

## Tests of Gas Producer

(Published by permission of the Director of the United States Geological Survey.)

A forthcoming bulletin of the United States Geological Survey, will contain an exhaustive report of the tests conducted at the Fuel-Testing Plant in St. Louis, Mo., and Norfolk, Va., on the gas producer. An interesting feature of the report will be the behavior of a certain bone coal from West Virginia in the producer. This fuel was considered of little or no value for steam boiler work, yet showed considerable usefulness in the gas producer, developing at the engine a brake horsepower per hour for 1.65 lbs. of coal.

This coal was delivered on the producer platform in lump form up to 8 or 10 inches in size. The coal crusher not being available at the time, necessitated breaking the large lumps with a hammer. The character of the fuel was rather peculiar; some of the lumps consisted almost entirely of what appeared to be a high-grade bituminous coal, others seemed to be nothing more or less than rock, heavy, hard, and when hit in the dark with a hammer numerous sparks could be readily seen. And again there were many lumps of this rock-like substance to which adhered much good coal. In the producer all of these lumps when not too large would burn entirely through. The fuel had no tendency to clinker or coke and worked exceedingly well, needing scarcely any poking. It contained a very high percentage of ash, about 45 per cent, thus causing the ash bed to increase in thickness very rapidly, and throughout the tests this fact was not properly appreciated; consequently much of the time during the test the ash bed was too high for best results. The fact that the coal had to be broken by hand and that it was unusually hard and rock-like had a tendency to allow lumps of coal much too large to be charged into the producer. These large lumps, very high in ash, did not burn entirely through; as soon as the burning was well started, a layer of ash formed around the lump interfering with the combustion of the remaining portion and before it had time to burn it had passed out with the ashes unconsumed. Because of the general appearance of the coal, but little was expected of it, and the test was started with only partial load. After several hours run, however, the results warranted full load on the engine. After 39 hours of full load the accumulation of ash in the producer caused a little trouble; the gas went down in heat value and it was necessary to reduce the load to about 9 per cent. of full load. After much grinding down of the ash bed and special care in breaking up the lumpy coal, the gas began to increase in heat value, and at the end of the test the producer was again in shape to maintain full load at the engine. The calculations for the tests are based on the 50 hours taken from the time full load was carried by the engine, and for this period the gas averaged 144 B. T. U. per cu. ft., with an average load of 97 per cent. of full load.

The following is the result of the test on the West Virginia bone coal:

### *Proximate Analysis of the Coal.*

Moisture . . . . .	0.47
Volatile Matter . . . . .	8.83
Fixed Carbon . . . . .	46.96
Ash . . . . .	43.74
	<hr/>
	100.00
Sulphur . . . . .	0.27

### *Composition of gas by volume.*

Carbon Dioxide (CO <sub>2</sub> ) . . . . .	9.7
Carbon monoxide (CO) . . . . .	19.5
Hydrogen (H <sub>2</sub> ) . . . . .	16.6
Methane (CH <sub>4</sub> ) . . . . .	1.6
Nitrogen (N <sub>2</sub> ) . . . . .	52.6
	<hr/>
	100.00

Duration of test . . . . .	50 hours
Coal consumed in producer, as fired, lbs. per hour . . . . .	378
B. T. U. of coal as fired . . . . .	8566
Standard gas per lb. of coal consumed in producer cu. ft. . . . .	44.1
Efficiency of conversion and cleaning gas . .	74.1
(1) B. H. P. developed at engine . . . . .	228.8
Coal per B. H. P. hr. developed at engine, lbs. .	1.65

(1) Based on an assumed efficiency of 85% for generator and belt.

## NEW BOOKS

### **History and Economics**

The fourth number of volume IV. of the series of "History and Economics" in the University of Toronto Studies contains a great deal of valuable information to the student of municipal questions in Canada. The mere repetition of the list shows the value of the book. It is as follows:

"Evolution of Law and Government in the Yukon Territory", by J. N. Elliott Brown, M. B., First Territorial Secretary of the Yukon.

"Local Government in British Columbia."

"Present Conditions," and

"Bibliography."

The above three are all from the able pen of Dr. S. Morley Wickett, B. A., Ph. D., formerly Lecturer in Political Economy at the University of Toronto.

"Local Government in the Maritime Provinces," by Walter C. Murray, Ph. D., Professor of Philosophy, Dalhousie University, Halifax, N. S.

"Local Government in Newfoundland," by D. W. Prowse, LL. D.

"Some notes on the Charters of Montreal and Related Statutes," by Hon. R. Stanley Weir, D. C. L., Recorder of Montreal.

"The Civic Administration of Montreal", by Hon. Paul G. Martineau, Judge of the Superior Court of the Province of Quebec.

"City Government in Ottawa", by Ex-Mayor Fred. Cook.

(This paper was published in full in the *Journal* of last March).

The list shows the subjects treated of, and the names guarantee that each subject is handled by one who is conversant with it.

The three previous numbers of the same volume have covered other parts of Canada, so that the whole volume forms a pretty good account of municipal affairs in Canada.

The number of post offices in the United Kingdom is over 22,850. There are about 371,021 road and pillar letter-boxes, and 188,001 persons (148,769 males and 33,262 females) employed by the post office.

For the convenience of Canadian trade an extension to the Liverpool, Eng. docks for the Canadian trade to cost over a million dollars is being considered by the board.