

Barthelemy Faujas de Saint-Fond on the Newcastle coal-mines, 1784.

(Barthelemy Faujas de Saint-Fond, *A Journey through England and Scotland to the Hebrides in 1784*, ed. Sir Archibald Geikie (1907), I, pp. 135-142; in D. B. Horn and Mary Ransome, eds., *English Historical Documents, Vol. X, 1714-1783*, N.Y: Oxford University Press, 1969, pp. 479-81.)

The coal-mines in the neighbourhood of Newcastle are so numerous that they may be regarded as not only one of the immense magazines of England, but also as the source of a profitable foreign commerce.

Vessels loaded with coal, for London and different parts of Europe, sail daily from this port, and, so to say, every hour of the day. Besides this commerce, the navigation which results from working these mines, gives an incalculable advantage to the navy, by forming a great nursery of seamen. In time of war, more than a thousand coal vessels can be armed, and do considerable injury to the enemy's commerce.

In this practical school of navigation are to be found men inured to every danger. The celebrated Cook began his naval career, as a sailor, on board of a Newcastle collier; . . . The modest house in which he was born, in the neighbourhood of Newcastle, is preserved with veneration.

The coal-mines, in the neighbourhood of Newcastle, are situated in so fortunate a position that the soil which covers them yields fine pasture that supports herds of horses. Under this fertile soil there is to be found a sand-stone, of excellent quality for grind-stones. This second richness of the earth forms another extensive object of trade for the industry of the inhabitants of Newcastle: these stones have so great a reputation, that they are exported to all the ports in Europe.

The first mine I visited belongs to a private individual: it is situated about two miles from the town, and requires one hundred men to work it; thirty for the work above ground, and seventy in the pit: twenty horses live in this profound abyss, and drag the coal through the subterranean passages to the pit-bottom; four outside work the machine which raises the coal, and some more are employed in auxiliary labours.

The following is the order of the mineral substances, as they appear in descending to the coal:

	Feet
Vegetable soil of good quality	2
Beds of rounded pieces of limestone and sandstone	15
Grey clay, more or less pure	16
Hard Quartzose sandstones, with flakes of mica	25
Very hard black clay, somewhat bituminous, intermixed with some specks of mica	26
Black clay, more bituminous, and partly inflammable; when the laminae of this clay, which separate with facility, are examined with attention, some prints of ferns appear, but they are scarcely discernible.	18
Total	102

At this depth of one hundred and two feet the coal is found. The seam is five feet thick in some places, and varies in others; but in general it is easily wrought, and much of it is brought up in large blocks. This last circumstance is of considerable advantage, as such pieces are always easily transported, and are besides well suited for chamber fires; which makes this kind of coal sell at a higher price.

When the bed of black and bituminous clay is penetrated, the coal is found adhering to it; but this is not always the case, for- there are other mines in the neighbourhood where the roof is of sandstone, which in the points of contact is mixed with coal to the thickness of two or three inches; the latter imbedded in the sandstone, in the form of splinters which, when attentively examined, have the appearance of wood.

The mine has a large steam-engine for pumping out the water, and at the same time working a ventilator to purify the air.

The winding machine which raises the coal from the pit is convenient, and easily worked by two stout horses. The buckets, in which the coal is brought up, are not of wood, but of osier, strongly made, and having an iron handle. They contain at least twelve hundred pounds of coal each; and as the one ascends while the other descends, one of these baskets arrives at the mouth of the pit every four minutes. It is received by a single man who while it is yet suspended, places it upon a truck drawn by one horse. He then unhooks the basket, puts an empty one in its place, and pushes the truck to a place somewhat raised at a short distance, where he empties the basket on the latticed roof above a kind of shed; the dust passes through the open spaces and falls below, while the large pieces of coal rolling down the inclined plane, fall upon the ground in heaps on the outside of the shed. Waggon, which I am about to describe, then take it up, and carry it to wharfs on the river-side.

It might be expected that the land transport of such an immense amount of coal would require numberless horses and men, which would involve immense expense. But art has surmounted this difficulty in the following manner.

Roads which have an almost insensible inclination are formed with the greatest care, and prolonged to the place where the vessels are loaded. The length of these roads is often more than several miles.

This first operation being finished, two parallel lines are traced along the road, at the exact distance which separates the wheels of the waggons. Logs of hard wood are then laid along these two parallel lines, and firmly fixed in the earth with pins.

The upper surface of these logs is carefully cut into a kind of moulding, which is well rounded, and projects upwards. The thickness of this elevated ledge must correspond with the width of the groove in the waggon-wheels, which are made of cast-iron, and hollowed in the manner of a metal pulley.

These wheels are completely cast in one piece, in a mould from which the rim comes out hollowed. This large groove is several inches deep, and of a proportional width; so that the wheel exactly encases the projecting part of the log, from which it cannot slide in any direction. As the moulding is well greased and is also polished by continual friction, four-wheeled waggons, containing eight thousand weight of coal each, move along the inclined plane, by the laws of gravity, and proceed as it were by magic one after another, until they reach the Tyne. Arrived there, a strongly and artistically made wooden frame prolongs the road for several fathoms at such a height above the water as to permit vessels to pass below it on lowering their masts. A man stationed on the platform opens a hatch, whence a large wooden hopper descends towards the vessel, the hatches of which are open. When the waggon comes to the trap in the platform it

stops, its conical bottom opens, and all the coal runs in a moment through the hopper into the vessel. The waggon being emptied, returns by a second road parallel to the first. Other waggons follow the same course after having been in this manner relieved of their contents; and in a short time the vessel is loaded. A few horses suffice to bring back the empty waggons to the pit, and they soon return with a new freight of coal. This contrivance, as expeditious as it is economical, soon repays the cost of constructing the roads.

I have here given but a rapid sketch of these extraordinary roads, which are varied in several ways. It would require me to enter into details which might prove too long, and ill-suited to the nature of this work, were I to describe all the ingenious means which art and industry have employed in working wonders of this kind. Where local circumstances have permitted, the weight of the load, and the accelerated movement have been combined in such a manner, that files of loaded waggons run down the inclined plane and at the same time cause the empty waggons to reascend without the assistance of horses, along another road parallel to the first.

The great economy produced by these ingenious contrivances, which save the employment of men and horses, enables the English to sell the coal which they export in such abundance to all our ports on the ocean and the Mediterranean, at a price lower than that of our own mines, in all cases where we have to bring it only three or four leagues by land. . .