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THESIS.

Subject, Cookery

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The process of making coke is very simple. The coal is conveyed from the tipple to the ovens by means of a larry. These larries are great iron wagons with bottom or side discharges. They convey the coal from oven to oven by means of a track laid on top of the ovens and are hauled either singly by mules or in a train made up of several small larries and hauled by a small locomotive. Each larry contains sufficient coal to charge one oven, the charge varying from 125 to 175 bushels.

The oven most generally used is the bee hive oven varying in size from 11 to 13 ft. in diameter and 6 ft. in height with an opening at the top called the tunnel-head, also a large opening in the front called the door through which the coke is

drawn out. The door is kept closed during the process of burning. When the oven is charged the next step is to level the coal. This is done by means of a long iron scraper made for the purpose. When the coal is evenly distributed over the bottom of the oven the door is walled up with fire brick and plastered with a mixture made up of loam and sifted ashes. The first charge put into a cold oven is fired by using wood and refuse coke. After the first charge is burnt and drawn the oven does not require any firing as the walls contain sufficient heat to ignite the coal in about one hour. The coal burns from the top down. The airing of the oven is regulated by means of holes made around the

arch of the door. This ventillation allows the air to pass through the oven and the smoke and impurities are thus expelled through the funnel-head. It requires about forty-eight hours to make furnace coke and about seventy-two hours for foundry coke. The bee-hive ovens are used exclusively in this district, the fire brick used for their construction being made within the district.

For the construction of a coke oven it requires about 3000 crown and 1200 lining brick and 120 bottom tile with about 16 yards of masonary.

Coke is used to the largest extent in blast furnaces for making pig-iron or metal. It is also used for foundry purposes and for domestic

use. After being crushed and prepared into sizes to correspond with anthracite coal it has proved to be much more desirable than anthracite coal and much cheaper.

Authentic history gives Isaac Meason the credit of being the pioneer in the production of coke in this district. He built a rolling mill at Plum Lock, Fayette Co., Pa. in 1817. The first coke used west of the Alleghenys mountains was used in the refining department of this mill and was burnt in ricks on the ground. It remained for the Monongahela Valley to furnish the first coke made in ovens as a furnace and foundry fuel. In 1859 the Clinton furnace at Pittsburg made pig iron from coke made on

the south side of the Monongahela River. Afterwards they were furnished with coke made from the Fayette Coke Works. In 1855 statistics say there were but twenty-six ovens above Pittsburg. The census of 1850 shows there were but four establishments making coke in the United States. Reports of 1850-60 show that all the coke produced in the United States was made in Pennsylvania. Since 1880 the Connellsville region has produced about two-thirds of the coke made in the United States.

The Connellsville coke region is about forty two miles in length, stretching across the Monongahela Valley on the south to near Latrobe on the north. It ranges from one to five miles in width and contains a

coal area of 87776 acres which, at the present time (1896), sixty thousand acres are not mined, enough to keep up the supply at the present rate of production for fifty years. One of the valuable features of this region is the freedom from impurities and it also possesses a strength of cellular structure. The calorific energy of coke in the crucible of the Blast Furnace shows how easily the heat penetrates these cells and maintains rapid combustion, enabling it to bear a heavy burden in the furnace.

Carbon is the great source of heat in coke. Other properties being equal, the larger the percentage of carbon the greater the volume of heat. Through the great calorific energy, which is such a

characteristic in the coke of this region, a much greater quantity of metal can be melted in a given time, than with any other fuel.

Analyses made of coke by Prof. McGeath of Pennsylvania State Laboratory are as follows:— water at 225 degrees. 130, volatile matter. 460, fixed carbon, 89.576, sulphur. 521, ash 9.113.

Considerable quantities of coke are now shipped from this region to Mexico, Canada, and South America.

Very recently some attention has been given to the by-product ovens in this region. A plant of fifty ovens are now located at Dunbar. The object in these ovens is the saving of all by-products such as gas, tar, and ammonia. It is claimed

that per every ton of coal there are 10,000 feet of gas.

In this region we have been slow to accept the European system of coking with by-products, possibly on account of the ability to derive reasonable returns on capital invested under the present system.

The law of progress is universal and with the ingenuity characteristic of the American people the future of the coke industry is brilliant with hopes. Science and system promise to advance its interests.

We are now fully in the age of coke!