**The Industrial Revolution**

The *British Industrial Revolution* brought innovative mechanisation and deep social change. The process saw the invention of steam-powered machines, which were used in factories in ever-growing urban centres. Agriculture remained important, but cotton textiles became Britain's top export, capital replaced land as an indicator of wealth, and the labour force diversified to include many more women and children.

**Defining a 'Revolution'**

Dating the precise beginning and end of the Industrial Revolution in Britain is problematic. Historians do not all agree on precise dates as the 'revolution' was not a single dramatic event or even a series of them, but, rather, a long and gradual process of mechanization of industry and agriculture, which in turn caused a number of important and long-lasting social changes, chief amongst them being accelerated urbanization across Britain. The generally agreed range of the mid-18th century to the mid-19th century is useful but misses important, even necessary developments beforehand (for example, the increased efficiency in agriculture) and the continuation of machine inventions (such as the telephone) afterwards. Research published in 2024 by the University of Cambridge focused on occupations and supports a start date for the 'revolution' as some point in the 17th century.

The term 'industrial revolution', coined by the historian Arnold Toynbee in 1884, is misleading since this process of change was neither quick nor driven by popular uprisings. In addition, the word 'industrial' denies the importance of significant changes in rural life through this period. What is more certain is that the imperfect label 'Industrial Revolution' does capture the idea that tremendous changes occurred so that the countryside, cities, and working life of the late 19th century would have seemed incredible to a visitor from the late 16th century. The author Thomas Hardy (1840-1928) noted that the steam-powered railways alone, probably the most visible element of the 'revolution' for most people, brought more change than any other development since the Norman conquest of England in 1066.

**The Negative Impact of the Industrial Revolution**

The benefits of the 'revolution' came at a cost. Traditional industries like handweaving and stagecoaches were all but destroyed by the arrival of steam power. The demand for cheap labour was insatiable as the profit motive became more important to more business owners. From 1800 to 1850, children composed between 20-50% of the mining workforce, working on average from the age of eight. Exploited with lower pay but the same 12-hour shifts as adults, child labour was used in every industry. An 1851 commission found that "one-third of children under the age of 15 worked outside the home" (Horn, 57). These children too often lived short and uneducated lives.

The factories offered many new jobs, but much of the work was unskilled, dull, and repetitive. The pay was regular, but the working day was ruled by the clock. There was no minimum wage, salaries were not related to inflation, and employees faced the ever-present threat of instant dismissal. Factory workers had few transferable skills, and so they were stuck at their level of work. Further, opening a business now required significant capital to invest in machinery so that one's product could be competitively priced. In addition, in the factory system, where workers concentrated only on a specific part of the production process, workers had little sense of achievement in the finished article, something they might have done in the old domestic system where a worker worked alone on a single item.

For men, women, and children, factories were dangerous and unhealthy places. Cotton mills were always kept dark and damp to protect the cotton threads, a situation detrimental to the lungs of the workers. Mines had a similar hazard and others. Machines were dangerous and could cause serious injury when pieces broke off or when fast-moving parts trapped fingers and limbs. Factories were noisy, and workers often suffered from impaired hearing. The common use of toxic substances like lead and mercury was another health hazard. Attempts to form trade unions met with a total ban from the government from 1799 and 1824. Gradually, there were reforms from the 1830s, and working conditions and workers' rights did improve as working days were limited to 10 hours and employers were obliged to pay more attention to hygiene and safety in the workplace.

Urbanisation greatly accelerated during the Industrial Revolution. The 1851 census revealed that, for the first time, more people were living in towns and cities than in the countryside. This trend caused unique problems. Cities became cramped, and workers often lived in cheap housing, with families sharing properties. The streets were polluted by a lack of sanitation. In 1837, 1839, and 1847, there were typhus epidemics. In 1831 and 1849, there were cholera epidemics. The air was polluted, too, with so many factories belching out smoke from their coal furnaces. Crime rose, although largely only petty crime, as the urban poor grew in number and escaping justice became easier in the anonymity of large cities. The state made a half-hearted attempt to help the unemployed by offering the workhouse, an institution that deliberately offered a worse life than even the lowest-paid labourer could gain in case it became an attractive alternative to employment. Despite all the problems, urbanisation continued so that by 1880 only 20% of Britain's population lived in rural areas, and land ownership was concentrated in just 5% of the population.

**The Spread of the Industrial Revolution**

Other countries caught up with Britain. Ideas in technology, industry, and farming easily crossed borders. Some countries with very cheap labour or expensive fuel had to wait until the machines became cheaper and more efficient. The spread of the railways was a good indicator of this process. In the United States, the first working railroad was completed in 1833 (New York to Philadelphia). The first railway line in Continental Europe was completed in Belgium in 1835 (Brussels to Malines). By 1870, Canada, Australia, India, and most of Europe had joined in the railway mania. So it was with other innovations. By the 20th century, whether directly or indirectly, few states in the world remained unaffected by the tentacles of 'progress' the Industrial Revolution put forth.