of external heat, will be partially, or wholly converted into gas. There are three principal processes for making gas from coal, the products of which are known respectively as:—

1st.—Illuminating, or coal gas.
2nd.—Water and producer gas.
3rd.—Semi-water gas.

Illuminating Gas.—The first (illuminating, or coal gas) is usually made from bituminous coal, as that contains a larger percentage of volatile matter, and less fixed carbon than anthracite, it being only the volatile matter that is converted into gas, the fixed carbon remaining in the retorts in the form of coke.

The coal is placed (in charges from two to four hundredweight) in fire clay retorts, hermetically sealed, which have been heated to the necessary temperature for gas making (from 1,800 to 2,000 degrees). The coal is subjected to this heat for a period of five or six hours, by which time the coal will have given off all the gas it is capable of evolving.

The gas, on leaving the retorts, passes through a pipe leading to the hydraulic main, where a portion of the tarry matter is deposited, and the temperature reduced to about 140 or 150 degrees.

From the hydraulic main it is drawn off into a surface condenser, where the gas becomes cooled to normal temperature, about 60 degrees, and deposits the tar and aqueous vapor previously held in suspension.

From the condenser the gas passes to the exhauster, the function of which is to remove the gas from the heated retorts as fast as it is produced, and at the same time force it on with sufficient force to pass it through the various materials used in its purification.

From the exhauster the gas enters the apparatus intended for the abstraction of the ammonia in same, consisting usually of a scrubber, or washer, or both. The function of these devices is to remove all the ammonia and some of the carbonic acid and sulphuretted hydrogen in the gas.

From the scrubbers the gas passes to the purifiers, where the remaining impurities—carbonic acid and sulphuretted hydrogen—are abstracted by means of lime and oxide of iron. Under this process the following are the approximate results obtained from a ton of Newcastle coal, according to an authority on the subject:—

Gas (10,000 feet)	380 lbs.
Tar (10 gals.)	115 "
Ammoniacal liquor	177 "
Coke (absolute)	1,568 "
	2,240 "