

## CHAPTER I

### INTRODUCTION AND HISTORICAL REVIEW

*Introduction.*—The intimate dependence of our comfort on a supply of cheap coal was brought home very forcibly to most of us during the strike of April, 1912, when ‘stove-nuts’ were quoted on the London Coal Exchange at 40 shillings the ton. Whether we use the coal itself in our sitting-rooms and kitchens, or warm ourselves, cook our food, and light our rooms with gas, we depend ultimately on the same fuel. Nor do we become independent of it by the adoption of electricity—generated as it is in most cases by steam-power raised by the combustion of coal. Our railways too, whether steam or electric, equally draw their vitality from a regular supply of the same source of energy. With our coal-supply cut off, our water-service, pumped by steam-power from the well to the reservoir, would soon fail us; and worse things would soon befall those towns whose sewage-system depends for its proper working on the assistance of steam.

The vast amount of coal demanded by our various manufactures is not so easily appreciated; but when

we reflect that, summer and winter alike, thousands of furnaces, forges, steam-engines, gas-works and coke-ovens, brick-works and lime-kilns, are devouring the fuel without cessation, while steam-vessels are not only consuming it but are carrying it to all parts of the world for foreign consumption, we gain some notion of the extent and importance of this great British industry.

In the sequel we shall see that the requirements of the coal-trade gave origin to an important series of useful inventions. The first steam-engines were constructed for no other purpose than the pumping of water from the mines; the locomotive was produced in order to convey the coal from the pit to the port of shipment, and with the introduction of iron rails laid the foundation of our present railway-system. In fine, the domestic, the municipal, and the commercial life of modern Britain depends for its very existence on, as it derives its vigour from, the fortunate circumstance that, many millions of years ago, some of the forests and swamps of the Carboniferous period spread across the site of the future Britain.

*Historical Review.*—Though the use of coal or lignite by the smiths of Liguria and Elis (Genoa and Southern Greece) is recorded by Theophrastus about 300 B.C., there is no evidence that the mineral was known in Britain before the Roman occupation. The

abundant supply of timber sufficed for all the needs of the natives, who required no lime in the construction of their primitive dwellings, and smelted their bronze and iron with wood or charcoal. There is little doubt, however, that it was employed to some extent by the Roman colonists, for smith-work and lime-burning. They also employed it for heating-purposes, on occasion, for coal-cinders were found in plenty in the hypocausts at Uriconium (Wroxeter) in Shropshire, and coal or its cinders have been discovered on the sites of many of the forts along the Wall of Hadrian. Their use of it seems however to have been very limited; no Roman remains have been discovered in any of our coal-workings, and though in the north of England they built their military stations close to the outcrops of the coal-seams, the Romans appear to have left the coal practically untouched.

The Saxon and English invaders seem to have known nothing whatever about the mineral. To them wood was the all-sufficing fuel; what little iron they had was smelted with charcoal, and their buildings, with the exception of a few churches, were constructed of timber, and needed no mortar; any lime they used was doubtless burnt with wood. They warmed their halls and their hovels alike with wood and peat, even in districts that abounded with coal. In Domesday Book no mention is made of coal,

though other minerals are alluded to. It could not have been long, however, before the Norman builders of castles and religious houses began to burn their lime and forge their iron with coal, but there is great difficulty in adducing contemporary records as evidence of this, owing to the fact that originally the term 'coal,' or, as formerly spelt, 'cole,' like the Greek *anthrax* and the Latin *carbo*, signified any fuel, generally wood. Unless therefore the document appealed to contains some contextual allusion to a pit, it is impossible to assert that the passage in question refers to the mineral fuel. Similarly the term 'collier' meant at first 'charcoal-burner'; and the 'Wood-collier's Arms' still survives (or did in 1895) as the name of an inn at Bewdley, affording an instance of this usage of the word among the charcoal-burners of the neighbouring Forest of Wyre.

There appears to be no uncertainty however about the records of Holyrood and Newbattle Abbeys, which allude to the digging of coal on the south shores of the Firth of Forth about the year 1200; and early in the reign of Henry III coal began to be gathered along the coast of Northumberland, where it was washed up by the surge from outcrops on the shore, and thus acquired the distinctive name of 'sea-coal'; and what is perhaps the first unequivocal reference to the mineral in England is contained in a grant, to the monks of Newminster

Abbey, by Adam de Camhous, of land on the coast near Blyth, with a road to the shore for the conveyance of sea-weed and sea-coal (*carbo maris*). This was a few years prior to 1236. With regard to the term 'sea-coal,' it is of interest to find that by the time of Henry VIII the origin of the name had become a matter of uncertainty; Leland regarding it as derived from the fact that the mineral was gathered on the shore, while Dr Caius attributed it to the mode in which the coal was conveyed to London.

During the reigns of Henry III and Edward I, coal-digging sprang up in most of the coalfields, but was most active in the great northern coalfield (Northumberland and Durham), owing to the facility with which the mineral could be floated downstream to the coast at Tynemouth. It was not long before it began to be shipped thence to London, where as early as 1228 it appears to have been sold to the lime-burners of Sea-coal Lane (still in existence near Ludgate Circus); and as one William of Plessey had property in Sea-coal Lane in 1253, the village of Plessey (north of Newcastle-on-Tyne) was probably the source of the first coal to reach the metropolis. In 1257-9 ship-loads of sea-coal arrived in London for the smiths—and lime-burners, probably—at work on Westminster Palace. In London the brewers and dyers were using it in 1306,

though it aroused the opposition of the citizens on account of its noisome smoke. Coal was employed by the smiths and lime-burners engaged on the Edwardian castles about 1300, *e.g.* Carnarvon, Beaumaris and Dunstanborough, as can be gathered from contemporary works-accounts; and in 1366–7 some 576 tons of it were brought from Winlaton in Durham county for works at Windsor Castle.

About 1300–25 coal began to be tried in a very shy fashion in the castles, abbeys and better sort of houses; for improvements in architecture carried with them improved chimneys and fireplaces, without which the new fuel, with its rank smoke, could hardly have displaced the less sooty and pungent wood-fire from the central hearth. By the middle of the 14th century the general demand for coal had increased considerably, and as early as 1325 a boat-load of the mineral left Newcastle for Pontoise in France; but this foreign exportation was prohibited in 1362 and 1367, except to Calais.

Up to this time the getting of the coal was not a very arduous business. The mineral no doubt was obtained at first from the actual outcrop, *i.e.* from the tract along which the coal-seam lay immediately below the soil, and could be got by simple quarrying. This method of ‘open-work’ or ‘open-cast’ would be specially applicable in those districts where the coals crop out along the steep sides of

hills and valleys (Fig. 1, p. 9). In such situations, moreover, the coal could readily be followed underground from its outcrop, and worked by horizontal tunnels known as 'day-holes' or 'day-levels,' which served the double purpose of affording an exit for the coal and allowing the works to drain themselves. But these modes were less suitable in flatter districts, such as parts of South Staffordshire; and there resort was had to the sinking of 'bell-pits' or 'bee-hive pits.' These were shallow pits sunk through the surface-beds to the desired seam of coal (or of ironstone), upon reaching which the pit was belled-out, and as much of the mineral removed as could be done with safety. The pit was then abandoned, and filled up with refuse from a new pit sunk hard by.

But by the middle of the 14th century opportunities for the application of these simple methods were becoming fewer in the north of England, and we begin to read of pits and water-adits, ropes and windlasses; in fact, coal-mining had entered on the second stage of its evolution, the 'pit-and-adit' stage (Fig. 1, p. 9). The earliest mention of coal-mining implements occurs in an inventory dated 1354 of property belonging to the monks of Finchale (on the Wear), in which are included *ij colpikkes*, *ij yeges ferrei*, i.e. two coal-picks and two iron wedges.

During the latter half of the 14th century the use of coal extended rapidly for all manner of

purposes where wood was employed before. The monks of Holy Island were using it in 1344–7 for warming their hall, their prior's chamber, and their infirmary, as well as in their brew-house and their lime-kiln. It was necessary now to win the coal over areas farther removed from the outcrop, and to follow it down in the direction of the dip. Pits were therefore required for raising the coal; and to allow the workings the benefit of natural or 'free' drainage, long narrow tunnels (adits, soughs, water-gates) were driven up to the workings from the lowest valley-bottom available, an arrangement that also provided the workings with a natural ventilation. The coal was carried to the bottom of the pit, or out of the level, on the backs of boys, girls and women, known as 'bearers,' and was raised to the surface in baskets with hempen ropes and windlasses.

During the 15th century the use of coal was steadily spreading. In London it was taking the place of wood on the hearths of the citizens, and in the maritime regions it was coming into use in the evaporation of sea-water for the manufacture of salt. Mention of water-gates or adits becomes more frequent, indicating that in many districts the pits were being deepened; and towards the end of the century (1486–7) the monks of Finchale had been obliged to set up a pump at their pits, which had apparently passed below the level of natural drainage,

and had entered on the third stage of their evolution, viz. the 'pit' stage (Fig. 1, below), when it became necessary to raise both coal and water by artificial means. In many of the coalfields, however, the 'pit' stage was not reached till the close of the 16th century. The tools used at this time were few and simple: picks and wooden shovels, 'scopes' (probably buckets) and ropes were all that were needed. At

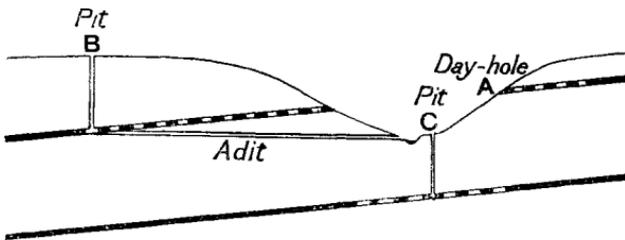


Fig. 1.—Section showing the three stages of coal-mining. *A*, the day-hole or day-level; *B*, the pit-and-adit; *C*, the pit. In the first, no machinery is needed for haulage or drainage; in the second, the coal is raised up the pit by machinery, and the water drains away by the adit; in the third, both coal and water are raised by machinery. (After R. L. Galloway.)

the close of the century the pitmen were still more or less serfs, and in some districts continued so till the reign of Elizabeth, who freed some of her serfs in 1574.

In the 16th century the growing scarcity of wood, which was steadily disappearing into the furnaces of the iron-smelters and salt-makers, gave an impetus

to the use of coal for domestic purposes. This was facilitated by improvements in the construction of fireplaces and chimneys that came in about the middle of the century. Various Acts of Parliament for preserving the woodlands and restraining the activities of the iron-makers were passed in the reigns of Henry VIII and Elizabeth, but with little effect. In the Newcastle district the general domestic employment of coal appears to have begun about 1570, previous to which its use seems not to have extended beyond the bloomery, the smithy and the lime-kiln ; and by the middle of the century a considerable foreign export had grown up ; but in view of the feared scarcity of fuel this trade was not encouraged. The corf or circular hazel-rod basket, in which the coal was drawn up the pits, is first mentioned in 1539 ; it was provided with a wooden bow for attachment to a hook at the end of the rope. This primitive vessel continued in use in some districts for special reasons even as late as 1871 !

About the middle of the 16th century coal was being used largely for salt-making by the monasteries along the coasts of Northumberland and Durham ; and in 1555 we first meet with a reference (in a book by Dr John Caius, one of the founders of Gonville and Caius College, Cambridge) to the noxious vapours given off during the working of the coal ; and the first recorded underground fire burned for some years