

Technology and the Way We Live: Child Labor in the Coal Mines of Industrial England, 1800-1842

By Michael Hahn

The British Industrial Revolution saw the arrival of the steam engine as a motive force in the development of England's machine-based manufacturing economy. Machinery fueled by coal became the backbone for sustaining high levels of output in textiles and cast-iron products. The marvel of coal-powered machinery, however, did not come without a cost. By 1800 a large number of English, Scottish and Welsh children were employed in mining coal. By 1842 the extent of child labor and the awful work conditions were brought to a focus in the Mines and Collieries Act that revealed the strife of an exploited labor force in industrial England.¹

A large workforce capable of quarrying coal from deep underground was needed to sustain an industrial dependence. Since the cost of employment could be kept low if children from working-class families were employed, fathers would usually bring their children to mines in search of their first jobs.² This cohort of potential workers consisted of both boys and girls of a mean age of 10.33 years. According to Humphries, this age fluctuated by a standard deviation of 2.62 years indicating the range of first-time employment from middle-childhood to early adolescence.³ Coal mining was listed as the fourth most frequently recorded first job for children.⁴

¹ In 1842 Parliament of the United Kingdom passed the Mines and Collieries Act prohibiting all females and boys under the age of 10 from working underground in coal mines.

² Tuttle, Carolyn. *Hard at Work in Factories and Mines*. Pp. 150.

³ Age at starting work according to father's occupation group.

⁴ Humphries, Jane. Table 8.1 *Most frequently recorded first jobs for 10-14 year old males in England and Wales, 1851 census*. Pp. 212.

The employment of children was sensitive to changes in the demand for labor.

Proportions of the child population aged 5-14 in England and Wales was 22.98% in 1811 and 24.41% in 1831.⁵ From 1750 to 1851 the population of England and Wales increased from 5.8 to 16.7 million.⁶ According to the census of 1851 that includes the occupations of employed British children aged 10-14, 8.8% of males and 0.8% of females worked in coal mines.⁷ These surviving census data provide an estimate that the number of coal-mining males aged 10-14 in England and Wales was about 23,000 by 1842.⁸

Fathers who cut coal recruited and supervised their own children to assist them in a decentralized subcontract system. In Bradford and Leeds, for example, the child's wage was derived from the father's need for assistance.⁹ It did not reflect the child's productivity.¹⁰ Children aged 5-13 could expect, on average, from two to five shillings per week.¹¹ Scant data from 1821 to 1850 suggest that the Bradford and Leeds average was approximate to every colliery with a subcontracting system of this kind.¹² The weekly wage for the child's work was handed back to the father almost as quickly as it was earned. Changes in the net-family income would therefore indicate a contribution from the child's labor.

⁵ England 1771-1871: E.A. Wrigley and R.S. Schofield, *The Population History of England, 1541-1871* (Cambridge, 1981) app. 3, back-projection results, table A3.1, pp. 528-9; England and Wales 1891-1931: B.R. Mitchell, *British Historical Statistics* (Cambridge, 1988), pp. 15; 1981: D. Coleman, 'Population,' *British Social Trends Since 1900*, ed. A.H. Halsey (London, 1988), table 2.42, pp.106.

⁶ Kirby, Peter. *Child Labour in Britain, 1750-1870*. Pp. 26.

⁷ Census 1851, pp. 1852-53, LXXXVIII, tables xxv, xxvi. From *Child Labour in Britain, 1750-1870* by Peter Kirby.

⁸ This is indicated by Kirby's table of data from the 1851 census. We extrapolate backwards to arrive at an estimate of males employed in coal mining during this time, for evidence from 1800 to 1842 is fragmentary and therefore not conclusive. There is not enough evidence for girls during this time to provide an estimate.

⁹ British system of pound (£), shilling (s.) and penny (d.) wherein there are 12 pence per shilling and 20 shilling per pound.

¹⁰ W.R. Wood, Esq., Report, § 28: App. Pt. II., p. H 5, 6. British Parliamentary Papers of 1842.

¹¹ Average based on the table from the British Parliamentary Papers, 1842, for Bradford and Leeds indicating a sample group of 758 children aged 5-13. Data come from the total amount of wages per week beginning with; 0£, 2s., 6d. for children aged 5-6, and ending with 51£, 2s., 9d. for children aged 12-13. Pp. 155.

¹² Humphries, Jane. Table 8.4. Money wages of boys per week or per year. Rymer, 1976, pp.4; Henderson, 1997, pp. 77.

A child's economic dependence was sometimes abused by those fathers who paid for the labor of their children. Some fathers "took advantage of their children and paid them less than they deserved."¹⁴ This control would often increase the father's complicit desire to maximize his family's income for self-indulgence since children had negligible bargaining power. "Father took sister and I [sic] down [into the mines]; he gets [sic] our wages."¹³ Particularly in the mines of Lancashire and Oldham, a child's mere presence alongside his father put more money in his father's wallet. This was due to the mine owners' perception that the father's efficiency would be significantly increased by the labor of his son or daughter.¹⁴ The reality was that a father's efficiency was likely to increase only slightly with the aid of his child.

Collieries that could specialize exclusively on coal excavation saw the largest profit by hiring child laborers. They quickly realized that yield could be increased by children whose sole task was to bring dislodged pieces of coal to the main shafts of mines to be brought to the surface.¹⁴ Because coal mining had very few mechanized processes for extraction, any increase in yield was due to increase in labor.¹⁴ As the demand for coal grew, the industry expanded their operations in scale and increased their productivity by employing more children to do the manual labor.

The nature of coal production was regionally differentiated. Large coal producing districts, such as those in the north-east and south Wales, grew their production rates rapidly while west Yorkshire and east Lancashire had smaller rates of production.¹⁵ Nevertheless, by the 1840s child laborers made up about 10-13% of the overall mining force, about 15-20,000

¹³ Agnes Moffat, seventeen years of age, began working in the East of Scotland at age ten. *Nature of the Employment in Coal Mines*. British Parliamentary Papers of 1842. Pp. 93.

¹⁴ Tuttle, Carolyn. Hard at Work in Factories and Mines. Pp. 151-152, 149, 151.

¹⁵ Kirby, Peter. Child Labour in Britain, 1750-1870. Pp. 76.

children.¹⁶ Mining districts that employed less advanced methods of ventilation, or those that lacked in technological innovation for the extraction of coal, would see the largest number of employed children. Technological modernization and regional differentiation therefore influenced the size of the child labor force.

By the start of the 19th century coal had to be cut or ‘hewn’ from its origin and removed using the Newcastle system. In this system the underground map of the mines looked much like blocks in a city square; each block was connected by a system of roads to ease transportation of the hewn coal to the surface and to allow for the flow of air.¹⁷ Putters, typically youths of ages 14-18, pushed heavy carts to places where they were filled with hewn coal, then fixed to a crane and hoisted to the main shaft.¹⁷ Their labor was critical for the manual extraction of coal in the Newcastle system.

By the 1840s, child labor in the coal mines was nearly ubiquitous as children were invaluable laborers for specialized tasks. The youngest children aged 6, 7 and 8, began their work as trappers, opening and closing ventilation doors for coal to reach the surface and then closing them quickly to preserve airflow.¹⁷ Slightly older boys, aged 9-12, worked alongside hewers collecting coal and dumping it into wagons to be hauled out in wheelbarrows.¹⁸ In Derbyshire, boys pushed wagons, dragged baskets, and drove horses to haul coal to the surface.¹⁸ Nearly every mining district in England employed children in some capacity in coal extraction.

¹⁶ P. Kirby, ‘The Historic Viability of Child Labour and the Mines Act of 1842’ in M. Lavalette (ed.) *A Thing of the Past? Child Labour in Britain in the Nineteenth and Twentieth Centuries* (Liverpool, 1999), table 4.1, pp. 105.

¹⁷ Tuttle, Carolyn. *Hard at Work in Factories and Mines*. Pp. 155, 156, (1853: Pp. 156), 197.

¹⁸ *Nature of the Employment in Coal Mines*. British Parliamentary Papers of 1842. Pp. 67-107, 69-70.

Labor was distributed indifferently amongst girls and boys with no distinction of sex. Girls worked alongside boys and men, often bare-breasted, and participated in nearly every aspect of coal extraction.¹⁹ Where male hewers weren't available, girls would cut coal.¹⁷ In the mining towns of Bradford and Leeds, girls hauled coal by dragging carriages from behind by attaching them by chain to their midsections.²⁰ In Lancashire and Cheshire both boys and girls pushed wagons on rails and dragged carriages.²¹ Few exceptions for work were granted based on gender differences in childhood.²²

Labor-specific tight spots in coal mines necessitated the small stature and maneuverability of children to remove coal deposits from constricted spaces. Mine owners knew that digging wide passageways required more time and money than keeping their sizes small. They recognized that the labor of young boys costs less than the expense to buy, feed and care for horses to hoist wagons full of coal.²² Mine owners therefore exploited children's small size, in some cases providing them only 22-28 inches of crawl space to hew, gather, and haul coal to the surface.²¹

A superintendent of one such mine in Oldham noted that "[t]he mines in the thin mountain-seams [...] are, with few exceptions, worked on a very small scale, and in a very rude manner [...] Many have insufficient drainage; ways so low that only very little boys can work in them, which they do naked, and often in mud and water, dragging sledge-tubs by the girdle and chain."²² The thinner the coal seam the cruder the method of extraction and the greater the need for child labor.

¹⁹ *Moral Effects of the Employment of Girls and Women Under Ground*. British Parliamentary Papers of 1842. Pp. 31-34.

²⁰ W. R. Wood, Esq., Evidence, No. 61: App. Pt. II., p. h 28, 1.9. *Nature of Employment in Coal Mines*. British Parliamentary Papers of 1842. Pp. 77.

²¹ *Nature of Employment in Coal Mines*. British Parliamentary Papers of 1842. Pp. 81-84, 78-86.

²² Tuttle, Carolyn. Hard at Work in Factories and Mines. Pp. 197, 168, 171, (1842 [380] XV: 55).

The public consciousness about child labor was altered after a tragic mining accident in 1838. Eleven girls aged 8-16 and fifteen boys aged 9-12 were killed when a ventilation chamber filled with water during a thunderstorm and restricted their airflow. Queen Victoria ordered an immediate inquiry into the events of the disaster, summoning a well-known reformer of factory laws named Lord Ashley to lead the investigation. After two years of inquiry, Ashley labeled the mines ‘refuges of immorality’ in an outright condemnation of the workplace environments.²³ Parliament subsequently passed the Mines and Collieries Act of 1842 stating that a mine was no place for children, thereby prohibiting underground labor for all females and the employment of boys under age ten.

By the time Parliament passed the Mines and Collieries Act of 1842, the percentage of child laborers aged between thirteen and eighteen was steady at 25% in the coal mines of Yorkshire and Lancashire. The percentage of the workforce aged thirteen and under was steady at 16% in Leicestershire, Derbyshire and North and South Durham.²⁴ Yet by 1851, the number of boys in the workforce under the age of fifteen was 37,300 in Great Britain; by 1861, it had grown to 45,100.²⁵ The year 1871 would mark the date when the labor of boys aged 10-15 began to steadily decline, increasing adult male employment from 50,100 in 1851 to 87,300 by 1881.²⁶

²³ Bourdenet, Nathalie. The Mines Act, 1842.

²⁴ Tuttle, Carolyn. Hard at Work in Factories and Mines. Table 5.3 Employment of Children in Mining in 1842. Pp. 148. Source: 1842[380]XV; First Report of the Commissioners on the Employment of Children (Mines), pp. 38, 198, 206, 236. 1842[381]XVI; Appendix to Report and Reports and Evidence: Part I (Mines), pp. 766-770, 778.

²⁵ Booth (1886) “On Occupations of the People in United Kingdom, 1801-81,” *Journal of the Royal Statistical Society*, XLIX, pp. 353-399. From Childhood and Child Labour in the British Industrial Revolution by Jane Humphries.

²⁶ Humphries, Jane. Childhood and Child Labour in the British Industrial Revolution. Cambridge University Press: Cambridge. Pp. 237-245.

The early 19th century saw England's economy shift towards increasing coal-dependence because industrial machinery used coal as the predominant energy source.²⁷ By 1840 the output of British coal mines had increased by roughly a factor of 8 from 1750 when coal production grew from 4,356 to 32,379 tons per year.²⁷ This demand for coal brought employment opportunities for a young labor force, but these opportunities resulted in child labor. By 1842, the Mines Act brought child labor to the fore of public consciousness by partially reforming labor laws to procure the safety of youth in the mines. The significant number of children working in British coal mines by the mid-19th century illustrates how a technical advance can cause a highly undesirable effect in social history. Science has human consequences, some good but also some bad.

²⁷ Tuttle, Carolyn. Hard at Work in Factories and Mines. Pp. 141, Pollard 1980: 229.

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