



Zinc and Lead

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THE story of the development in the zinc and lead industry during the past few years reads almost like fiction. Under normal conditions the greatest demand for zinc products has been in the peaceful pursuits of industry, in the making of preserve jars, waste pipes and chemical apparatus. After the outbreak of hostilities the demand for these metals changed from domestic uses to the more serious business of war, and the present demand for these products is largely for military purposes.

Both of these metals are found in enormous quantities buried in the ground in the form of ores, with no indication on the surface to show their location. The ore bodies of the Mississippi Valley, where most of these minerals are mined, are generally located by drilling from the surface by means of well drills. The powdered rock and ore brought up by these outfits are carefully tested, and when there is enough of the desired minerals to pay for mining,

shafts are sunk to the levels of the ore bodies. Tunnels called "drifts" are driven from these shafts to permit of the mining of the ores, which are the minerals together with the rock in the natural bed. Zinc and lead ores generally occur together combined with sulphur as sulphides. As these ores of zinc and lead are so similar, many complex and difficult problems are often encountered by the mill operators in separating them, and by the smelters in finally reducing them to pure metal.

In addition to these simple zinc-lead ores, called sulphides, of the Mississippi Valley, other sources of zinc are from franklinite, a very complex ore containing iron and manganese; smithsonite, a carbonate of zinc; willemite, a silicate of zinc; zincite, an oxide of zinc; and calamine, another carbonate of zinc. Lead

also occurs associated with silver, gold, copper and sulphur; likewise as an oxide, sulphate, chromate, phosphate and carbonate. In all of these



Down in a Zinc and Lead Mine, and the Mill Where the Ore is Treated

ores the minerals desired are associated with many other substances from which they must be separated.

In the Missouri district the drifts ordinarily strike the deposits of "pay ore" at the top. After a considerable amount of the worthless rock is removed by blasting, the ore itself is drilled by means of power drills and the hole loaded with dynamite. The blasts break the ore loose and shatter it into fragments that are loaded into buckets or small mine cars and hoisted to the surface.

The ore is then crushed to the fineness of sand and sent to the jigs, where it is mixed with water and subjected to a pulsating or jiggling motion. The desired ore is separated by gravity from the lighter and worthless rock called "gangue." This also separates the zinc and lead ores, which are now called "concentrates," and each is collected in troughs or chutes and carried to bins until needed. The refuse or gangue is passed out as waste to the spoil pile or dump.

Some of the very fine material cannot be separated by the jigs, and passes to concentrating tables, where, carried in partial suspension in water, it is passed over tables that shake the material in such a way as to separate not only the valuable ore from the gangue, but the zinc from the lead ore as well. These concentrates are then placed in the bins with those from the jigs.

In smelting, the zinc ore is placed in sealed clay retorts or furnaces and heated. This drives the metal-

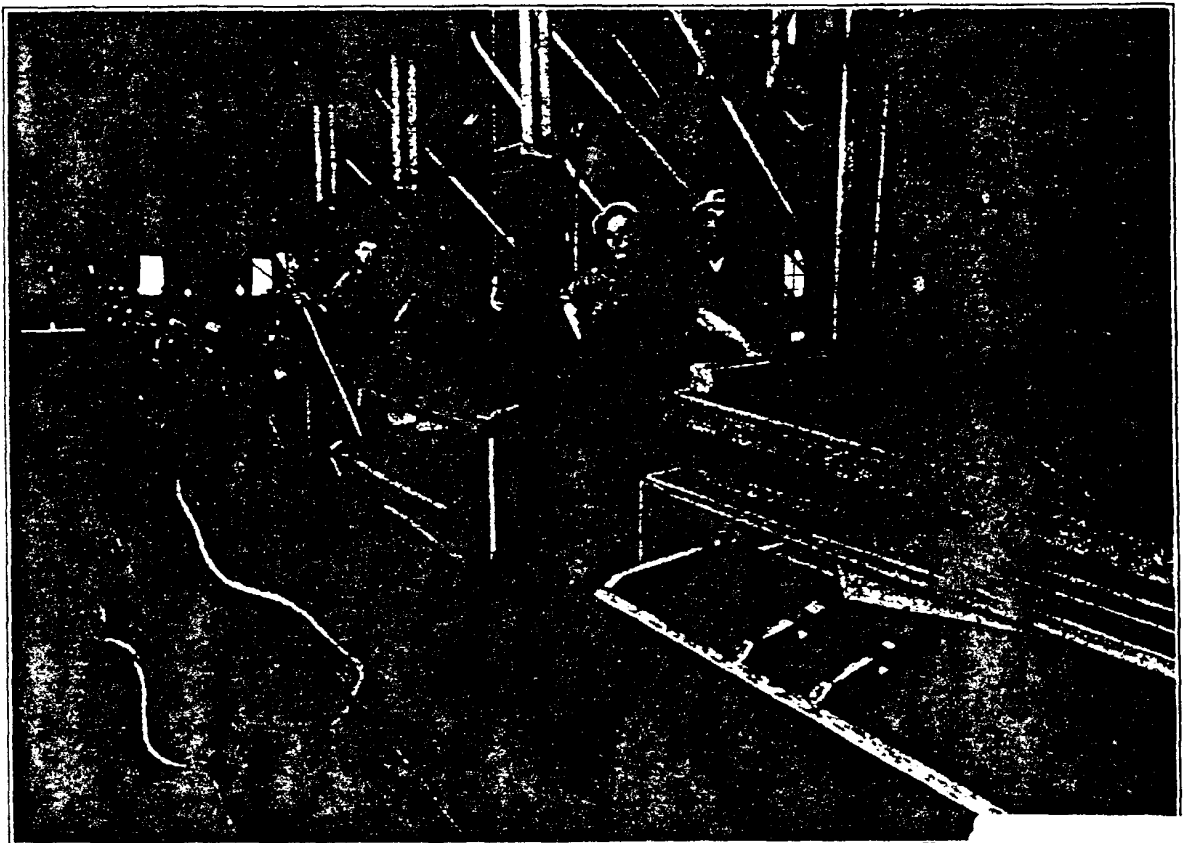
lic zinc off in the form of a vapor, which is condensed and is then known as "spelter," of which there are several grades, based on the purity or the amount of zinc contained.

Different smelting equipment is needed for the lead, which is melted out of the ore in large furnaces. The heavy molten lead sinks to the bottom and is drawn off there, while the lighter "slag" or waste, which is much lighter, rises to the top of the mass and is drawn off through a higher set of openings and is sent to the slag dump.

The uses of spelter, both in times of peace and of war, are many. Sometimes it is used alone; sometimes it is associated with copper, lead and various other substances.

It is not necessary to go out of the home to find these uses, for when the visitor pushes the button at the door the bell rings—the battery which supplies the power to ring the bell contains zinc. The ringing of the bell may result in one or all of the following events in the household: The washboard of zinc may be abandoned temporarily; baby may splash water out of his little tub of zinc; young son may find an opportunity to investigate the contents of the zinc-lined refrigerator, and old dog Faithful may crawl out from under the stove and leave his resting place on the sheet of zinc to join young son on his foraging expedition.

The linoleum covering on the floor of the automo-



Concentration Tables Where the Valuable Minerals are Separated from the Worthless Rock

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bile and kitchen contains an appreciable quantity of zinc. In this use it is combined with barium sulphate to form a very complex pigment.

The trains are operated and guided by zinc and lead, as the telephone, telegraph and signal towers are made possible and practical by the use of zinc and lead substances in the batteries to develop the necessary current for the transmission of messages and signals.

The operation of the submarine is made possible by the lead storage batteries, as without batteries of this type the operation of the submarine submerged would not be possible, and of course it would not be a submarine if it could not submerge, and would consequently lose its value as a fighting craft. Similar use of storage batteries is essential to the success of the starter of the modern automobile.

Lead is a source of supply for lead azide. This material is used in the manufacture of detonators. A common use of lead has been as a core in the bullets in the rifle ammunition.

The lead gives weight to the bullet, and permits accurate marksmanship. Lead bullets are also used in the shrapnel shells. The brass shrapnel shell is made of zinc and copper.

For buildings the architects design the structure, and the zinc and lead producer fills a large share of the requirements—the galvanized sheeting for the roof, galvanized cornice and other exterior and interior decorations, and lead for plumbing.

In the operating room in the hospitals, as well as throughout the institution, large quantities of zinc in various forms are consumed for disinfecting and deodorizing and as a caustic. The soldier in the trenches is gassed and wounded by zinc and lead products, and is treated in the hospital with zinc in other forms.

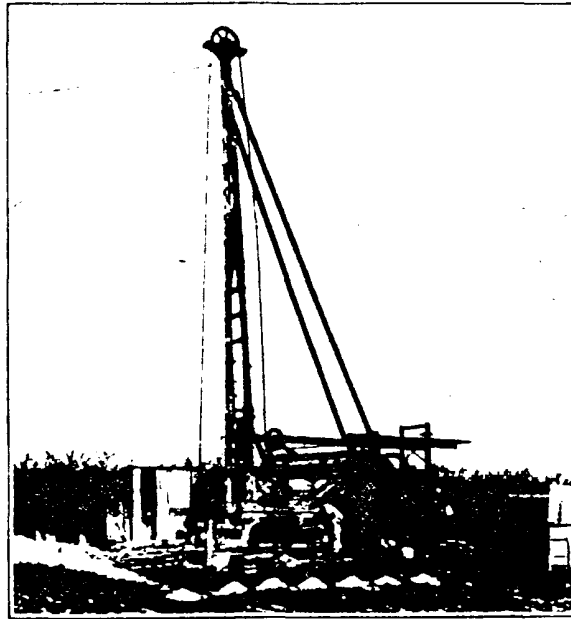
The farmer uses the galvanized iron wire to inclose his land to prevent loss by straying of hogs and other live stock. Galvanized barbed wire is also used extensively by troops of the Allied Nations, as entanglements between the trenches in "No Man's Land" as an obstruction to prevent active operations and raids by enemy troops. Galvanized wire will withstand effectively the action of the weather and will not rust or corrode for a long period.

Zinc is used extensively by manufacturers of printing type for newspapers and other publications.

The oxide of zinc, which is a material used in the rubber industry, is the result of roasting and other treatment of the crude ore. It is also used extensively

in the manufacture of paints and forms one of the essential materials for the manufacture of inside paints.

Lead also plays an important part in the paint industry, and is the basis for the manufacture of several important paint materials and for other important pigments.



Well Drill Used for Locating Valuable Deposits of Ore

Zinc is perhaps one of the most important and versatile ores produced. It plays its part in the treatment of gold, and its products also find their way in large quantities into the textile and many other industries.

A cycle in this industry exists which embodies the fact that explosives are necessary to produce zinc and lead products, and these elements in turn in various forms are necessary and essential in the production of high explosives.

Taken all in all, the life history of lead and zinc in their course from the mine to the final uses is quite an interesting story, and the part they play in the activities of the world is equally interesting and important.

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In course of time, under the tutelage of their protector, the Federal agent, the Indians learned how to take advantage of the opportunity given to them by a bountiful Providence, assisted by the U. S. Government and the intelligent energy of the white miner. Benjamin Quapaw is receiving \$20,000 per month as royalty from ore mined under his allotment of 200 acres. Emma Gordon, who owned a similar allotment, married a "mucker," Hiram McBee, a Scot, who had been "fired" from a mine working on that particular allotment. When he married the bronze landlady he did not revenge himself on the mining company; on the contrary, he conceded a full extension of the lease. He is dubbed "a real gent from Oklahoma." His income is \$25,000 per month, the tribute on a 20% royalty. The half-breed to whom Mr. Moore paid \$6000 royalty per month bought farm mortgages in Kansas and two automobiles. These Indians are great motorists, in the sense of owning cars. The story is told that Jim Good Eagle bought a six-cylinder car at Joplin. A few days later another Indian went to the same agent and asked: "Jim Good Eagle, he buy car how many cylinders?" The agent said, "Six." To which the Indian replied, "Jim Good Eagle him no good; got no money; I buy nine-cylinder car." During the meeting of the

(Continued on page 10)

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(Du Pont Magazine, June, '18)

Sales Promotion Division
E. I. du Pont de Nemours & Co.
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- ☐ Land Clearing
- ☐ Permissible Explosives
- ☐ Refined Nitrate of Soda
- ☐ Road Building
- ☐ Saltpetre
- ☐ Tree Planting
- ☐ Wood Pulp

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- ☐ Auto Finish
- ☐ Auto Paints and Enamels
- ☐ Barn Paint
- ☐ Bridgeport Standard Paint
- ☐ Bridgeport Wood Finishes
- ☐ Colors in Oil
- ☐ Concrete Paint
- ☐ Decorative Stains
- ☐ Dulite for Mills
- ☐ Enamels
- ☐ Ferro-Keep (Metal Paint)
- ☐ Floor Paints
- ☐ Floor Varnishes
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- ☐ Industrial Paints
- ☐ Japans
- ☐ Marine Paints
- ☐ Railway Paints
- ☐ Red Lead
- ☐ Sanitary Wall Finish
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- ☐ Vitrolac Stain Finish
- ☐ Vitrolac Varnish
- ☐ Wagon and Carriage Paint
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SPORTING POWDERS

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- ☐ Hand Trap
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- ☐ Resort Shooting
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- ☐ Shooting in Colleges
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CHEMICALS

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

- ☐ Rubber Makers White
- ☐ Salt Cake
- ☐ Shingle Oil
- ☐ Solvents
- ☐ Split Leather Solutions
- ☐ Waterproof Cement
- ☐ White Lead
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COATED TEXTILES

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

Name.....

Position

Your Address (If Personal)

Name of Concern (If Company)

Address of Company

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

What Du Pont products do you sell?

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

Specific Questions Should Be Asked In An Accompanying Letter

DU PONT