

A MODERN BLAST FURNACE

AUTOMATIC DEVICES HAVE LARGELY
SUPERSEDED MANUAL LABOR IN
MAKING PIG IRON.

It is no longer necessary for human beings to sweat their lives away turning the iron ore of the mountain into the iron pigs of commerce. The man with the wheelbarrow and shovel has ceased to be a factor in the complicated machinery that runs a modern blast furnace. Since the first furnace was fired his labor has been indispensable; when he ceased to work the furnaces did not pour. Then invention stepped in and wiped his name from the pay-rolls.

Unthinking creatures of iron and steel, with cogwheel brains and members that are limited to a single function, untiring, never perspiring, and without ambition beyond the performance of the particular duties for which they were moulded and cast, have taken his place, at least so far as modern furnaces are concerned. They do this wheelbarrow man's work in less time, with more accuracy and at much less expense. They belong to no labor union, and they never strike, except for a just ration of oil or from absolute mistreatment.

Of course, a blast furnace has not yet been perfected to such a degree that it can be planted in the midst of a forty acre lot and left to run itself. Man still plays his part in the smelting operation. He touches buttons that loosen the giant strength of electricity; he pulls hydraulic levers and turns steam valves; but no longer does he toil in the original meaning of the word.

A good demonstration of these facts is to be found in the new blast furnace which Joseph Wharton has just built at Port Oram, N. J., and which was "blown in" the other day. It is the newest blast furnace in the world, and it makes a nearer approach to mechanical perfection than any other. All of the skill of the best inventors has been drawn on to perfect the works, and the result is wonderful.

One who attempts to describe the new Port Oram furnace has a valid excuse for overworking the word automatic. It is the one word in Webster that accurately sums up the working of the furnace. The mind of man planned the whole, his hand directs the work, but machinery does the rest.

From the time the iron ore leaves the mines, twelve miles back in the Jersey hills, sometimes called mountains by those who have never seen the Rockies, it is not touched by human hand until it lies a molten mass at the bottom of the furnace. The same is true of the coke, coal and limestone used in smelting. The doors of the furnace are opened by pulling a lever, and the melted ore, without handling, finds its way through a series of stages until it is pushed by machinery into flatcars, finished, clean cut pigs, ready for rolling mill use. The entire process from mine to rolling mill is automatic.

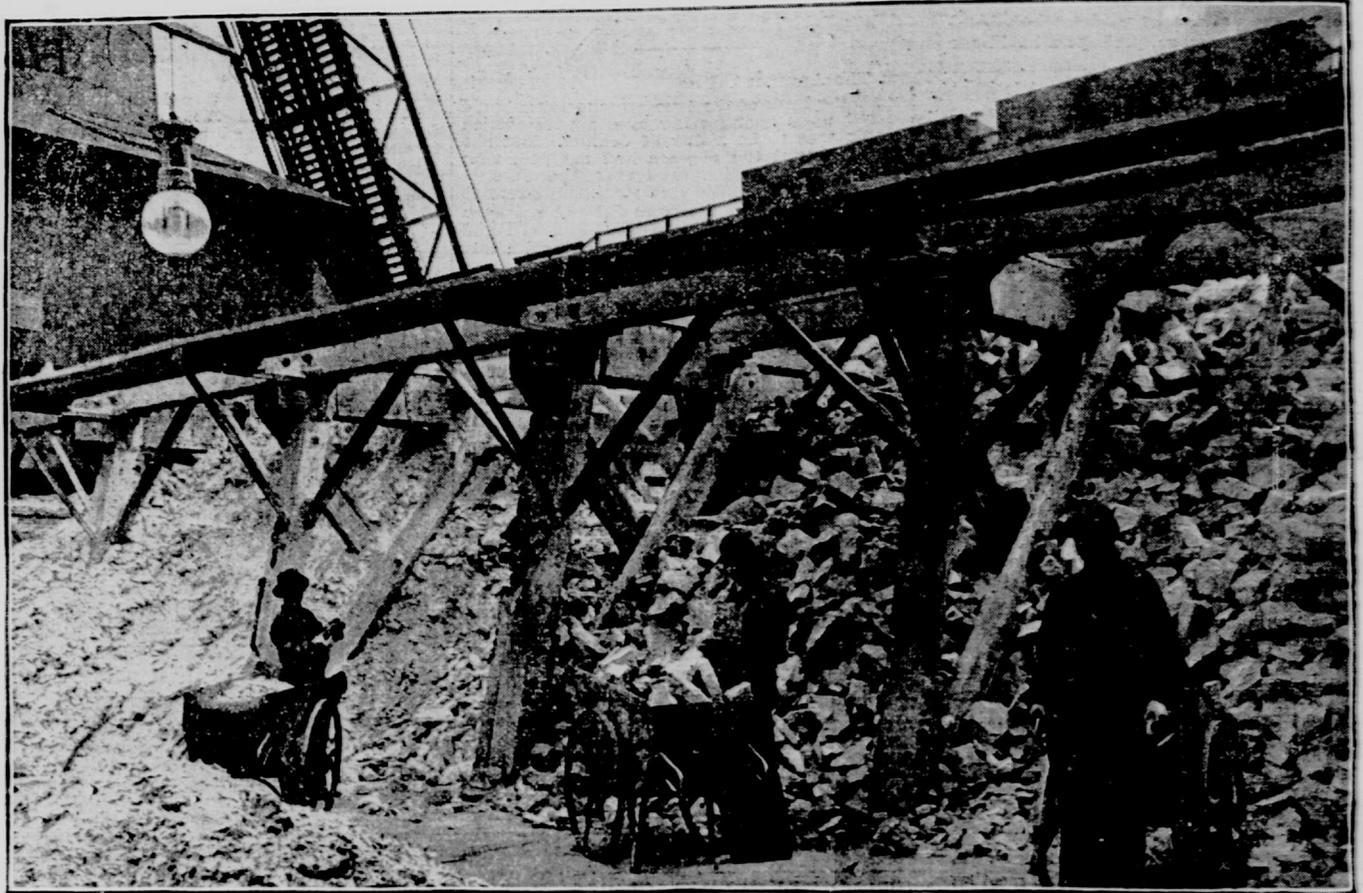
The ore used at Port Oram comes from the Wharton mines, at Hibernia. Miners shovel it into big "skips," which haul it up the mine slope and dump it automatically into a conveyer. Machinery pushes it into the hopper of a powerful crusher, and then carries the crushed ore to a magnetic separator. Another conveyer takes the ore to storage bins, which are tapped by chutes from below. In this way the Wharton steel ore cars can be filled without handling to their fifty ton limit. The cars are pulled by a locomotive over the old Morris County Railroad, now known as the Wharton Mine Railroad, to the furnace, a distance of twelve miles.

When the ore is directly over one of a long line of bins, its bottom drops away at the touch of a spring, and the contents, obeying the law of gravity, fall into one of the patent roasters. Gas, taken from the furnace stack, furnishes the fuel. It is forced through the dense body of the ore by two big fans placed at the end of the boiler flue. This roasting process, it is said, puts New-Jersey ore on a level with the superior quality which comes from the mines in Lake Superior. Roasted ore takes less time in the furnace, and in consequence the output of the furnace is increased by the process.

An electric road runs underneath the roasting bins, and also extends under the storage bins for coal, coke and limestone. The cars used on this road are a most important factor in the modern automatic furnace. They are loaded by pulling levers which raise the bin gates. Automatic scales tell the operator just how much of a load he has on board. There are different sets of balances for iron, coal, coke and lime. They can be called into use by moving the indicator on the side of the scales. It is important that exact proportions be maintained in filling up the furnace with the different materials. That this may be done accurately, the scales have a plus and minus beam. For instance, if a car should get three hundred pounds too much iron ore on one trip, the scale is placed at the three hundred minus mark, and the next load is that much short.

The trolley cars dump into "skip" cars, which are pulled by cables to the top of the furnace. The "skips" are operated by one man, who stands in a little house fastened to the side of the high furnace tower. About all he has to do is to watch the skip cars empty themselves and start them down the incline for another load.

Within the furnace the coal and coke fires work upon the iron ore with the assistance of the limestone. The slag is separated from the iron in the same way as it is in other furnaces.



THE OLD METHOD OF HANDLING ORE AND FUEL.

When the doors are opened twice a day streams of molten iron flow out into runners and find their way into twenty-ton ladle cars, which run on standard gauge tracks to various parts of the works. The ladles are huge, black affairs of steel, and resemble a mortar battery gun. The ladles hang on a frame and can be tilted to any angle by turning a wheel at the side of the car.

If the pour has been satisfactory the cars are run into the casting works. The ladles are tilted and slowly pour their molten contents into a modern casting machine. It consists of two endless chains of moulds, which turn out clean cut pigs of uniform size. The casting machine carries the moulds through a cold water bath and dumps the pigs on a conveyer which is constantly in motion. The pig iron is carried up an incline and dumped into freight cars, which are weighed automatically before they get to the main track.

The furnace is equipped to gather the gas which arises from the fuel used in smelting, and to deliver it on demand to different parts of the works. One pipe carries gas to the boiler room, where, after being washed, it furnishes five batteries of boilers. The surplus is carried into four monster tanks, called stoves, where it is stored and heated. Blowing engines furnish a cold air draft, which forces the gas out of the stoves into pipes leading to the

roasting furnace. The gas almost cares for itself, and the size of the boiler room force is greatly reduced by its use.

The new Port Oram furnace was built by Frank C. Roberts, of Philadelphia, and under the best conditions could smelt 600 tons of ore every twenty-four hours. With Hibernia ore, however, the average output will be 450 tons. The completed works will cost nearly \$800,000, it is said.

An interesting contrast between methods of smelting, old and new, is furnished by the furnace just completed and the one which has been in operation at Port Oram since 1878. They are in the same yard, and both are in operation. In the old furnace workmen shovel the ore and heating materials into wheelbarrows and wheel it on elevators which carry it to the top of the furnace. Other men dump each barrow into the furnace. The old furnace employs 150 men and produces 160 tons of iron a day. The new furnace will employ about the same number of men, but will have an output nearly four times greater than the old. This is the saving effected by the use of automatic machinery.

The Hibernia mines have been worked for more than fifty years, and there is a large ore body which has not yet been touched. Mr. Wharton has acquired a more extensive body of ore within two miles of the furnace, the Teabo and Allen mines, which have not been worked

for some years. These properties will be opened up in a short time and connected with the new furnace by an electric railroad. Mr. Wharton still directs all of the mine and furnace operations, in spite of his seventy-six years. He makes frequent visits to the mines from his home in Philadelphia, and is as active as the youngest man in his employ. It is only within the last year or two that his hair has begun to turn gray, but his eyes still serve him without the use of glasses.

AT A LONDON MUSIC HALL.

THE ENGLISH JOKES WOULD SCARCELY "CATCH ON" IN THIS COUNTRY.

From The Saturday Review.

The entertainments in music halls are the exact and joyous result of the public's own taste. "Turn" by "turn" these entertainments have grown up with reference to nothing but the public's own needs and aspirations. There is no compromise, no friction between the form and the audience. The audience is the maker of the form, the form is the symbol of the audience. And thus a music hall offers always a great chance to any student of humanity at large.

The band was playing loudly as I entered, every brazen instrument seeming to intensify the terrific heat, but over and above it all, from the triply brazen lungs of one who wore a torrid suit of black and white, cheeks, and who had one Union Jack tied round his hat and another round his walking stick, were wafted to me these words:

"On coronation day, coronation day, we'll have a spree and jubilee, singing hip-hip-hip-hooray! On coronation day, coronation day, drinking whiskey, wine and sherry, won't we all be jolly merry, on coronation day?"

Were to-morrow the day in question, and were the evening tolerably cool, the singer could not stamp around the stage in a more perfervid ecstasy of anticipation, nor could the audience be more obviously infected by his rapture. Coronation day! To you or me, how remote, how negligible as yet! To think that the great heart of the public is already thumping at the thought of it! To think that Demos can see it clearly across the intervening span of more than three hundred other days, and can calculate how gloriously drunk he will get on it!

Nowhere but in a music hall could one find this lurid sidelight. Luridly pathetic? It is. But for me at least, the pathos of it is obscured by delight in the "document."

Who is this loathsome object, this seedy scaramouch, lank haired, red nosed? At mere sight of him the audience rocks with laughter. "Mr. — the Funny Man." Me his makeup disgusts merely. Unsightliness in itself never makes me smile; only, as a student, I am glad of the reminder that it invariably splits the sides of the public. I do but note the fact now; some day I must try to elucidate it.

Ugliness of appearance, ugliness of manner, ugliness of jokes—such is the panoply of Mr. — Hark how the audience chokes with laughter!

Now he is reading them a sheaf of telegrams. One of them purports to come from a general "at the front." "No truth in report that De Wet has lost his reason—he never had any." Loud and prolonged cheers—another sidelight to make one gasp. You and I wince at a depreciation of a person who has been persistently scoring off our gallant soldiers.

To the British public, because he is not a Briton, he is still merely ridiculous. Sheer stupidity enables them to treat as mere guys true bogies, and hence that admirable self-control which has been the envy of foreign nations throughout the war.

I wish I had space in which to go through the other songs seriatim. Not one of them, believe me, but cast its own lurid sidelight.

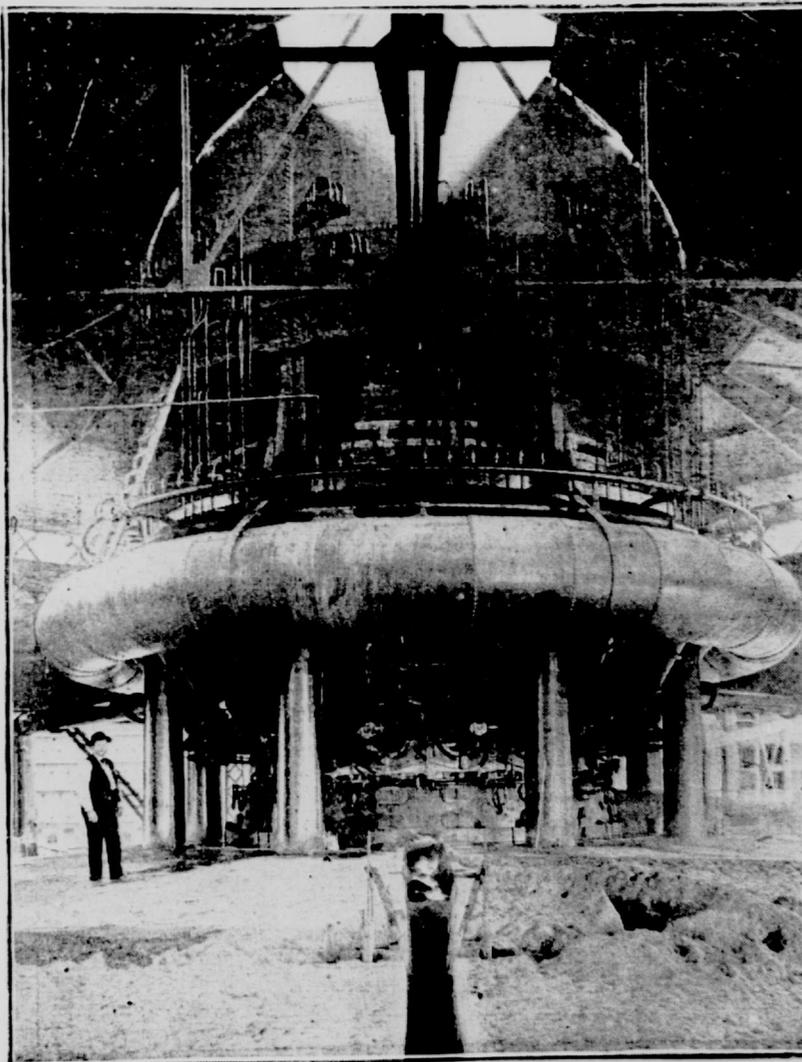
HIS ONE SUCCESS.

From The Philadelphia Press.

Miss Kulcher—Did you ever go in for literature, Mr. Gay?

Mr. Gay—Well—er—not exactly, but once when I was at college I wrote a short story and got \$100 for it.

Miss Kulcher—Really? What was it?
Mr. Gay—"Dear Father: I'm broke. Please send me a hundred."



BLAST FURNACE OF THE WHARTON IRON WORKS AT PORT ORAM, N. J.