards.

The cigar is good to look at, too. It may be fat or slender, but always pleasing to the eye as it beckons invitingly to the passing smoker, appealing to his tastes for shape, color and workmanship. Cigars are interesting. Each has three parts—wrapper, binder and filler; or the coat, the union suit and the man or himself. And a very delicate sort of a man, too, one who must be protected at all times and very carefully.

Cigars and cigarettes are strictly convenience items that all of us buy at the nearest store when we need them. We do not lay in supplies for days and weeks. We pick them up when we "run out."

Therefore, to be sold, cigars must

be displayed. Now they can be, with every assurance that the delicate leaf will not dry out, as has been the case with unwrapped ones in the past. An exposed cigar can become unfit to smoke in a few hours. A good five-cent cigar, with its factory freshness and aroma preserved, is far more enjoyable to a smoker than a dried-out Corona-Corona with part of its wrapper unfurled.

Moisture-proof du Pont Cellophane is the answer. Several companies have proved it a highly successful direct wrapper, and a combination humidor and showcase as well. One manufacturer,

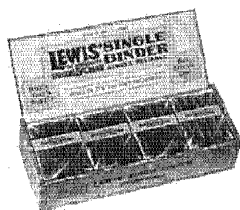
whose cigars are shown in an accompanying illustration, calls his "put up" a Humipack.

Laboratory experiments carried on with about a thousand cigars have proved to those who smoked the cigars after extended periods of time that this new moisture-proof Cellophane wrap is superior to all other types of cigar wrappers for preserving aroma and freshness. And this moisture-proof wrap has still other advantages, for it is not only protective but also transparent, making cigars more readily salable.

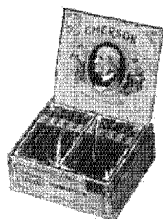
The past six months have shown such a satisfactory spread and growth in the use of this marvelous transparent material among cigar manufacturers that a bright future for Cellophane is predicted by authorities in the industry.



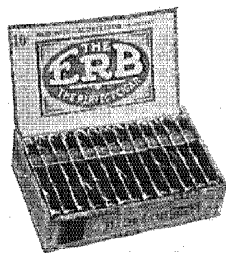
Courtesy of makers of Robt. Burns cigars



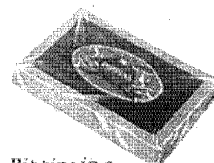
Lewis brand wrapped in packs of five



Emerson packs of five in Cellophane



The Erb brand features the individual-wrap cigar



Pippins in a colored Cellophane holiday wrap



Above—The arrow shows point where ten-inch tile culvert crosses under highway.
Right—Stumps blasted but not removed



MAKING IDLE LAND DO ITS SHARE OF WORK

*How a farmer made crops from a reclaimed swamp
pay his ditching and draining bill*

EACH year hundreds of ditching and draining operations are performed throughout the country, and many of them are alike in respect to methods employed, type of soil encountered, and relative costs of explosives used. Most of them are just ordinary jobs with no unusual features to make them outstanding. They are individual projects quickly dispatched and soon forgotten. Occasionally, however, a piece of work is made interesting because one project one year leads to another the next, so that there is continuity. That affords the opportunity to study the results of previous blasting services year after year. The work on the farm of Edgar Brown near Savannah, New York, was of that type.

On Mr. Brown's farm there was a three-acre area filled with stumps and second-growth timber. His problem was first of all to make this valueless land yield some sort of crop revenue.

Mr. Brown had heard and read of ditching and draining with dynamite; how land of the type he intended to drain was reclaimed and made to yield valuable crops. He wanted his land working for him and that involved the question of getting rid of the water in the muck area. But how and where?

Now the Brown farm is divided by a public highway running north and south. The property line, to the south, prevented the owner from seeking a drainage outlet in that direction. A highway ran between the creek on the

By F. T. RANSOM

east and the swamp. This further complicated the situation. Finally, it was decided to tunnel under the highway and lay a ten-inch tile culvert three hundred and fifty feet long through which the drained water could pass. This comprised the first operation. The cost of the tile, fifty pounds of 40 per cent Red Cross Extra dynamite, caps, fuse, labor and materials amounted to \$400.

Two men labored eight weeks in the swamp, clearing away the timber which was subsequently cut into stove-wood size. Their work netted two hundred and fifty cords which were sold for \$500. This was the first cash return Mr. Brown received, but it went a long way toward paying for the cost of constructing the culvert, which was the major project at that time.

It took one hundred pounds of 40 per cent Red Cross Extra dynamite to blast out the larger stumps which could not be pulled by hand or with the aid of a tractor. The cost of explosives, caps, and fuse for this clearing job amounted to \$31. Five days after this blasting operation, the remaining debris was all cleared off and burned.

With the culvert built, the swamp cleared of stumps and second-growth timber, everything was ready to begin blasting the east-west ditch, which was designed to drain the land west of the highway and carry off the water through the culvert to the creek. This ditch is indicated on the accompanying chart by a broken line.

One of the illustrations, showing the first ditch after

the blast, will give some idea of the condition of the terrain from the highway to the muck swamp. One hundred and fifty pounds of du Pont 50 per cent straight dynamite sufficed for this work.

The next step was to plow the land and get it into proper condition. As the ground had never been broken before, it was a difficult and time-consuming task, requiring a full week of labor to get it in condition for cultivation.

CROPS PLANTED

Celery, onions, potatoes and lettuce were planted on the reclaimed acreage. The first two mentioned crops took up one-half the acreage and produced about \$700 in two years. Onions and potatoes thrive especially well in this soil. To date this same area has returned more than \$400 a year since the initial planting. Thus, in two years Mr. Brown has been paid back in crop values almost enough to cover the amount he expended on development work.

The returns were so gratifying that the owner next decided to expand the drainage system to include the land to the west and north of the old swamp.

Several hundred feet beyond and to the west of the drained portion were three acres more of wet land. This ground, however, was in better condition for drainage than the swamp previously mentioned. A ditch six to eight feet deep was blasted from the drained portion, through a ridge of ground to the wet area. This was the second ditching operation and is shown in the accompanying sketch by a dotted line. In this reclaimed section, Mr.

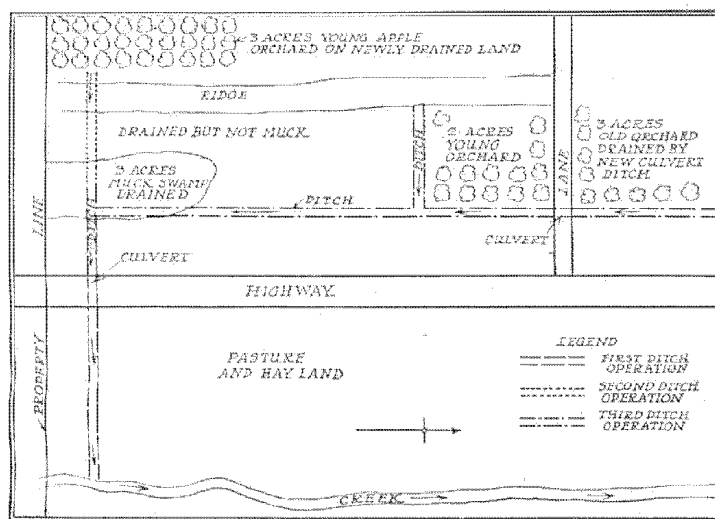
Brown set out a young apple orchard which will probably yield a sufficient revenue to pay for the drainage work as soon as the trees reach the bearing stage.

Some distance to the north a lane joined the highway and here the owner had three acres of old orchard trees. The land had some water on it, and as the acreage between the lane and the former swamp was not producing crops of any kind, it was decided to construct a third ditch parallel to the highway and at some distance from it. This ditch tunneled the lane and joined the first blasted ditch leading to the old swamp.

On the south side of the lane, two additional acres of young orchard trees were planted. To insure adequate drainage for this section, a short lateral ditch was blasted up to the ridge, thus completing the drainage system on this farm. The third ditch is shown in the accompanying sketch by a broken and dotted line.

Much good land lies fallow on many American farms year after year. Not only is it non-productive, but it is also a drag on the owners who pay taxes on it. By making use of explosives for ditching work Mr. Brown has made the low-lying acres on his farm productive and valuable. And his experience is like that of thousands of other farm owners who have also used dynamite to carry through some one project and then, satisfied with results, have

continued to use explosives from year to year for additional work to make their idle acres yield crops that will sooner or later pay for the initial development work and at the same time permanently increase the value of their farms.



Below—Looking north along the ditch which was blasted to drain the old orchard area

Right—A sketch to show the location of the three drainage operations in sequence

Below—A section of the reclaimed area on the Brown farm, from a photograph made four years after drainage operations were undertaken. The land now yields a good revenue





Above—The arrow shows point where ten-inch tile culvert crosses under highway.
Right—Stumps blasted but not removed



MAKING IDLE LAND DO ITS SHARE OF WORK

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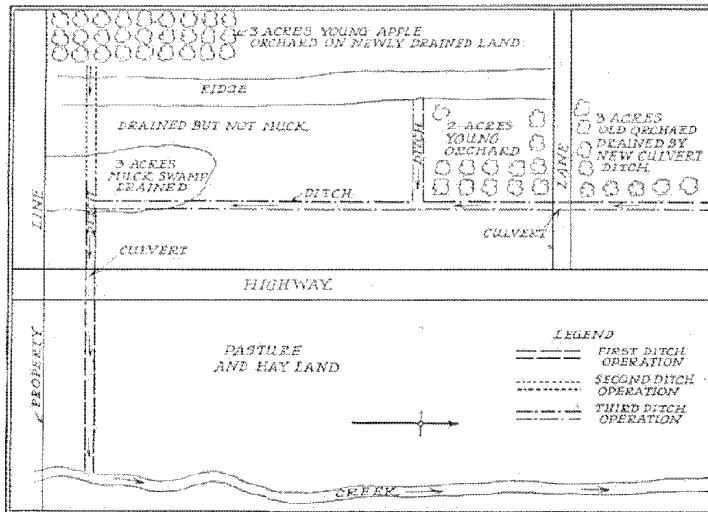
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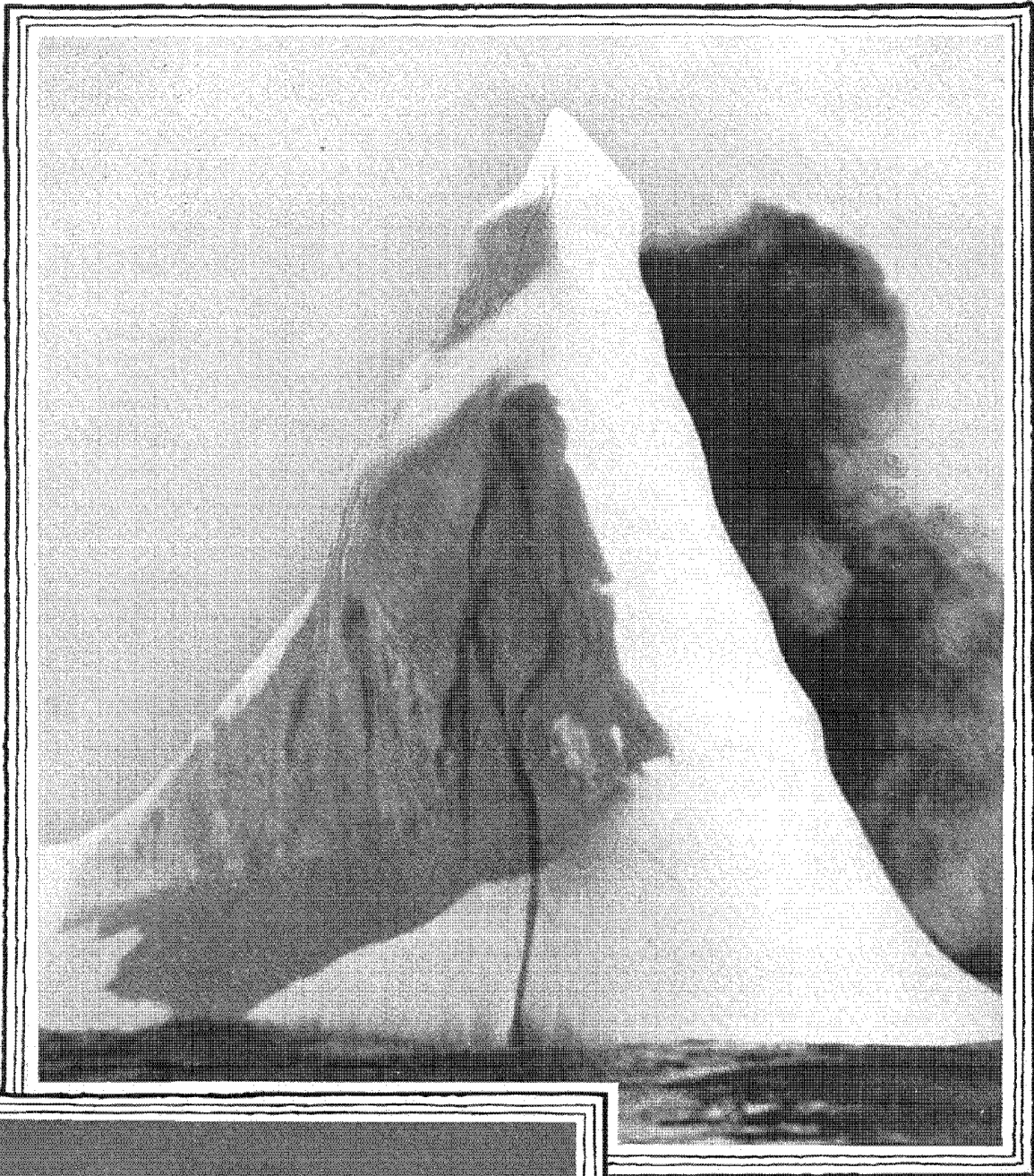


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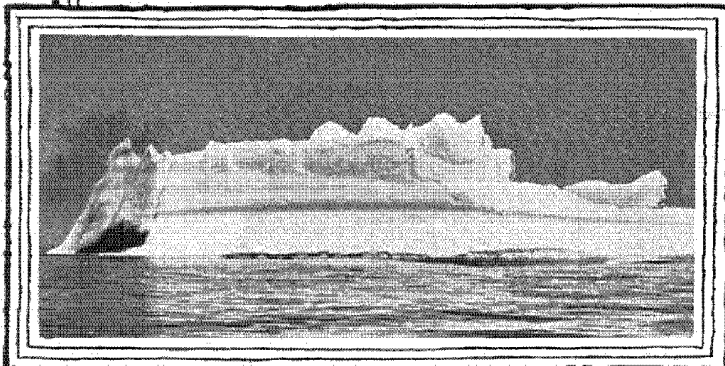
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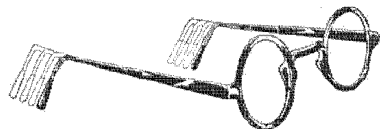
Underwood & Underwood



When icebergs menace navigation in the North Atlantic, patrol boats of the U. S. Coast Guard serve as traffic cops, warning ships by radio and following the bergs until they melt in the warm Gulf Stream waters. Occasionally, the patrol crews use high explosives to hasten the destruction of their wards. The smoke from a blast may be seen at the right of the iceberg shown above, and at the left in the lower picture another blast has just been set off

AN IMPROVED OPTICAL FRAME

ONE of the outstanding developments in the optical field this year is the new self-adjusting frame made by the Zylow Corporation of Long Island City, New York. It automatically adjusts itself to the face by means of an ingeniously concealed spring in the temple and cannot slip down on the nose.



The "Selfit" frame, showing how it may be adjusted

The optical trade and the public will welcome this improved frame which saves time and trouble for both the retailer and his client in making a selection. The customer gets a comfortable and becoming frame, because it is practically a custom-made product, easily regulated to fit any facial contour. The adjustable temple makes it unnecessary for the merchant to carry the usual large variety of sizes required for different types of faces. It enables him to reduce his stock and still serve just as many customers as before on a smaller investment. While the stock reduction is not large, it nevertheless has its bearing on overhead expense, especially in high-rental districts.

Besides keeping abreast with business conditions the optical merchant today must follow closely the fashions of the hour. Style affects his merchandise just as it influences other products. A change of vogue from a large, loose-fitting hat to a small, tight one will swing the

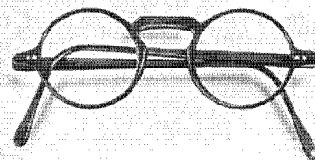
By W. D. MAGINNES

demand from one type of frame to another. Sometimes the style demands

a large, thick-rimmed imitation shell frame and then the public wants the thinnest type that can possibly be made. The bobbed hair vogue changed the style of frames to such a marked degree that an entirely new type of temple had to be originated.

The "Selfit" frame, designed and constructed to meet the retailer's needs and for greater comfort to the wearer, was also styled to give a smart, new and distinctive beauty to eye-glasses. Since it is made of du Pont Pyralin the lenses rarely break or crack if dropped to the floor, as usually happens when metal rim or rimless glasses are used. Pyralin is flexible enough to absorb such shocks. The constant necessity of replacing costly lenses is eliminated—an economical feature not to be overlooked.

Pyralin frames are so sturdy that they are not bent or dislodged from position by work or recreational activities. They can be safely carried in the pocket or purse without fear of breakage, and they are comfortable to wear. Additional information about this new frame will gladly be furnished by the Du Pont Viscoloid Company, 330 Fifth Avenue, New York City.



It is made of Pyralin and is flexible yet strong

A NEW SPORT HAT

PRESENT-DAY stylish sun hats are decidedly an improvement over those of earlier years—those broad-brim models that flopped about in the wind and were so uncomfortable that farmers and others who spent a great deal of time out-of-doors disliked to wear them. Instead, they either wore felt hats or none at all. It was not until the importation of pandan palm that a really satisfactory sun hat was made.

One of the newest outdoor sport hats of this type is the Evr-Kool Ex-Ray, which is advertised as the "only hat of its kind in the world." It is woven from fine imported pandan palm in the panama shape, and, as the accompanying illustration shows, a feature of its construction is a section of green transparent Pyralin in the front of the brim, which protects the eyes from sun glare and blinding headlights of motor cars, without obstructing vision.

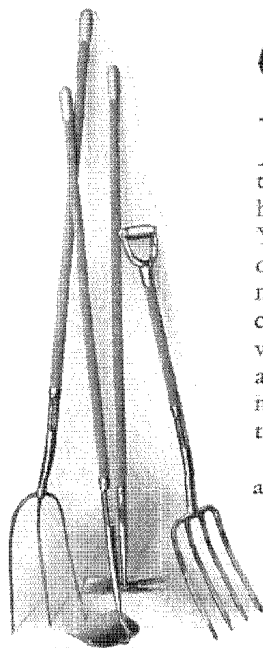
The Superior Hat Company, of St. Louis, Missouri, has

had long experience in manufacturing sun and sport hats, which accounts for the improvements found in the new Ex-Ray style. For one thing, the company has developed an exclusive shape-retaining device which overcomes the tendency of the hat to flop about the eyes. The brim holds

its shape to suit the fancy of the wearer. Other features of this hat are its light weight, its waterproofness, its leather sweat band, and an adjustable sport band that can be regulated to insure a perfect fit with comfort to the wearer. Incidentally, the patent adjustable buckle on the sport band is a detail of special interest to dealers, for stock-keeping is reduced to a minimum. One size of hat can be made to fit practically every head.



For golf, motoring, fishing, the beach and general sport wear, the Evr-Kool Ex-Ray meets all requirements. For further information and a descriptive booklet, write direct to the manufacturer at 2301 Madison Street, St. Louis.



GOOD NEWS FOR THE GARDENER

HEAVERY second-growth white ash is considered the best timber for making handles for hoes, rakes, forks and the like. Yet each year first-quality wood of this kind becomes more and more scarce and it is sold at increasingly higher prices. Poor wood in tool handles causes breakage and dissatisfaction and ultimately its use means trouble for the manufacturer.

It seemed to the Connors Hoe and Tool Company, Inc., that a new and improved tool handle would find a ready market. Men who had been in the business for years, and who knew what a garden tool should be, busied themselves to find a suitable material for handles.

After some experimenting a steel tubing was developed which was strong enough for the purpose and of about the same weight as a wood handle. But it had one

disadvantage—steel is not kind to the human hand. It is hard and unsympathetic, and has a way of heating up quickly on a hot day, while remaining chilled on a cold day. In all kinds of weather it is uncomfortable.

Why not cover the steel with some insulating material which would be as easy on the hands as wood?

More testing and discarding followed, and then it was found that cork-faced Fabrikoid provided a good, smooth, non-blistering grip and the necessary insulation.

The method of applying Fabrikoid to the tubular steel handles is interesting. The material is cut into one-inch strips, then coated with a strong, waterproof adhesive, and wrapped spirally under pressure by a specially designed machine. A steel ferrule, clamped over the end of the cork, prevents unwinding.

That there was a real need for tools with dependable handles has been proved by the growing demand for "Corksteel" products. They are strong and enduring, and cost about the same as similar first-quality tools with wood handles. Since the tool and its handle are both made of steel, riveted or welded together, implements of this kind give lasting satisfaction to their users. For additional information and literature, write to the Connors Hoe and Tool Company, Inc., Columbus, Ohio.

THE RÔLE OF CHEMISTRY IN INDUSTRY

(Continued from page 3)

tantalum lamp was developed in 1902 and the tungsten drawn wire in 1906. In 1924 \$90,000,000 was paid for incandescent lamps. The electrical industry of today has a book value of \$25,000,000,000 and a generating capacity of 20,000,000 horse power.

In 1888 Charles Hall, a young American college student, changed aluminum, a metal so expensive to produce that it was practically useless commercially, to a commodity from which the commonest kitchen utensils are made, and which, either by itself or with various other alloys, has thousands of applications. The electric furnace has also produced carborundum, used as an abrasive for sharpening tools, for grinding, for polishing; all operations of prime importance in a machine age such as this. Graphite from carbon, and calcium carbide, used in the manufacture of acetylene, are also electric furnace products.

The figures given by the "Friends of Domestic Industry" in 1831 for the entire American chemical manufactures comprised thirty establishments employing 900 hands and producing \$1,000,000 worth of products. In 1925 the rayon industry alone, manufacturing a synthetic fiber by chemical processes, comprised fourteen establishments in this country employing more than 20,000 people and the value of the product was \$88,000,000.

The total value added to the materials passed through

the chemical industry, according to the Bureau of Census Reports for 1925, was \$6,655,575,000. This figure is exclusive of the increase in value imparted to the products by metallurgical processes, which was stated to be \$527,862,000. The total increase in value of the products for chemical industries and metallurgy is, therefore, \$7,183,437,000.

Finally, the value of the products of American industries which have a chemical interest amounted, in 1925, to \$21,021,875,000, exclusive of the metallurgical industries which produced products valued at \$2,479,968,000. This total of the products of the chemical industries and metallurgical industries of \$23,501,843,000 may be compared with the figure of \$1,000,000 worth of products given by the "Friends of Domestic Industry" in 1831.

CORRECTION

On page 24 of the May number the "L'Enfant All-in-one" billfold was described and illustrated. Two exposed corners of the billfold were said to be "bound in nickel for protection and durability," and we have recently learned that this was incorrect. The corners referred to are bound with one-fiftieth 14-karat gold.



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

General Executive Offices
WILMINGTON, DELAWARE

All Inquiries Regarding du Pont Products Should Be Addressed to the Company—the Nearest Office

ACIDS AND HEAVY CHEMICALS

*Acids, alums and miscellaneous
heavy chemical products.*

Philadelphia, Pa., 35th and Gray's Ferry Rd.
Newark, N. J., 256 Vanderpool Street

AMMONIA

Anhydrous and Aqua Ammonia.

Lazote, Incorporated
Du Pont Building, Wilmington, Del.

CELLOPHANE

Du Pont Cellophane Company, Inc.
New York, N. Y., Park Avenue Building
2 Park Avenue

Boston, Mass., Little Building
80 Boylston Street

Chicago, Ill., State Bank Building
120 South LaSalle Street

San Francisco, Calif.,
Balfour Building, 351 California Street

CHEMICAL PRODUCTS

*Bronze powders, collodion, Household Cement,
leather belting cements, Duco, No. 7 Duco Polish,
No. 7 Auto Top Finish, No. 7 Nickel Polish,
pyroxylin lacquers and enamels, split and patent
leather solutions and other pyroxylin preparations
and solvents.*

Boston, Mass., Everett Station 49

Chicago, Ill., 2100 Elston Avenue

Detroit, Mich., General Motors Building

Flint, Mich.

Parlin, N. J.

San Francisco, Calif., 569 Mission Street

DYESTUFFS

*Dyestuffs and dyestuff intermediates.
Rubber chemicals and seed disinfectants.*

Boston, Mass., 274 Franklin Street

Charlotte, N. C., 232 W. First Street

Chicago, Ill., 1114 Union Trust Building

New York, N. Y., 8 Thomas Street

Philadelphia, Pa., 126 S. Front Street

Providence, R. I., 709 Hospital Trust Bldg.

San Francisco, Calif., 569 Mission Street

Bombay, India, Jacob Sassoon Building

Rampart Row, P. O. Box No. 1010

Kobe, Japan, No. 83 Kyomachi

P. O. Box No. 384

Hankow, China, No. 23 Tung Ting Road

Shanghai, China, Robert Dollar Building

3 Canton Road, P. O. Box No. 393

Tientsin, China, 52 Taku Road

MOTION PICTURE FILM

Positive and Negative.

Du Pont-Pathé Film
Manufacturing Corp.
New York City, 35 West 45th Street

EXPLOSIVES

*Explosives for all industrial, agricultural,
military and sporting uses.*

Birmingham, Ala., 601 Brown-Marx Bldg.

Boston, Mass., Room 404 Charles Chauncy

Building, 38 Chauncy St.

Chicago, Ill., 1814 McCormick Building

Denver, Colo., Midland Savings Building

17th Street and Glenarm Place

Duluth, Minn., Hartley Building

742 E. Superior Street

Huntington, W. Va., Suite 1004 Union Bank

and Trust Company Building

Joplin, Mo., 816 Joplin Nat'l Bank Building

Juneau, Alaska, Room 503

Goldstein Building

Kansas City, Mo., 210 Scarritt-Arcade Bldg.

Miami, Florida, 305 Clark Building

343 S. W. North River Drive

New York, N. Y., Graybar Building

420 Lexington Avenue

Pittsburgh, Pa., Clark Building

Seventh and Liberty Avenue

Portland, Ore.
American Bank Building

St. Louis, Mo., 17th Floor, Arcade Building

San Francisco, Calif., Suite 403 Balfour Bldg.

351 California Street

Seattle, Wash.

Hoge Building, 2d Avenue and Cherry St.

Scranton, Pa., 710 Traders Bank Building

Spokane, Wash.

721-22 Old National Bank Building

Riverside Avenue and Stevens Street

Springfield, Ill., 716 Reisch Building

Wilkes-Barre, Pa.

728 Second National Bank Building

FABRIKOID

*Fabrikoid for auto and furniture upholstery; auto
topping, bookbinding, luggage, novelties, etc.*

Toutine Washable Window Shade Cloth.

Chicago, Ill., 1411 So. Michigan Avenue

Detroit, Mich., 5-236 General Motors Bldg.

Newburgh, N. Y.

New York, N. Y., 21 East 40th Street

San Francisco, Calif., 569 Mission Street

RUBBER PRODUCTS

*Pontop for auto tops and curtains. Raincoat
fabrics, gum rubber, Rug Anchor, Ventube for
mine ventilation. All kinds of rubberproofing.*

Chicago, Ill., 1411 So. Michigan Avenue

Detroit, Mich., 5-236 General Motors Bldg.

Fairfield, Conn.

New York, N. Y., 21 East 40th Street

San Francisco, Calif., 569 Mission Street

RAYON

Du Pont Rayon Company, Inc.

New York, N. Y., Park Avenue Building
2 Park Avenue

Buffalo, N. Y., P. O. Station B

Greensboro, N. C.

708 Jefferson-Standard Building

Greenville, S. C., 408 Woodside Building

Old Hickory, Davidson Co., Tenn.

Philadelphia, Pa.

1209 Land Title Building

Providence, R. I., 941 Hospital Trust Bldg.

Reading, Pa., 31 N. 6th Street

San Francisco, Calif., 569 Mission Street

LITHOPONE, DRY COLORS & PIGMENTS

*Products for paint, ink, oilcloth, linoleum,
rubber and other industries.*

Boston, Mass., Everett Station 49

Chicago, Ill., 2100 Elston Ave.

Cleveland, Ohio, 876 Union Trust Building

Los Angeles, Calif., Citizens' Warehouse

1904 Atlantic Street

Newark, N. J., 256 Vanderpool Street

Philadelphia, Pa., 3500 Gray's Ferry Road

PAINTS, VARNISHES, DUCO (FOR HOME USE)

*A complete line of paint and varnish products
for all home and industrial uses.*

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Brooklyn, N. Y.

Building No. 26, Bush Terminal

Chicago, Ill., 2100 Elston Avenue

New York, N. Y., 21 E. 40th Street

Philadelphia, Pa., Public Ledger Building

Independence Square

San Francisco, Calif., 569 Mission Street

PYRALIN AND VISCOLOID

Pyralin—Arlington, N. J.

Viscoloid—Leominster, Mass.

*Pyralin toileware of Amber, Pearl, Shell and
Ivory and combinations of these colors. Novelty
and transparent sheeting, rods, tubes and heading.
Also Cleanable Collars.*

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Chicago, Ill., North American Building

New York, N. Y., 330 Fifth Avenue

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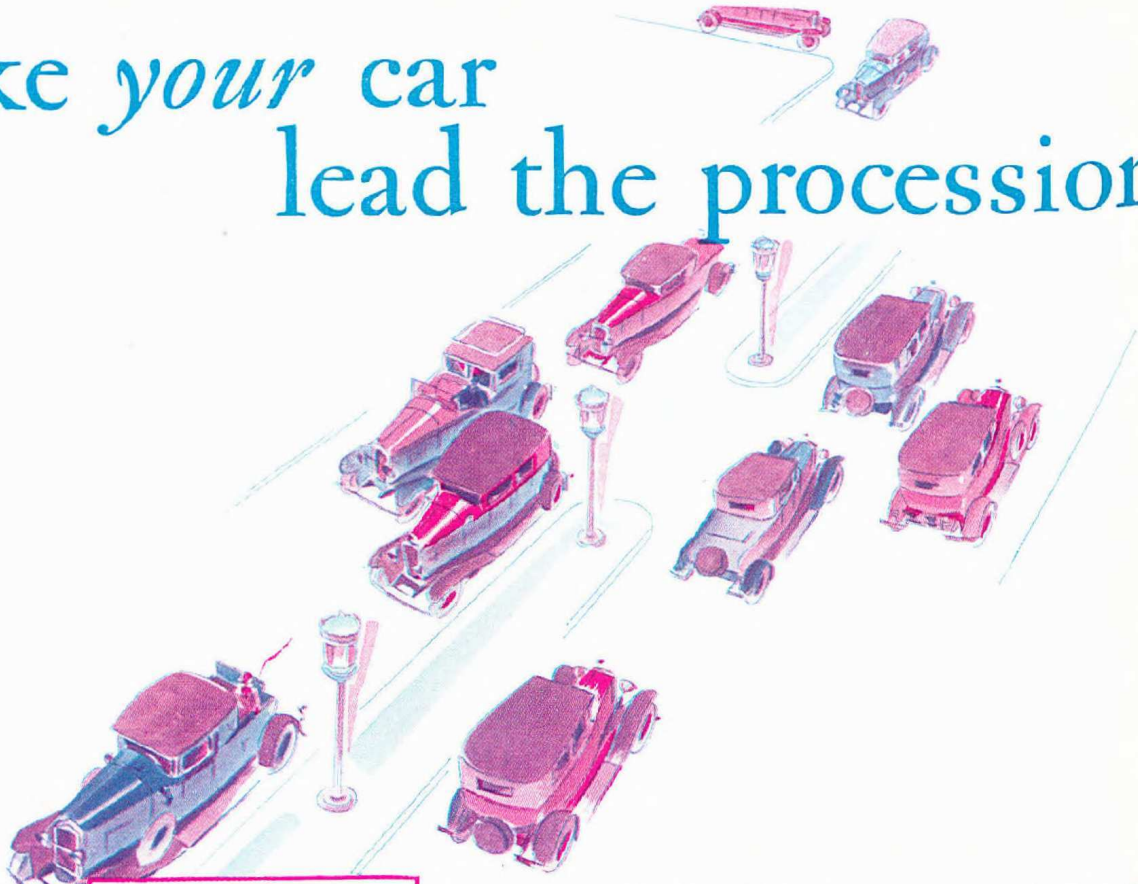
PACIFIC NOVELTY DIVISION

Toys, rattles, infant sets, hair ornaments.

New York, N. Y., 330 Fifth Avenue

When you are in Atlantic City, New Jersey,
Visit the du Pont Products Exhibit, at 1121 Boardwalk

Make *your* car lead the procession



GLANCE along the parking line. Look up the stream of traffic. Color, gleaming, lustrous color, flashing in the sun, sleek, bright bodies, a glowing finish — they're the sign of the well-groomed car everywhere.

When time and weather take their toll, when your car no longer leads the procession, when the only place left for pride is the motor under the hood—then is the time to see the Duco Authorized Refinisher.

The du Pont Process was worked out by du Pont chemists, in collaboration with

How to get your car refinished by the du Pont Process

The du Pont Duco Authorized Refinishing Station sign is now displayed by more than 2000 shops throughout the country. Only at these shops can you be sure that your job will be done by the du Pont Process.

DUCO—made only by du Pont

leading automobile and body makers. It prescribes the proper succession of "anchored" coats, controls the time, and standardizes the quality of the materials from the priming coat that is applied to the bare metal to the final color coat.

Outside every shop which is equipped to apply Duco by the du Pont Process there hangs this

sign: Du Pont Duco Authorized Refinishing Station. There are more than 2000 of these stations across the country. There is undoubtedly one in your neighborhood. Look

for the sign. Drive in today or tomorrow. Let Duco, properly applied, defeat the efforts of time and weather. Get your car refinished. *The du Pont Process is your assurance of satisfactory results.*

If your car does not need a complete refinishing job, if the original finish is still in good condition, you can make it look like one of the latest models by a Duco recoloring job. A recoloring job with Duco can be done quickly and at a moderate price.

WRITE FOR THIS BOOKLET

E. I. DU PONT DE NEMOURS & CO., INC.
Dept. D.M., Advertising Department, Wilmington, Del.
Gentlemen Without obligation please send me your booklet, "Modernizing the Automobile with Duco Colors," which will explain how to select color combinations best suited to my particular requirements.

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Address _____

DUCO Authorized



Auto Refinishers