

It will be interesting now to discuss what is being done in Europe.

As has already been stated, peat is the forerunner of lignite, and if it can be used for any purpose with efficiency, then it is reasonable to expect equal, if not better, results with lignite.

Mond gas plant has been installed at Orentana (Italy) to consume 100 tons of peat per day. Part of this gas is used in three 500-b.h.p. double-acting gas engines driving alternators in parallel. The current is distributed over the surrounding district and to the town of Pontedra, 14 miles away. Another plant gasifies German peat containing 40 to 60 per cent. of water and producing 85,000 cubic feet of gas having a heat value of 150 B.t.u. per cubic foot out of every ton of theoretically dry peat.

Mond gas plant is economical if the ammonia can be recovered, but so far as the information extends at present, the cost of commercial sulphuric acid delivered in Regina is too great for this.

Reference may be made to the Volcker furnace, which is shown on cartoon. A test was made at Leipziger Cotton Mills, Leipzig, Linderau, Germany, in 1903. There were three boilers, each having a water heating surface of 302.5 square meters and in 1908 another test was made at the Renate Mines, Germany. The general results are given below:—

	Leipzig.	Renate.
Water heating surface of boiler	907.5 sq. m.	267. sq. m.
Superheater heating surface ..	107.5 sq. m.	87.8 sq. m.
Grate area	25.92 sq. m.	10. sq. m.
Heat value of lignite combustible	2503 cal.	2019 cal.
Duration of test	7¾ hrs.	8 hrs.
Coal consumed	34,620 kg.	19,900 kg
Coal consumed per sq. m. grate area and per hour		247 kg.
Water evaporated	101,012 kg.	41,324 kg.
Water evaporated per sq. m. heating surface per hr. ..		19.19
Actual evaporation	2.86	2.08
Water from 0 deg. C. to steam 100 deg. C.	2.91	2.34
Steam pressure	10.8 atms.	12.8 atms.
Temperature of feed water....		36.4 deg. C.
Temperature of superheated steam	245 deg. C.	356.2 deg C.
Percentage of C.O. in flue gas	15%	12.7%
Heat absorbed in calories per kg. of combustible	1,826.3 cal.	1,489 cal.
Net thermal efficiency	72.9%	73.7%

As no information is given as to the proximate or ultimate analysis of the lignite, it is not possible to express any opinions to the similarity of the lignites used to that found in this province. Even allowing for some difference in quality, the results obtained are high.

In connection with gas producers, it is possible to obtain a certain quantity of steam as well as gas by means of water jackets on producers, economizers on gas engine exhausts, etc. With regard to water-jacketed producers, this has been adopted to a small extent in the States and in England, but apparently this arrangement has been more developed in Germany. One of the cartoons on the wall depicts a Kerpely producer encased in a Marischka boiler, in other words, the producer is provided with an enlarged water jacket, while the fire brick lining which is usually found inside producers is entirely absent in this case.

A large installation of these combined producers and boilers have been erected in connection with the Vienna municipal gas works at Leopoldau.

Coke breeze is used as fuel; this has a calorific value of about 10,000 B.t.u. per pound and contains 11.75 per cent. water and 15.8 per cent. ash.

These producers are 2 metres or 6 feet 8 inches in diameter, and have 55 square metres or 600 square feet heating surface. One kilogram of coke evaporated 1.13 kg. of water, and 11.4 kg. of steam were obtained per sq. metre of heating surface per hour at a pressure of 76 lbs. per sq. in.

The temperature of the feed water was 45.9 deg. C. or 114.6 deg. Fahrenheit, and that of the gas at the outlet of the producer was 220 degrees C. or 428 degrees Fahrenheit. As the temperature of the hot gas in other producers is ordinarily about 1,100 degrees Fahrenheit, it will be seen that a large absorption of sensible heat had taken place. The net value of the gas was 1,218 cal. per cubic metre, or 134 B.t.u. per cubic foot.

The gas had the following average composition:

Carbon dioxide	CO.....	2.78%
Carbon monoxide	CO.....	29.84%
Hydrogen	H.....	9.12%
Marsh gas	CH.....	0.8%

The loss of carbon in ash was 1.43 per cent.

The heat contained in the steam was 689 caloric; 3.8 cubic metres of gas were produced per kg. of coke, the specific heat of which was 0.31, and the heat value obtained was 3.8 c.m. x 220 deg C. x 0.31 = 259 calories.

To gasify the coke 0.18 kg. of steam was required per one kg. of coke.

The efficiency of the combined producer and boiler may be calculated as follows:—

Heat value of coke	5,636 calories
Heat value of steam used	110 "
	<hr/>
	5,746 calories
Heat obtained from steam	689 calories
Heat obtained from gas	4,628 "
Heat obtained from temperature of gas.....	259 "
	<hr/>
	5,576 calories

The total net efficiency of combined producer and boiler

was $\frac{5,576 \times 100}{5,746}$ equals 97 per cent.

The heat balance may be struck off as follows:—

11.99% in producing steam.
80.54% in the gas produced.
4.51% sensible heat of hot gas.

When the gas was cleaned and cooled ready for use in gas engines, the efficiency was reduced to 92.53 per cent. as compared with about 85 per cent. in other producers. As one kilogram of coke produced 1.13 kg. of steam of which 0.18 kg. was required in the generation of gas, the balance —0.95 kg.—was available for other uses. For example, as in this case, if 15,000 kg. of coke were consumed in 24 hours, the 600 kg. of steam per hour is available, which is equal to at least 60 h.p.

As this test was made with gas coke, it is a question that requires answering, whether equal results could be obtained with the consumption of raw lignite.

Another test made with the same make of producer, but without the encasing boiler, is stated to have resulted in a net thermal efficiency of 86.87 per cent., when consuming Syrian lignite of Austria.

Saskatchewan lignite is stated to correspond approximately in quality to the lignite of Bohemia and Upper Hungary. One German firm of engineers claim that the efficiency of their producers average about 80 per cent. and