

former goes over the end of the sieve or jig with the overflow water and is collected, to be drained and dried later. The impurities fall to the bottom of the jig, from where they are drained off by a gate in the side. This is a single compartment piston-jig. Sometimes the impurities are more persistent or the coal is very small; in this case a series of two or more jigs is used. Two precautions are to be observed in washing—first, crush the coal as little as possible; secondly, wash the coal so that it can be easily and cheaply drained.

Washing frees the coal from sedimentary impurities; another operation is necessary to drive out the infiltrated impurities. This is the coking process. Coke is a strong, hard, cellular material, bearing the same relation to coal as charcoal to wood; it burns without smoke or tar and possesses a high calorific intensity. The advantage of these qualities is readily seen. It is cellular and consequently light, therefore transportation expenses are decreased. It is strong and hard; therefore it does not crumble, but remains in large pieces and its heat value is very great. It burns without smoke or tar, therefore it is invaluable for iron-smelting.

Coke is formed by heating bituminous coal in ovens in vacuo; decomposition occurs, and water, gases and volatile compounds are released. These released impurities are usually retained to create more heat; but sometimes the useful impurities such as tar and ammonia, are collected and only those remaining are burned. This latter style of oven is called the by-product recovery oven; that in which all the impurities are burnt is called the non-recovery oven. The non-recovery oven is more generally in use in Canada than the recovery oven. It is shaped like a beehive—because of this it is called the beehive non-recovery oven. In the top there are a few holes, which admit just enough air to keep the heat alive. The coal is fed through a door in the side; when it is heated, the gases are released and remain ignited over the coal, so that even when the exterior heat dies down, the oven remains hot, as long as the coal has any gas left in it. When the gases are entirely released, ignition ceases and the coke is cooled by a spray of water; very little water is required, as, too much would render the coke wet and heavy, and would cool the walls of the oven. As the process nears completion, hydrocarbons pass up from the bottom of the coal to the surface, where a layer of coke is already formed. These compounds break up and yield a silvery deposit of carbon