

the purification of the materials employed, two slags being made for that purpose, and carburization is effected in the furnace by carbon briquettes. The furnace is of the tilting pattern, consisting of an iron casing lined with dolomite brick. The bottom of the furnace is filled on top of the lining with crushed dolomite, upon which the charge reposes. Two electrodes pass through water-cooled joints in the roof of the furnace. The electrodes are vertical and parallel, and are adjusted vertically either by hand or a specially constructed regulator. An alternating current of 4,000 amperes of 110 volts is distributed to the electrodes. Different classes of steel are made by the company at a cost per electric energy absorbed of \$1.54 per ton of ingot. The selling price of steel varies from 363 francs 60 centimes to 123 francs 60 centimes per ton, depending upon quality. Interesting experiments were made for the commission at this plant in the production of pig from the ore in a very simple furnace consisting of an iron box of rectangular cross sections, open on top and lined with refractory material. The bottom of the furnace in communication with the iron casing constituted one terminal of the electric circuit. A carbon electrode of square cross section and about three feet in length, placed vertically in the open top of the furnace, constituted the other terminal. By hand regulation this electrode could be lowered or raised within the furnace. Thirty charges of ore were made during the working, and thirteen taps of metal and slag taken.

Dr. Haanel's report being of such a satisfactory character we imagine that the Dominion Government will make a satisfactory allowance to give the system a thorough test in Canada; and if it proves as successful as is hoped for it, no doubt a liberal bounty will be paid upon the product of steel achieved from it. The simplest form of aid would be to confine the bounty to such products as are made entirely from Canadian ores.

NATURAL GAS.

Information comes from London that a representative of the owners of certain oil wells, and oil lands in and about Petrolea, Ont., is now in that city endeavoring to induce British manufacturers of tubes and tubing to exploit the Canadian market for that article. Millions of feet of such tubing has been consumed in oil and gas wells in Canada, not one foot of which was made in Canada, nor in any other country except the United States, American manufacturers always having had a monopoly of the Canadian market. The use of such tubing is not confined to oil well operations, and there is a strong and growing demand for it for piping gas wells, and in the West in boring for water; and no doubt that in that section where lignite is found, gas will also be found. Should such be the case, which fact geologists should determine, it would be indeed a great boon to the army of settlers now flowing into that region, to find all the heat, light and power they require so close at hand. It is to be hoped that the British manufacturers of tubing will awake to the fact that they could find a profitable market for their products in Canada, but judging from the trend of the trade in the past, unless the Dominion Government give sufficient tariff encouragement to the industry, the American manufacturers will continue masters of the situation.

According to recently published statistics, there is no country in the world which can compare with the United States in the production of natural gas; and if the article can be found in considerable quantities in Canada, and as widely distributed, it would be a blessing that few realize. The combined production of all other countries is not over 1½ per cent. of the quantity produced in the United States, which had in 1902 a value of \$30,867,668. A large portion of even the small outside production goes into the United States from Canada.

Mr. F. H. Oliphant's report on the production of natural

gas in 1902, which the United States Geological Survey has recently published as an extract from its annual volume of "Mineral Resources," is full of interesting details about the history, output, value and uses of this most satisfactory combustible.

The records of early investigators and missionaries show that natural gas has been known to exist in natural springs in western New York, western Pennsylvania, central West Virginia, northeastern Kentucky and southeastern Ohio for at least 250 years. In 1775 General Washington visited a burning natural gas spring on the northeast bank of the Great Kanawha river in West Virginia, a few miles east of the present city of Charleston. He was so impressed by the phenomenon that he preempted an acre of land surrounding the spring and dedicated it to the public forever.

The earliest economic use of natural gas in the United States was probably made in lighting the village of Fredonia, Chautauqua county, New York, in 1821. The existence and utilization of this gas at Fredonia became widely known, both at home and abroad, and excited the liveliest interest among scientific men. So little suspected, however, was the presence of the enormous volume of gas since developed, that, when it was further explored, it was pronounced "unparalleled on the face of the globe," and Humboldt is quoted as declaring it the eighth wonder of the world.

Its introduction into commercial use was slow, but after its value was fully demonstrated there was a rush of capital and a large amount of money was invested in gas territory, gas wells and pipe lines. Then followed a period of reckless consumption and appalling waste. Many of the original fields were rapidly depleted of their high pressure. Not until it was fully realized that a large proportion of the natural supply had been consumed and dissipated by the extravagant methods in use, were improved means adopted for holding back the gas in the original rock reservoirs. This was done by shutting off the wells, by cutting off all blow-off standpipes and escapes, by improving the joints of the pipe lines, and by the more economical consumption of the gas.

The economy came rather late, but enough of the original supply remains, stored principally in the deep and prolific sands of northern and southwestern Pennsylvania and western West Virginia, to furnish this ideal household fuel for many years to come. What may be done by deeper drilling and improved methods to prolong its use indefinitely is yet unknown.

The most profitable customers that the natural gas companies have are the householders. Natural gas is eminently fitted for domestic uses, as every woman who has cooked by its convenient flame has realized, if she has ever had occasion to abandon it for a wood or coal range. She does not wonder that the gods were jealous of the hero who brought fire down from heaven in a hollow reed and showed men how to warm and light their homes and how to cook their food. His was a god-like gift and meant to mankind the beginning of civilization. It is from such primitive uses of fire as Prometheus taught that the natural gas companies of to-day derive nearly all their revenue. They supplied natural gas to 509,695 domestic consumers in 1902, and blessed not less than 4,500,000 people with it as an illuminant.

The number of natural gas companies that supplied the 509,695 home bodies and the 8,103 establishments in 1902 was 2,147, which represented a gain of 602 companies over the enrollment of 1901.

One of the most effective uses to which natural gas has been