

**Atkins, P.J. (1993) Causey Arch and the industrial revolution in north east England, pp 182-184 in Sargent, J. & Wiltshire, R. (Eds) *Geographical Studies and Japan* Folkestone: Japan Library**

Causey Arch in County Durham (grid reference NZ 205 562) is a site symbolic of the very fundamental restructuring of the economy of the north east of England which took place in the 18th and 19th centuries. The spatial evolution of the northern coalfield was a complex outcome of the interaction of a number of significant factors. Geological conditions were of course a constraint, but we must also consider the available mining and transport technology and the facilitating organization. There is room here for only a brief resume of two main points: the attempts by entrepreneurs to monopolise space, and the outward linkages of the region with other parts of an emerging national economic system.

As some of the pits close to the River Tyne were worked out in the late 17th century, it became imperative to develop sources further afield. This could only be accomplished if ready access to the river was maintained, but pack horses or carts were slow on the poor contemporary roads, and therefore expensive. The solution was purpose-built wooden railways or waggonways along which coal could be hauled with reasonable efficiency by horse power and gravity. These linked with staithes along the river bank from which coal was landed into keels, for transport downstream to waiting ocean-going ships. Waggonways were costly to construct and 'wayleaves' had to be negotiated with landowners to cross their land. In the early 18th century these expenses were increasingly shared by partnerships of colliery owners who, by pooling their resources, were able to make investments they could not have contemplated individually. The most famous such group was the Grand Alliance formed in 1726 by, amongst others, William Coteworth, Henry Liddell, George Bowes and Edward Wortley, who attempted to monopolise space on the coalfield by buying up wayleaves and paying 'dead rents' on potential colliery sites they had no immediate intention of developing.

Causey Arch was constructed by Liddell and Wortley in 1725-6 over the Causey Burn for branch lines to join the new Tanfield waggonway, which ran 13km north east to the Tyne at Dunston. This was for several decades the longest single span arch in the country and is reputedly the world's oldest surviving railway bridge. In the early 1730s up to 500 waggons per day paid tolls to cross the bridge and then ran by gravity for much of the route northwards. Horses were used to pull the empty waggons on the return journey. A replica coal waggon (built to carry 33 cwt) and length of double wooden track are displayed near a viewpoint where visitors have a spectacular view of the 100ft deep river gorge.

As the waggons left the arch on their journey to the staithes, they passed over a substantial embankment, again built as a crossing of Causey Burn. The stream itself was culverted and many thousands of tons of fill must have been carted in. Whereas Causey Arch fell into disuse after 50 years, the embankment carried the Tanfield Railway until 1962 and a main road until the present day. The Tanfield Railway surprisingly did not use iron rails until 1839 and the introduction of steam locomotives was delayed until 1881.

The theme of intra-regional spatial monopoly must be considered in conjunction with the linkages which the north east had with other regions. Inward investment and the extraction of surplus value by externally controlled manufacturing enterprise is epitomised locally by the activities of Ambrose Crowley who in 1691 located his ironworks on the lower reaches of the River Derwent to the north of Causey.

The ready availability of water power, charcoal, coal, millstone grit for grindstones, and quantities of ironstone in the coal measures encouraged metal working and the production of edge tools in this area. In 1687 a number of German sword makers escaping religious persecution had already migrated to Shotlcy Bridge. Crowley, who came from a famous nail making family of Stourbridge in Worcestershire, arrived in Sunderland in 1682 with the intention of using cheap local coal and imported Swedish pig iron. His employment of skilled foreign workers proved unpopular, however, and in 1690 he moved his enterprise to Winlaton. Crowley's ironworkers produced a wide range of goods from pots and hinges to anchors and cannon. In 1703 he installed steel furnaces and supplied the metal to the swordmakers. The business prospered, expanding to Swalwell, and in 1768 it was described as 'among the greatest manufacturies of the kind in Europe'. It is interesting to note that, although factory-style production was an important element of iron and steel making, here much of finished output was the responsibility of blacksmiths employed on an outwork basis. Crowley's employees were subjected to a strict regime of rules and regulations, but a school was provided for their children and by contemporary standards working conditions were good. Most of Crowley's products were exported to London, where the East India Company was a major customer, and, since the company's headquarters were at Greenwich, the profits left Tyneside. Ambrose Crowley was knighted in 1706 and his family kept an interest in these factories until 1863.

The north east has had a peculiarly disadvantaged, one might almost say 'colonial', type of industrial economy for the last 400 years. Primary extraction, principally coal but in the nineteenth century also lead and other minerals, was closely linked to the export of domestic and other grades of fuel, with only a relatively small quantum of locally added value. Much of the manufacturing which came to be established was subject to exogenous ownership and control. These are two of the inherent weaknesses which still haunt the region's economy.

#### *Reference*

Atkins. P.J., 1990, 'Historical geography of Newcastle', in Atkins, P.J. (Ed.) *Durham Geographical Fieldwork*, Department of Geography, University of Durham, pp. 111-27