

## THE PHOTOGRAPHY OF A CHIMNEY.

BY EDGAR MELS.

The second highest chimney in America has been completed for Heller & Merz Company's plant at the foot of Hamburg Place, Newark, N. J. It is 350 feet high, just 15 feet less than the stack of the Orford Copper Company at Bayonne, N. J., but it is said to be a far finer piece of structural work. As its cost would seem to indicate—\$35,000, or \$100 per foot of height—it is as complete as the best of material and labor could make it. Aside from these features, it is an engineering feat of no mean proportions, for it is built on the treacherous salt meadows just to the east of Newark, and this despite its weight of 3,000,000 pounds.

The building of this stack has pleased the lower portion of Newark, not only because it promises to remove the objectionable odors emanating from the color works, but because it was constructed solely for this reason, and not because of legal interference, or threats of the local board of health. As long ago as 1903, Eugene and August Merz, of the firm, decided that in view of the rapid growth of the city in the vicinage of the works, it would become necessary sooner or later to increase the height of their present stack—only 60 feet high; so plans were drawn for the present chimney. Plans of all the tall chimneys here and abroad, especially one in Glasgow, Scotland, which is more than 400 feet high, were carefully considered, and then the final diagrams drawn.

Next came the borings to determine the quality of the ground in which the foundation was to be built. Four holes were driven down for a distance of 60 feet, when red shale was struck. The first 4 feet was found to be the usual filling, followed by 6 inches of meadow roots and by 18 inches of clay. Then came 10 feet of coarse sand, of good quality, but containing so much water as to render it of almost the quicksand variety. Soft red clay followed, until the shale, better known as Jersey red rock, was struck. At the southern end, this was found at a depth of from 30 to 35 feet, and at the northern, at 60 feet.

What is said to be the tallest land pile-driver in use was employed to drive the 60-foot piles. There were 324 of them, of the best Virginia yellow pine, with the top 14 inches or more in diameter. The driver, 70 feet high where the weight drops, carried a weight of 3,000 pounds, limited to a drop of 15 feet, to prevent shattering of the piles. This blow was greatly reduced when the piles showed the slightest sign of having reached the shale. The utmost care was taken in placing this timber 6 feet 6 inches apart from center to center. When the entire lot had been sunk, they occupied a space 45 feet square. They were then cut off 2 feet below the permanent water level, and their tops sunk one foot in the concrete base, composed of one part cement, three sand, and five stone. Every twentieth bag of sand was sampled, the fineness of the cement was determined by special screens and with a boiling-water test, and briquettes made of the concrete tested every seventh and twenty-eighth day.

The concrete base, containing 21,000 cubic feet of

concrete, is 10 feet high. To build it were required seventeen cars of crushed stone, or 510 tons; ten cars of 30 tons each of sand, and 4,000 bags of Portland cement. The concrete base was finished on May 23 of this year, having taken just three weeks to construct. The first brick was laid May 31, and the last September 18. The chimney itself is of the best pale

red, segmental brick, the total number being estimated at about 950,000. There are 44,000 cubic feet of masonry in the shaft, which, if piled into one heap, would make a pile 100 feet long, 22 wide, and 20 deep. The bricks vary materially in size and shape, some ranging from 5 by 8 by 6 inches to 5 by 6 by 5, according to location. The work was carried on without inter-

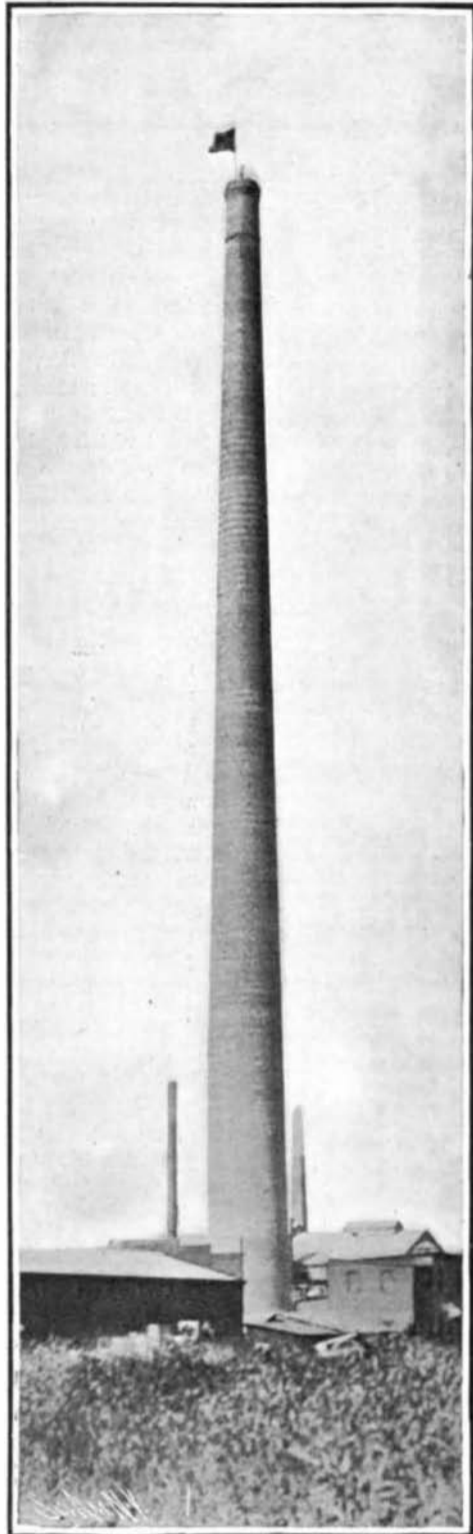
ruption, scaffolding being used by the laborers. There was only one mishap, a brick falling from the 210-foot level, hitting the ground, and on bouncing, striking a workman, whose arm it broke.

As it stands to-day, the chimney is 27½ feet in diameter at the bottom, the interior measurement being 20 feet, and 9 feet 10½ inches at the top, with an inside diameter of 8 feet. It is lined with hard-baked red brick, set 2 inches from the wall, and is built in four sections, so that any one section may be repaired, should the occasion require. The stack was built to withstand a wind pressure equivalent to 19 tons to the square foot resultant pressure at the base. It was constructed by the Alphons Custodis Chimney Construction Company, of New York city, and under the personal supervision of Eugene and August Merz of the firm, both engineers. The accompanying photographs, taken by Mr. August Merz, represent the stack at various phases of its construction.

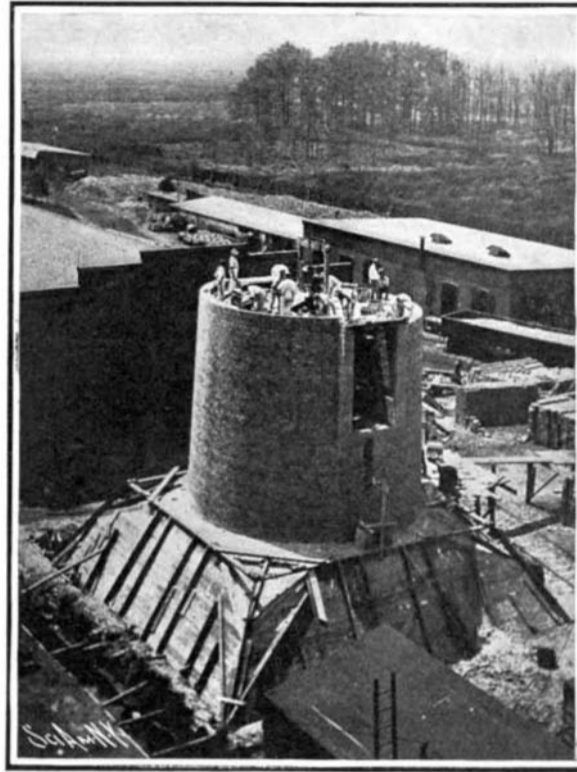
## Theory of Bichromated Gelatine.

The composition of bichromated gelatine which has been made insoluble by adding salts of the sesquioxide of chromium, is brought out by two prominent photographic chemists of Paris, Messrs. Lumière and Seyewetz, and they treat also of the theory of the action of light upon gelatine containing metallic chromates. The conclusions of the different experiments which they made in this field may be summed up as follows: First, when gelatine is treated with salts of chromium, it seems to fix the chromium directly, seeing that its properties undergo profound modifications and that the chromium cannot be eliminated after numerous washings with boiling water. Second, the acid of the chromium salt, although it is retained with energy by the gelatine, does not seem to enter at all into the phenomena we observe where the gelatine becomes insoluble, seeing that we can eliminate the acid without modifying the properties of the insoluble gelatine. We may suppose that it is owing to the functions of the gelatine, which are both basic and acid, that it can retain at the same time the oxide of chromium and the acid which is combined with it. Third, a given weight of gelatine will fix a maximum constant quantity of sesquioxide of chromium comprised between 3.2 and 3.5 per cent of the weight of the gelatine, regardless of the nature of the chromic salt which is used for making the gelatine insoluble. Thus it seems that we have to deal with a well-defined compound in this case. Again, seeing that it is easily dissociated, the insoluble gelatine is rather an addition compound than a veritable combination. Lastly, the dissociation of the bichromated gelatine by successive treatments of boiling water can be prevented either by washing the

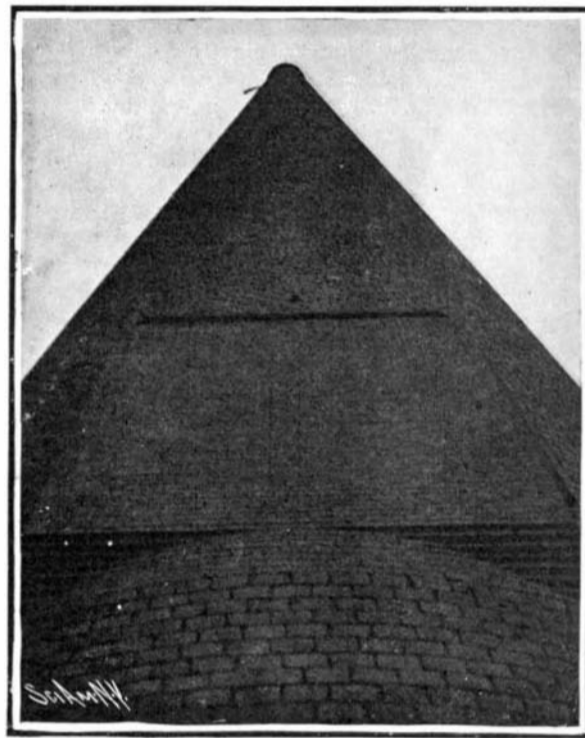
treated gelatine in the proper way with ammonia water or again by adding to the gelatine (before putting in the chromic salt) the theoretical quantity of ammonia needed to saturate the acid of the salt.



The 350-Foot Chimney. The Second Highest in America.



Base of Chimney, Showing Flue Opening.



Looking Up at the Completed Chimney.

The little speck at the left of the apex is the American flag.



Excavation 4 Feet Below Grade, with Piles Cut Off 3 Feet Below Grade, Ready for Concrete.

## THE PHOTOGRAPHY OF A CHIMNEY.

red, segmental brick, the total number being estimated at about 950,000. There are 44,000 cubic feet of masonry in the shaft, which, if piled into one heap, would make a pile 100 feet long, 22 wide, and 20 deep. The bricks vary materially in size and shape, some ranging from 5 by 8 by 6 inches to 5 by 6 by 5, according to location. The work was carried on without inter-

ruption, scaffolding being used by the laborers. There was only one mishap, a brick falling from the 210-foot level, hitting the ground, and on bouncing, striking a workman, whose arm it broke.

The British Automobile Club have decided to hold trials for tires and lamps next year.