

## Coal Refining.

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THE history of the coal-mining industry of a country may almost always be divided into two distinct periods. This has been the case notably in Canada and the United States. When first coal was discovered in these countries the seams were large, the quality good, and the mines accessible. Right at the doors, so to speak, of the iron furnaces was found coal possessing great calorific value, and as a result the mining methods were hasty, cheap and wasteful. Only the very best coal was taken; that of inferior quality was either not touched or left as a heap of waste at the mouth of the mine.

But in a short time it became necessary to employ new methods. The demand for coal increased, as the supply decreased; the seams were deteriorating; and the consumers were becoming more exacting. The greatest consumers of all, the iron and steel industries, had to have pure coal; for three reasons. First, the ashes of the impurities blocked the grates of the smelting-furnaces; secondly, the heat was diverted to the purification of the coal itself instead of to that of the iron; and thirdly, these companies refused to pay for the transportation of useless weight, such as the impurities were. It was discovered also that gases e.g. sulphur and phosphorus, passing into the molten iron, render it unfit for use in the manufacture of steel.

The impurities in coal are of three kinds—innate, infiltrated and sedimentary. The innate impurities are those that were in the parent plant, and have become part of the chemical combination of the coal itself—such as silica and alumina. The infiltrated are those that have percolated through the ground while the coal was in process of formation, and have entered into the seams as a separate element. These are principally sulphur and phosphorus. The sedimentary impurities are foreign substances, such as slate, shale and rock floods whose seams run through the coal, and which become mixed with it in the mining process. The first two classes of impurities are removed by coking; the sedimentary impurities by crushing, sizing and washing.

Crushing and sizing operations are first performed to fit the coal for washing. These operations are possible because of