Coal Mining

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Introduction

Coal is formed by geological processes that take millions of years to complete and is usually found in ‘seams’ (layers of up to several feet thick) deep underground. Britain has been very fortunate in two respects with its coal. First, it has had more, better quality coal than most countries in Western Europe. Second, most coal seams slope up towards the surface of the earth and it has been common to find coal ‘outcrops’ on the surface, where it can be broken up and taken away for use. We know that these outcrops were used almost two thousand years ago in Roman Britain to provide heat and coal was much appreciated by the legionnaires in the forts along Hadrian’s Wall during the harsh British winter weather. These outcrops occurred in the North-East in Northumberland and Durham, in the North-West around Flint and Chester, and in the South-West in present-day Somerset. Along with firewood from the hedgerows and forests, coal was used mainly for heat, but it was also used by local craftsmen such as brewers, dyers and soap boilers.

Fuel remained relatively plentiful for eight hundred years after the departure of the Romans in 400AD. Firewood could be gathered from almost everywhere, and in most of the areas where coal outcrops were found, villagers were allowed to take coal that was available on the surface. But over that long span of years a crisis slowly emerged in fuel supplies, as wood became more and more scarce. It was an important building material, both for houses and ships. But it was also an important fuel (usually after it had been turned into charcoal) for a number of growing industries. Charcoal supplies were becoming scarce from the reign of Elizabeth 1 (the 1550s) and its price rose. Craftsmen began to look for new sources of fuel, and more and more turned to coal.

In fact, there is good evidence from archaeology that much more thought and effort had been given to using coal from around the 1300s. The first coal mines began to appear from this date. They were tiny and simple and not so very different from the tin and lead mines of Cornwall. Coal miners would dig coal from a hillside or down below the surface of an outcrop. In some cases, the mines were bigger and deeper but would involve very simple tools: picks, shovels, mallets and wedges to break down the coal, baskets to hold the coal, simple hand-operated windlasses to haul it from the bottom of the mine to the surface and buckets for clearing water from the workings.

The evidence for growing use of coal is simple but stunning. The archaeologists have found that very few houses had chimneys before 1600, but after that they became more and more common. They have also found simple industries turned to coal as the main source of fuel. This evidence from the archaeologists backs up historians’
efforts to calculate how much coal was mined. The best estimates suggest that in the 1550s about 200,000 tons of coal were mined each year. In the 1680s, the figure had risen to almost 3 million tons mined each year. To make this huge increase possible, there were big changes in the way the industry was organised, in the amounts of money invested, in the number of workers involved, and in technology.

**Organisation**

The most important problem to be decided was who owned the coal. Where coal occurred naturally on the surface, there was a strong belief that local villagers had the right to collect it and use it for their own purposes. But in the 1300s and 1400s there was a struggle in the law courts between the Crown and the big landowners over who owned the right to mine coal that was below ground. The courts decided in favour of landlords, and the more progressive land-owners would allow specialist miners to dig for coal, in return for a ‘royalty’, a payment based on the amount of coal mined. Until the time of Henry VIII, the church was one of the biggest landowners in the coalmining districts, but bishops and abbots generally did not encourage coal mining. However, when Henry VIII confiscated the estates owned by the church, he frequently sold the land to wealthy merchants, who were very keen to make money from their new lands. A very famous example occurred in the North-East of England, where the lands confiscated from the Bishop of Durham were sold to a group of Newcastle merchants who already had strong business interests in the coal trade. They were quick to begin coal mining in their new lands. Since these changes occurred at roughly the same time as the price of fuel began to rise steeply, the big land-owners began to follow the lead set by merchants. Some of the biggest landowners in the country became very important coal owners and the payments they received from coal-mining became a very important part of their family wealth.

Land-owners usually had very little talent for starting and running businesses. Nevertheless, a few learned the skills needed to become successful mine owners. More often, land-owners went into partnership with merchants who had more experience in running a business. The combination of land-owners’ family wealth and the practical, commercial skills of merchants was used to develop the larger coal mines. In other cases, small mines were run by a sole ‘proprietor’, who frequently had only a handful of workers, and even these workers would have other jobs (like farming) for part of the year. It was common for large and small mines to exist side-by-side in most coalfields. The small mines were far more common, but they were relatively inefficient and produced only a tiny proportion of total output. The reason for so many small mines was that there were many shallow, easily-found coal deposits. Even as late as 1700, coal could still be mined with little more than primitive tools and equipment. These mines could survive because they needed a relatively small local market, and could easily charge prices only slightly below those of the competition.

But as this easily found coal was gradually discovered and worked out, new skills and methods were needed. First, once the shallow coal had been mined, the mines had to be deeper, and this meant more powerful machinery to get the miners to the coal face and the coal up to the surface. The deeper the mine, the more it was likely to flood. There was also an increasing threat of explosions as mines became deeper.
Coal seams usually contain an explosive gas, methane. The standard method of dealing with methane until the 1800s was to sink additional mineshafts to allow a better circulation of air underground. This was, of course, expensive. It was also dangerous as the most common method of ensuring that the air circulated as rapidly as possible was to light underground fires, often tended by miners’ children. Also, better machinery was needed to drain water from the deeper mines. These mines needed much higher levels of financial investment to dig the shaft and to equip the mine with the machinery needed. To make these deeper, more expensive mines profitable, it was necessary to produce more coal, and this meant more workers underground. All these changes brought about a big change in the way that mines were organised and managed. Bigger, more complicated mines needed more managers to ensure that accurate records were kept of the amount of coal produced (so that the owners received proper royalties) and to ensure that machinery and workers were used most efficiently. This new job of mine manager, or ‘overseer’, began to appear in the 1600s and numbers gradually increased into the 1800s, when a huge expansion of coal mining began in Britain.

**Investment**

By 1800, mine owners were forced to dig deeper and deeper mines to get access to the underground coal deposits. Company records from Northumberland in the early 1800s that new mines were, on average, 120 to 180 feet deep. Some were as much as 300 to 400 feet deep. To dig such deep pits was expensive, and very costly if they had to be dug through hard rock or through underground water courses. Every coal mine needed additional shafts to increase ventilation. To get miners down the shaft and coal back up, it was common for mines to use horse-driven winches. Horse-driven pumps were also common to drive water from the mine. Horses, winches and pumps added to the costs of setting up and running a mine. Coal had to be transported from the mine to market, and this too required much expenditure in horses and carts, and was not helped by the very poor state of Britain’s roads in the 1700s and early 1800s. In the early 1700s, the average mine in Northumberland cost approximately £1,500 to open, and the bigger mines could take as much as £20,000. In today’s money, this is equivalent to £120,000 and more than £1.5 million. By 1830, we think that the average coal mine in Northumberland cost £50,000 to equip, equivalent to almost £2.5 million today. This raises two important questions:

- Where did the money come from?
- How did the mines produce enough coal to justify such huge expenditure?

Raising such large sums of money was very difficult. Large landowners could borrow, using their income from farming or their family wealth as collateral. We saw in the last section that partnerships were often used to bring together a small group of people with the qualities needed to start and manage a mine. These partnerships became more common and complicated as it became clear that bigger, deeper, more expensive mines were needed. For example, there might be the wealthy landowner (who brought the right to mine coal on his land), a rich merchant (who knew about the marketing of coal and also had large amounts of money to invest), a mine manager (who knew the details of how to organise the layout and efficient working of coal-mining) and someone trained in science (to decide where might be the best
place to sink the mineshaft). It was common for the profits from a successful mine to be used to finance the starting of a new pit.

We must also remember that the biggest part of the cost of coal, at least until the late-1700s, came from the cost of transporting it from the pit to the market. At that time, the roads were in a very poor state, and coal had to be carried in relatively small loads by pack horse or by wagon. Those coal mines that were close to water had an advantage because it was cheaper to send coal by river or by sea. For this reason, most of the coal that was burnt in London was mined in Northumberland because the pits were located close to either the sea or one of the big rivers, like the Tyne or the Tees. One of the most famous big investments in coal mining history was the decision by the Duke of Bridgewater to build a canal from his mine in Runcorn to Manchester. It cost the Duke almost £2 million in today’s values to build the 39 mile canal, but it allowed coal to be transported much more cheaply, and for its price in Manchester to fall dramatically. This meant that it was profitable for more businesses and households to use coal and output from the Runcorn mine soared. The Bridgewater Canal was the first to be built to connect a mine with its market, but its huge success led more mine-owners and financiers to copy the Duke’s example. The period between 1760 and 1830 is often known as ‘canal mania’.

Labour

The price of coal would not have fallen so much if it had been impossible to recruit ever-increasing numbers of coal-miners and workers to dig the canals. By 1700, the typical coal mine in Northumberland had about 100 employees. By 1800, mines employing 500 or more were common. The surge in coal-mining and the coal-mining work-force is clear:

- In 1700, there were approximately 16,000 miners
- By 1800, the number had risen to about 50,000
- By 1850, the number had risen above 200,000
- By 1900, there were nearly three-quarters of a million miners (730,000)
- At the start of the First World War, Britain had more than one million coal miners
- In 1950, there were still more than 700,000 employed in the industry
- Today, there are fewer than 3,000

The expansion in the 19th century was extremely rapid. At that time, employment in coal mining was physically very hard work, but the majority of coal miners needed few skills. The knowledge that a coal-miner needed could be learned at the pit. Coal-mining recruited from unskilled workers across the economy, but especially from farm workers. In fact, the number of Britain’s farm workers declined as the number of coal-miners increased. For example, the huge growth of the South Wales coalfield from the 1850s was made possible by the migration of agricultural workers into the valleys from all parts of Wales and South West England.

These very high levels of migration were possible because coal-miners gradually became among the best-paid manual workers. It is very interesting to see how the wages for miners compared to those of other unskilled labourers. Of course, wages
varied from area to area, from pit to pit and were much higher in good years (when the demand for coal was growing) than bad. But, in very general terms, until 1850, coal miners earned little more than workers in other unskilled and semi-skilled jobs, except in years when there was an exceptional rise in the demand for coal. But from the 1850s, when the very, very rapid growth of the coal mining work-force took place, the mine managers needed to offer higher and higher wages to get the workers they needed. Wages still fell back during recessions, but gradually the coal miner became among the best paid of all British workers.

The nature of the work, especially for the workers at the coal face, was tough and dangerous. Even as late as the 1920s, miners had few machines to help them. Coal was got from the coal face by pick axe, and was loaded into small wagons by shovel. The work of hewing the coal by pick axe was undertaken by men, but the loading of coal to get it away from the coal face and to the shaft created opportunities for the employment of women and children underground. In many mines, these wagons were pulled by ‘pit ponies’ along tracks (like small railway lines) from the coal face to the bottom of the shaft. Children had an especially important role in guiding and caring for these animals. At the bottom of the shaft, the coal was raised to the surface by the winding gear that could be seen at the top of every deep mine. The air underground was awful. It usually contained tiny particles of dust, that gradually damaged the lungs of the underground workers. Deep mines were often very hot. Many mines had constant problems from flooding. As the miners dug more and more coal from the coal seams, the coal face was driven further and further from the mine shaft and these tunnels sometimes collapsed under the weight of the rock above them.

The biggest fear for the coal miners and their families was explosion. Some coal seams contained pockets of an explosive gas, fire damp. If this gas was ignited, by a naked flame, it would explode, and would set light to the dust (tiny particles of coal). The explosions would cause rock falls and the fierce fires could set alight the coal, and underground fires were very difficult to put out. The mines developed two ways to avoid explosions. We have already seen the first, which was to ensure that mines were ventilated, by having at least two shafts from the mine to the surface. It was hoped that the circulation of air would remove the dangerous gases. This was, however, not very effective, especially because miners had to use candles to provide light underground, and the naked flame could easily cause the gases to explode. In the early 1800s, a number of inventors tried to create a ‘safety lamp’, to provide light for working miners without creating a naked light to ignite the dangerous gases. Sir Humphry Davy’s name is forever linked with the introduction of an effective safety lamp, but his was only one of the types used. In truth, the safety lamp was continuously improved during the 1800s.

For the most part, coal deposits were found in rural areas, away from the main towns. The mine owners therefore had to build the houses, schools, roads and other aspects of normal everyday life. Mining communities can be very distinctive and often cut off from other forms of employment. The miners’ cottages in the valleys of South Wales or the pit villages of County Durham are good examples of these types of coal mining communities. Because they grew up around a single industry with few local alternative sources of work, coal mining towns and villages developed very distinct
social and cultural lives. They quickly created a sense of community solidarity. In part, this came from the need to work together underground. In part, it was created from the way that major accidents underground could be so devastating, killing large numbers of workers in a single catastrophe. This sense of solidarity can be seen in the organisations common in coal mining communities. South Wales has its male voice choirs and the North East its brass bands. Both show the efforts of miners to create a distinctive working class culture, tied to the unique nature of pit work.

But the best example of the very distinctive culture of coal-mining communities is the union. Coal-mining was one of the first industries to have strong trade unions. The danger of the work, the need to work together and suspicion of an employer who could also own the houses in which they lived and provide the only shop for food encouraged miners into unions. Most historians now think that the unions had little impact on miners’ wages. But they had their biggest impact in promoting safety and compensation for workers who were hurt in mine accidents or who had their lives gradually ruined by the lung diseases that were so common among workers who worked in the industry. Often, changes were negotiated with the local employer, pit-by-pit, but from the 1880s onwards mine unions tried to have conditions in the industry regulated by Parliament.