

**The Plant of the
American Zinc & Chemical
Company
at Langeloth, PA.**

**Employees' Houses
with Special Features of
Construction**

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Zinc Manufacture in the Pittsburgh District

The Plant of the American Zinc & Chemical Company at Langeloth, Pa.—Employees' Houses with Special Features of Construction

In April, 1913, through the efforts of Ralph Cooke, industrial agent of the Pennsylvania Lines West, the American Zinc & Chemical Company, an identified interest of the American Metal Company, New York, secured about 900 acres of ground two miles south of Burgettstown, Pa., on the main line of the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad. Of this, 400 acres located on the crest of a hill and admirably adapted for the purpose, was set aside for a plant for the manufacture of spelter and its by-products, sulphuric acid, while about 500 acres located just west of the plant site were reserved for the building of a new town for employees to be named Langeloth, in honor of a chairman of the board of the American Metal Company, who died less than a year ago.

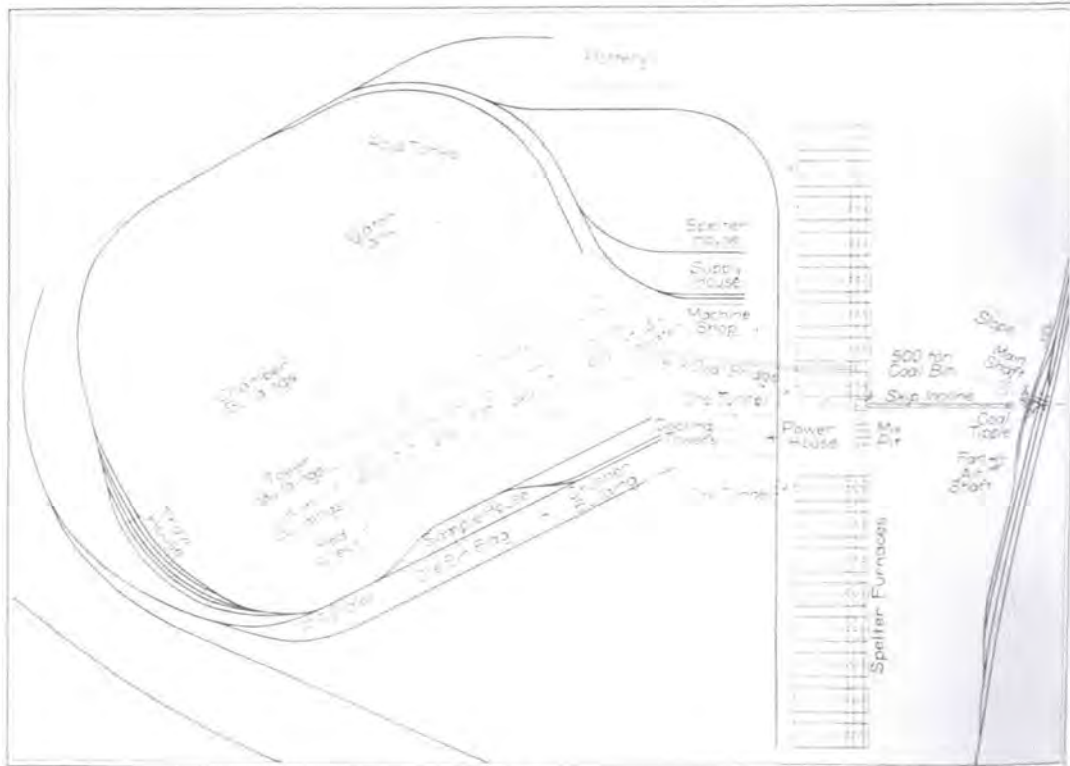
Active work on the plant was started in June, 1913, and in a little more than a year the first unit was finished and put in operation. The ground plan, as shown in an illustration, gives an idea of the general layout of the plant, but it should be



Ore Bin and Crusher Building

Tower Building
Roasting Furnaces

noted that only one unit has been completed. The three units to the left are prospective, while that to the extreme right is finished and in operation. There are direct sidings from the main line of the Pennsylvania Railroad, also from a branch line



A General Map of the New Spelter Plant at Langeloth, Pa.

of that road, running from Burgettstown to Paterson mills, while the company itself has built a main service standard gauge line, which completely encircles its plant and also numerous switches connecting different departments.

In order to obtain a supply of pure water essential to its purposes, the company built a concrete dam just south of its works on its own property. This has a capacity for storing 15,000,000 gal., the reservoir being supplied by natural water sheds and springs. From this reservoir the water is pumped by centrifugal and plunger pumps through a 12-in. cast-iron pipe water line to a steel tank, built by the Des Moines Bridge & Iron Works,

pany. The mine is located near the smelter and the coal is delivered from the tippie to a steel incline, the cars being electrically hauled up this incline to a 500-ton steel storage bin. From a bridge under this bin, the cars are loaded by gravity and hauled by electric motors over steel bridges to bins located in different parts of the works. All the coal mining is done by machines, and in addition to the main hoisting shaft there is a slope entrance built of concrete, 8 ft. high, leading into the mines through which all supplies are taken and which is also used by the miners in going to and returning from work. The company has a supply of coal amply sufficient to meet its needs, when the four units of its plant

have been built, for many years to come. The company intends to market the lump coal and use its slack for smelting purposes.

The smelting plant is located on high ground, with a view to having better working conditions for the men. This necessitated a large amount of excavating and concrete work.

The different departments are so laid out that three additional units can be constructed without cramping or disturbing the operation of the present one. The present plant comprises a sample house, ore bin and crusher building; two roasting furnaces and their respective



Power House Distillation Furnaces

Coal Tippie

with a capacity of 250,000 gal., and from this tank water is taken to all departments of the plant through 12-in. mains.

The coal supply is obtained from about 2500 acres of Pittsburgh seam coal owned by the com-



The Upper Picture Shows the Concrete Ore Bins and Ore Crusher Building. In the Lower Are Shown the Roasting Furnaces with the Chamber Acid Plant to the Left

sulphuric acid systems; four distillation furnaces; carpenter and machine shop; supply house; coal mines and pottery. Very economical methods are used to receive, handle and store the ores used in the manufacture of zinc, and which come almost entirely from Missouri and Wisconsin. The ore is received in 50-ton capacity steel cars, which are delivered to the ore bins by a switching engine. The cars are weighed and the ore is unloaded into deep concrete bins. These ore bins are 22 ft. high, 20 ft. wide and 70 ft. long, there being seven of them with room for 13 more, each having a storage capacity of 2000 tons. The building is equipped with a 10-ton Shaw traveling crane with grab bucket. The latter distributes and carries the ore to the mill, which is equipped for handling coarse and fine ores.

The ores are dumped on a grizzly, the fines passing through and the coarse going to a jaw crusher. They then enter a Ruggles-Coles cylindrical drier. From the drier the ore is elevated to the screens, with the oversize returning to the rolls. The drier gases are passed through a steel dust collector, and then discharged into the chim-

ney. Connected with the ore bin building is a sample room, in which samples of ore are taken from each car and treated by the regular processes in order to obtain a good average sample of the ore for assay purposes.



The Pottery Building

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The roasting furnaces are of the Hegeler type, 20 x 80 ft., with modern improvements in both the furnaces proper and their machinery. Each furnace is double, seven hearths high, the dimensions of each hearth being 6 ft. x 20 ft., making about 6800 sq. ft. of hearth area. The large lower hearths are muffled. The interior arches have considerable spring and are built of tongue and grooved brick. A special brick is laid above each row of skewbacks to carry the weight of the rabble, which keeps it off the hearth, the latter can then rise and fall with the arches. The rakes are the usual style used in this class of roaster. An improvement in the rake rods is that they are jointed in sections thus allowing easy replacement of any part. The rods are drawn through the furnace by endless chains.

Each furnace is provided with a 9 x 15 gas producer with water cooled boshes, the fire gases being burned under the three lower ore hearths. Sirocco fans are used for furnishing air to the gas hearth and to the ore muffles. The waste heat gases pass through an air heater, which is composed of cast-iron "U" pipes, cold air flowing through in an opposite direction to the fire gases. The temperature of the fire gases entering the heater is about 800 deg. C. and hot air leaves at 400 deg. C. The hot air then passes through flues and enters the muffles through the middle wall. The use of pre-

THE SULPHURIC ACID DEPARTMENT

heated air gives good results in the matter of fuel economy. Fifty-five tons of ore are roasted per day, or 16 lb. per sq. ft. of hearth area, with a coal consumption of seven tons. The gases run 4 per cent. SO₂ by volume and reach the Glover tower at 380 deg. C.

Two buildings contain the sulphuric acid department, one known as the Tower building, 95 x 220 ft., and the other the chamber building, 138 x 440 ft., the former being all steel and brick and the latter steel construction. The roast furnace gases on leaving the furnace pass through a centrifugal dust chamber, 30 ft. in height and 20 ft. in diameter. The chamber has a hopper bottom so that dust can be drawn out into cars in an ore tunnel running underneath the roasting furnaces. The gases pass on to the Glover tower, which is 14 x 14 x 40 ft. in height and thence through 10 lead chambers, which have a space of 360,000 cu. ft. From the chambers the gases pass through three Gay Lussac towers which are 14 x 14 x 40 ft. All towers are packed with special chemical brick. Two hard lead fans are

used for forcing the gases through the towers and chambers. The acid is pumped to the tops of towers by means of acid eggs and compressed air. Large steel storage tanks are located convenient to railroad, and acid is loaded by gravity into tank cars.

There are four distillation furnaces, all of the Hegeler type, each containing 864 retorts of 8-in. inside diameter. The smelting capacity of each furnace is 20 tons. An improved Hegeler type of gas producer, 9½ x 22 ft., furnishes the necessary gas. The furnaces are placed parallel at 100 ft. centers, each building having a width of 70 ft., thus allowing ample space between furnaces for light and air. The building having been substantially built of steel, a sheet steel hood surrounds each furnace, thus affording extremely good ventilation for the workers. Counterweighted doors are used between hood and working floor after the campaign has been completed. The waste gases from the furnace pass through a 588 hp. Rust vertical tube boiler and thence to a Radial brick stack, 125 ft. high, built by the Heine Chimney Company of Chicago, with an inside diameter of 6 ft. at the top. Each boiler is equipped with a firebox for direct firing, in case of the shut down of a furnace.

Retort annealing kilns are placed at the end of furnaces. Down-draft kilns are used with flues connecting with the large radial stack. Each furnace is equipped with a No. 6 Sirocco fan of 27,000 cu. ft. capacity against a pressure of 5 in. of water. An air main extends longitudinally over the furnace with branch pipes leading to both sides of furnace, ports being between each section of 24 retorts. A particular feature of the furnace is the flat roof

arch laid at the same slope as the retorts. The buckstaves are connected with tie rods through springs, thus allowing for the usual expansion. The bottom of the buckstaves have ball and socket joints, allowing movement in any direction. Another variation from the usual custom is that a large pocket is directly under the furnace, allowing room for the accumulation of several days' residue. A tunnel under this pocket allows the easy removal of residue. This arrangement of tunnel and pocket eliminates all possibility of up-draft in front of the furnaces. Each gas producer has a massive reinforced concrete bin over it, capable of holding a 15-days' supply of coal, which is fed by gravity into the producer.

THE POWER PLANT AND POTTERY

The power plant is contained in a steel and brick building, 43½ x 120 ft., and is equipped with a General Electric 2000 kw. turbine and also with two Ingersoll-Rand air compressors. Alternating current is used throughout the plant. Steam for the power plant is supplied by waste heat boilers by an overhead line. The machine shop is a brick and steel building, 90 x 160 ft., to which special attention was paid in order to secure maximum light and ventilation. There are windows on all four sides of the machine shop building and also in the roof. The machine shop is equipped with a full line of iron working tools and at one end are located complete carpenter and pattern shops.

The pottery is a substantial brick and steel structure, 60 x 142 ft., conveniently arranged for building material. The drying rooms are located on both sides of a main alleyway. Another alleyway is at each end of the rooms, the latter being used for loading retorts and condensers into cars. The rooms are heated by steam pipes under grated floors, air being driven by a large Sirocco fan. The air from the rooms is taken out through galvanized air ducts. The clay is worked through the usual dry and wet pans. A Wettengel pug mill and hydraulic press are used for retort making and a Garrison machine is used for condenser making.

The company makes only two products, zinc and sulphuric acid, having a capacity of about 50 tons of zinc per day and about 100 tons of sulphuric acid. Its entire product is sold to domestic consumers but the company has made a few foreign shipments. The entire works were designed and built by N. L. Heinz, general manager. Mr. Heinz is also the designer and erector of the huge acid plant of the Duckton Sulphur, Copper & Iron Company, Ltd., of Isabella, Tenn., where blast-furnace gases are used. Archibald Jones is general superintendent and J. W. Geib, assistant superintendent.

THE TOWN FOR EMPLOYEES

When the works at Langeloth were established they were built on farm land and there was no means of taking care of employees of the company except in building houses for them. This was done, and the company has established, just west of the factory site, a new town known as Langeloth, where some 60 to 70 houses have been built and are occupied by its employees. Some new ideas in construction in the building of these houses were carried out. They are built of different designs so that there is no monotony in their appearance. A new feature in the detail of their construction is the use of sheet zinc placed outside the sheathing, instead of paper, thus affording a lasting material, which is windproof, vermin proof and damp proof. Tinning strips are nailed on the studding over the zinc sheets and metal lath outside of this, on which is

placed concrete stucco plaster. The houses are roofed with red slate imbedded and shingles which add much to their appearance. Some of the houses are five rooms and others seven rooms, and they are neat and equipped with modern appliances. Water is furnished from the company's own supply, and natural gas and coal are used for fuel. It is probable the company will build a large number of houses as soon as contemplated plant additions have been made.

Practical Co-operation in Foundry Work

The Philadelphia Foundrymen's Association held its monthly meeting at the Manufacturers' Club, in that city, Wednesday evening, May 5, having as its special guests the officers and members of the Associated Foundry Foremen of Philadelphia and vicinity. Paul E. Poindexter, of the reorganization committee of the Greater Chamber of Commerce of Philadelphia, addressed the meeting and after explaining the plans under which the new organization proposed to operate urged the foundrymen to become members.

William H. Barr, president of the Lumen Bearing Company, Buffalo, who is president of the National Founders' Association, made an interesting address on "Co-operation in the Foundry." It behooves every foundryman, he said, to devote time and energy to the betterment of working conditions. Something must be done to stimulate foundry labor, both skilled and unskilled. Manufacturers will have to deal in the next few years with a shortage of unskilled labor. The influx of foreign labor, following the war abroad, will be smaller. Foundrymen should look forward to this condition and prepare in advance. Methods and machinery should be installed to bring out maximum production with a minimum of labor. The installation of modern foundry equipment will go a long way toward solving the problem. Team work in daily foundry operation, not only in the individual organization, but also with associated foundrymen, will do much.

Reference was made to the constructive work of the National Founders' Association, particularly on lines of safety and sanitation. Hazards have been reduced, and the work has been made more agreeable. The standardization of goggles, leggings, foundry shoes, safety guards on machinery, etc., has aided materially in minimizing foundry accidents.

The treatment and education of apprentices were touched upon; also uniform legislation relating to the conduct of the foundry, maintenance of order in and about the foundry, the foundry store and scrap castings. Mr. Barr recommended closer co-operation between the shop foremen and the sales forces. Much can be accomplished by meetings of the department heads and sales forces. The game should be studied from all angles, so as to get out of the old low-capacity rut and build up a clean, profitable business on a sound basis.

Following the meeting a planked shad luncheon was served, at which informal addresses were made by various members and guests.

The Jeffrey Mfg. Company, Columbus, Ohio, announces the removal of its New York branch from 77 Warren street to 50 Dey street, adjoining the Hudson Terminal. In its new quarters the company proposes to carry the largest combined stock of its kind in New York City, consisting of power transmission machinery and elevating and conveying appliances. A large engineering and sales force will be maintained with ample facilities for handling promptly inquiries and orders. George H. Mueller, assistant sales manager of the Jeffrey Company, is the manager in charge of this office.

The steel plant of the International High Speed Steel Company at Rockaway, N. J., is nearing completion, and it is expected it will be in operation by the latter part of June. The product will be tool steels, alloy steels, high speed steels of various shapes, solid octagon and cruciform and hollow hexagon and round rock drill steels under the Bulldog brand.