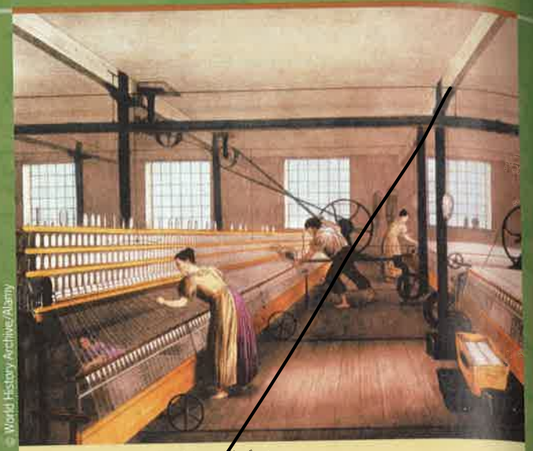
CHAPTER 20

The Industrial Revolution and Its Impact on European Society



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Power looms in an English textile factory

CHAPTER OUTLINE AND FOCUS QUESTIONS

The Industrial Revolution in Great Britain

Q Why was Great Britain the first state to have an Industrial Revolution? Why did it happen in Britain when it did? What were the basic features of the new industrial system created by the Industrial Revolution?

The Spread of Industrialization

Q How did the Industrial Revolution spread from Great Britain to the Continent and the United States, and how did industrialization in those areas differ from British industrialization?

The Social Impact of the Industrial Revolution

Q What effects did the Industrial Revolution have on urban life, social classes, family life, and standards of living? What were working conditions like in the early decades of the Industrial Revolution, and what efforts were made to improve them?

CRITICAL THINKING

Q What role did government and trade unions play in the industrial development of the Western world? Who helped the workers the most?

CONNECTIONS TO TODAY

Q How do the locations of the centers of industrialization today compare with those during the Industrial Revolution, and how do you account for any differences?

THE FRENCH REVOLUTION dramatically and quickly altered the political structure of France, and the Napoleonic conquests spread many of the revolutionary principles in an equally rapid and stunning fashion to other parts of Europe. During the late eighteenth and early nineteenth centuries, another revolution—an industrial one—was transforming the economic and social structure of Europe, although more slowly and somewhat less dramatically.

The Industrial Revolution caused a quantum leap in industrial production. New sources of energy and power, especially coal and steam, replaced wind and water to run machines that significantly decreased the use of human and animal labor and at the same time increased productivity. This in turn called for new ways of organizing human labor to maximize the benefits and profits from the new machines; factories replaced workshops and home workrooms. Many early factories were dreadful places with difficult working conditions. Reformers, appalled at these conditions, were especially

critical of the treatment of married women. One reported, "We have repeatedly seen married females, in the last stage of pregnancy, slaving from morning to night beside these never-tiring machines, and when . . . they were obliged to sit down to take a moment's ease, and being seen by the manager, were fined for the offense." But there were also examples of well-run factories. William Cobbett described one in Manchester in 1830: "In this room, which is lighted in the most convenient and beautiful manner, there were five hundred pairs of looms at work, and five hundred persons attending those looms; and, owing to the goodness of the masters, the whole looking healthy and well-dressed."

During the Industrial Revolution, Europe experienced a shift from a traditional, labor-intensive economy based on farming and handicrafts to a more capital-intensive economy based on manufacturing by machines, specialized labor, and industrial factories. Although the Industrial Revolution took decades to spread, it was truly revolutionary in the way it fundamentally changed Europeans, their society, and their relationship to the rest of the world. The development of large factories encouraged mass movements of people from the countryside to urban areas, where impersonal coexistence replaced the traditional intimacy of rural life. Higher levels of productivity led to a search for new sources of raw materials, new consumption patterns, and a revolution in transportation that allowed raw materials and finished products to be moved quickly around the world. The creation of a wealthy industrial middle class and a huge industrial working class (or proletariat) substantially transformed traditional social relationships.

The Industrial Revolution in Great Britain

Q FOCUS QUESTIONS: Why was Great Britain the first state to have an Industrial Revolution? Why did it happen in Britain when it did? What were the basic features of the new industrial system created by the Industrial Revolution?

Although the Industrial Revolution evolved over a long period of time, historians generally agree that it began in Britain sometime after 1750. By 1850, the Industrial Revolution had made Great Britain the wealthiest country in the world; it had also spread to the European continent and the New World. In another fifty years, both Germany and the United States would surpass Britain in industrial production.

Origins

A number of factors or conditions coalesced in Britain to produce the first Industrial Revolution. One of these was the **agricultural revolution** of the eighteenth century. The changes in the methods of farming and stock breeding that characterized this agricultural transformation led to a significant increase in food production. British agriculture could now feed more people at lower prices with less labor. Unlike people in the rest of Europe, even ordinary British families did not have to use most of their income to buy food, giving them the potential to purchase manufactured goods. At the same time, rapid population growth in the second half of the eighteenth century provided a pool of surplus labor for the new factories of the emerging British industry. Rural workers in cottage industries also provided a potential labor force for industrial enterprises.

SUPPLY OF CAPITAL Britain had a ready supply of **capital** for investment in the new industrial machines and the factories that were needed to house them. In addition to profits from trade and cottage industry, Britain possessed an effective central bank and well-developed, flexible credit facilities. Nowhere in Europe were people so accustomed to using paper instruments to facilitate capital transactions. Many early factory owners were merchants and entrepreneurs who had profited from the eighteenth-century cottage industry. Of 110 cotton-spinning mills in operation in the area known as the Midlands between 1769 and 1800, fully 62 were established by hosiers, drapers, mercers, and others involved in some fashion in the cottage textile industry.

EARLY INDUSTRIAL ENTREPRENEURS But capital is only part of the story. Britain had a fair number of individuals who were interested in making profits if the opportunity presented itself (see the box on p. 598). The British were a people, as one historian has said, "fascinated by wealth and commerce, collectively and individually." No doubt the English revolutions of the seventeenth century had helped create an environment in Britain, unlike that of the absolutist states on the Continent, where political power rested in the hands of a group of progressive people who favored innovation in economic matters.

Nevertheless, these early industrial entrepreneurs faced considerable financial hazards. Fortunes were made quickly and lost just as quickly. Early firms had a fluid structure. An individual or family proprietorship was the usual mode of operation, but entrepreneurs also brought in friends to help—and just as easily jettisoned them. John Marshall, who made money in flax spinning, threw his partners out: "As they could neither of them be of any further use, I released them from the firm and took the whole upon myself."[1]

MINERAL RESOURCES Britain had ample supplies of important mineral resources, such as coal and iron ore, needed in the manufacturing process. Britain was also small, so the resources had to be transported only relatively short distances. In addition to nature's provision of abundant rivers, from the mid-seventeenth century onward, both private and public investment poured into the construction of new roads, bridges, and, beginning in the 1750s and 1760s, canals. By 1780, roads, rivers, and canals linked

The Traits of the British Industrial Entrepreneur

Richard Arkwright (1732–1792), inventor of a spinning frame and founder of cotton factories, was a good example of the successful entrepreneur in the early Industrial Revolution in Britain. In this selection, Edward Baines, writing in 1835, discusses the traits that explain the success of Arkwright and presumably other British entrepreneurs.

Edward Baines, *The History of the Cotton Manufacture in Great Britain*

Richard Arkwright rose by the force of his natural talents from a very humble condition in society. He was born at Preston on the 23rd of December, 1732, of poor parents: being the youngest of thirteen children, his parents could only afford to give him an education of the humblest kind, and he was scarcely able to write. He was brought up to the trade of a barber at Kirkham and Preston, and established himself in that business at Bolton in the year 1760. Having become possessed of a chemical process for dyeing human hair, which in that day (when wigs were universal) was of considerable value, he traveled about collecting hair, and again disposing of it when dyed. In 1761, he married a wife from Leigh, and the connections he thus formed in that town are supposed to have afterwards brought him acquainted with Highs's experiments in making spinning machines. He himself manifested a strong bent for experiments in mathematics, which he is stated to have followed with so much devotedness as to have neglected his business and injured his circumstances. His natural disposition was ardent, enterprising, and stubbornly persevering: his mind was as coarse as it was bold and active, and his manners were rough and unpleasing. . . .

The most marked traits in the character of Arkwright were his wonderful ardor, energy, and perseverance. He commonly labored in his multifarious concerns from five o'clock in the morning till nine at night; and when considerably more than fifty years of age,—feeling that the defects of his education placed him under great difficulty and inconvenience in conducting his correspondence, and in the general management of his business,—he encroached upon his sleep, in order to gain an hour each day to learn English grammar, and another hour to improve his writing and orthography [spelling]! He was impatient of whatever interfered with his favorite pursuits; and the fact is too strikingly characteristic not to be mentioned, that he separated from his wife not many years after their marriage, because she, convinced that he would starve his family [because of the impractical nature of his schemes], broke some of his experimental models of machinery. Arkwright was a severe economist of time; and, that he might not waste a moment, he generally traveled with four horses, and at a very rapid speed. His concerns in Derbyshire, Lancashire, and Scotland were so extensive and numerous, as to [show] at once his astonishing power of transacting business and his all grasping spirit. In many of these he had partners, but he generally managed in such a way, that, whoever lost, he himself was a gainer.

Q *As seen in the life of Richard Arkwright, what traits did Edward Baines think were crucial to being a successful entrepreneur? To what extent are these still considered the necessary traits for a successful entrepreneur?*

Source: From *The History of the Cotton Manufacture in Great Britain* by Edward Baines (London: Fisher, Fisher, and Jackson, 1835), pp. 195–96.

the major industrial centers of the North, the Midlands, London, and the Atlantic. Unlike the Continental countries, Britain had no internal customs barriers to hinder domestic trade.

ROLE OF GOVERNMENT Britain's government also played a significant role in the process of industrialization. Parliament contributed to the favorable business climate by providing a stable government and passing laws that protected private property. Moreover, Britain was remarkable for the freedom it provided for private enterprise. It placed fewer restrictions on private entrepreneurs than any other European state.

MARKETS Finally, a supply of markets gave British industrialists a ready outlet for their manufactured goods. British exports quadrupled between 1660 and 1760. In the course of its eighteenth-century wars and conquests, Great Britain had developed a vast colonial empire at the expense of its leading Continental rivals, the Dutch Republic and France. Britain also possessed a well-developed merchant marine that was able to transport goods anywhere in the world. A crucial factor in Britain's successful industrialization was the ability to produce cheaply the articles most in demand abroad. And the best markets abroad were not in Europe, where countries protected their own incipient industries, but in the Americas, Africa, and the East, where people wanted sturdy, inexpensive clothes rather than costly, highly finished luxury items. Britain's machine-produced textiles fulfilled that demand. Nor should we overlook the British domestic market. Britain had the highest standard of living in Europe and a rapidly growing population. As Daniel Defoe noted already in 1728:

> For the rest, we see their Houses and Lodgings tolerably furnished, at least stuff'd well with useful and necessary household Goods: Even those we call poor People, Journeymen, working and Pains-taking People do thus; they lye warm, live in Plenty, work hard, and know no Want. These are the People that carry off the Gross of your Consumption; 'tis for these your Markets are kept open late on Saturday nights; because they usually receive their Week's Wages late. . . . In a Word, these are the Life of our whole Commerce, and all by their Multitude: Their Numbers are not Hundreds or Thousands, or Hundreds of Thousands, but Millions; . . . by their Wages they are able to live plentifully, and it is by their expensive, generous, free way of living, that the Home Consumption is rais'd to such a Bulk, as well of our own, as of foreign Production.[2]

This demand from both domestic and foreign markets and the inability of the old system to fulfill it led entrepreneurs to seek and adopt the new methods of manufacturing that a series of inventions provided. In so doing, these individuals initiated the Industrial Revolution.

Technological Changes and New Forms of Industrial Organization

In the 1770s and 1780s, the cotton textile industry took the first major step toward the Industrial Revolution with the creation of the modern factory.

THE COTTON INDUSTRY Already in the eighteenth century, Great Britain had surged ahead in the production of cheap cotton goods using the traditional methods of the cottage industry. The development of the flying shuttle had sped the process of weaving on a loom, enabling weavers to double their output. This caused shortages of yarn, however, until James Hargreaves's spinning jenny, perfected by 1768, enabled spinners to produce yarn in greater quantities. Richard Arkwright's water frame spinning machine, powered by water or horse, and Samuel Crompton's so-called mule, which combined aspects of the water frame and the spinning jenny, increased yarn production even more. Edmund Cartwright's power loom, invented in 1787, allowed the weaving of cloth to catch up with the spinning of yarn. Even then, early power looms were grossly inefficient, enabling home-based hand-loom weavers to continue to prosper, at least until the mid-1820s. After that, they were gradually replaced by the new machines. In 1813, there were 2,400 power looms in operation in Great Britain; they numbered 14,150 in 1820, 100,000 in 1833, and 250,000 by 1850. In the 1820s, there were still 250,000 hand-loom weavers in Britain; by 1860, only 3,000 were left.

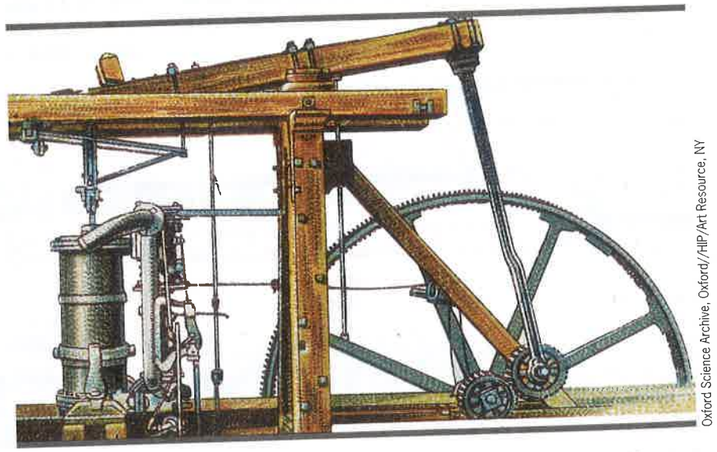
The water frame, Crompton's mule, and power looms presented new opportunities to entrepreneurs. It was much more efficient to bring workers to the machines and organize their labor collectively in factories located next to rivers and streams, the sources of power for many of these early machines, than to leave the workers dispersed in their cottages. The concentration of labor in the new factories also brought the laborers and their families to live in the new towns that rapidly grew up around the factories.

The early devices used to speed up the processes of spinning and weaving were the products of weavers and spinners—in effect, of artisan tinkerers. But the subsequent expansion of the cotton industry and the ongoing demand for even more cotton goods created additional pressure for new and more complicated technology. The invention that pushed the cotton industry to even greater heights of productivity was the steam engine.

THE STEAM ENGINE The steam engine revolutionized the production of cotton goods and allowed the factory system to spread to other areas of production, thereby securing whole new industries. The steam engine thus ensured the triumph of the Industrial Revolution.

In the 1760s, a Scottish engineer, James Watt (1736–1819), created an engine powered by steam that could pump water from mines three times as quickly as previous engines. In 1782, Watt expanded the possibilities of the steam engine when he developed a rotary engine that could turn a shaft and thus drive machinery. Steam power could now be applied to spinning and weaving cotton, and before long, cotton mills using steam engines were multiplying across Britain. Because steam engines were fired by coal, they did not need to be located near rivers; entrepreneurs now had greater flexibility in their choice of location.

The new boost given to cotton textile production by technological changes became readily apparent. In 1760, Britain had imported 2.5 million pounds of raw cotton, which was farmed out to cottage industries. In 1787, the British imported 22 million pounds of cotton; most of it was spun on machines, some powered by water in large mills. By 1840, fully 366 million pounds of cotton—now Britain's most important product in value—were imported. By this time, most cotton industry



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A Boulton and Watt Steam Engine. Encouraged by his business partner, Matthew Boulton, James Watt developed the first genuine steam engine. Pictured here is a typical Boulton and Watt engine. Steam pressure in the cylinder on the left drives the beam upward and sets the flywheel in motion.

employees worked in factories. The cheapest labor in India could not compete in quality or quantity with Britain. British cotton goods sold everywhere in the world. And in Britain itself, cheap cotton cloth made it possible for millions of poor people to wear undergarments, long a luxury of the rich, who could afford expensive linen cloth. Cotton clothing was tough, comfortable, cheap, and easily washable.

The steam engine proved indispensable. Unlike horses, the steam engine was a tireless source of power and depended for fuel on a substance—coal—that seemed unlimited in quantity. The popular saying that "steam is an Englishman" had real significance by 1850. The success of the steam engine led to a need for more coal and an expansion in coal production; between 1815 and 1850, the output of coal quadrupled. In turn, new processes using coal furthered the development of the iron industry.

THE IRON INDUSTRY The British iron industry was radically transformed during the Industrial Revolution. Britain had large deposits of iron ore, but at the beginning of the eighteenth century, the basic process of producing iron had changed little since the Middle Ages and still depended heavily on charcoal. In the early eighteenth century, new methods of smelting iron ore to produce cast iron were devised, based on the use of coke or "courke" that was made by slowly burning coal. Coke could heat iron ore at a faster rate than charcoal, thus yielding higher amounts. Still, a better quality of iron was not possible until the 1780s, when Henry Cort developed a process called puddling in which coke was used to burn away impurities in **pig iron** (the product of smelting iron ore with coke) to produce an iron of high quality called **wrought iron**. Wrought iron, with its lower carbon content, was malleable and able to withstand strain. A boom then ensued in the British iron industry. In 1740, Britain produced 17,000 tons of iron; in the 1780s, almost 70,000 tons; by the 1840s, more than 2 million tons; and by 1852, almost 3 million tons, more than the rest of the world combined.

The development of the iron industry was in many ways a response to the demand for the new machines. The high-quality wrought iron produced by the Cort process made it the most widely used metal until the production of cheaper steel in the 1860s. The growing supply of less costly metal encouraged the use of machinery in other industries, most noticeably in new means of transportation.

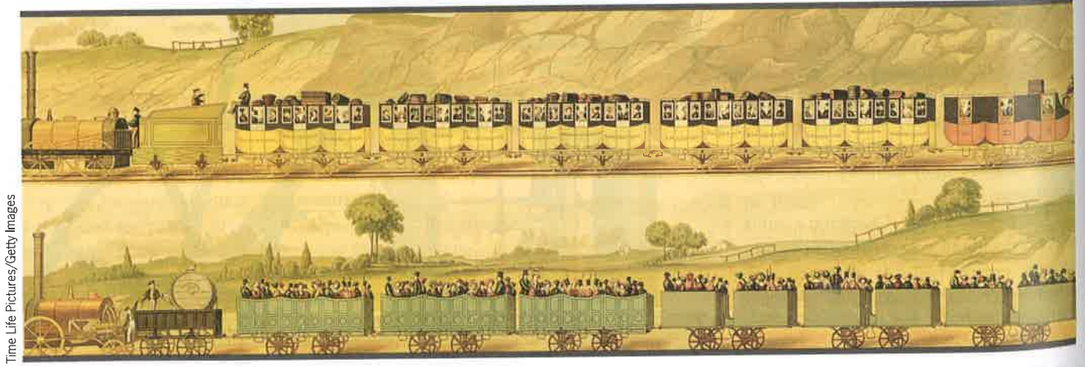
A REVOLUTION IN TRANSPORTATION The eighteenth century had witnessed an expansion of transportation facilities in Britain as entrepreneurs realized the need for more efficient means of moving resources and goods. Turnpike trusts constructed new roads, and between 1760 and 1830, a network of canals was built. But both roads and canals were soon overtaken by a new form of transportation that dazzled people with its promise. To many economic historians, railroads were the "most important single factor in promoting European economic progress in the 1830s and 1840s." Again, Britain was the leader in the revolution.

The railways got their start in mining operations in Germany as early as 1500 and in British coal mines after 1600, where small handcarts filled with coal were pushed along parallel wooden rails. The rails reduced friction, enabling horses to haul more substantial loads. By 1700, some entrepreneurs began to replace wooden rails with cast-iron rails, and by the early nineteenth century, railways—still dependent on horsepower—were common in British mining and industrial districts. The development of the steam engine led to a radical transformation of the railways.

In 1804, Richard Trevithick (TREV-uh-thik) pioneered the first steam-powered locomotive on an industrial rail line in southern Wales. It pulled 10 tons of ore and seventy people at 5 miles per hour. Better locomotives soon followed. The engines built by George Stephenson and his son proved superior, and it was in their workshops in Newcastle-upon-Tyne that the locomotives for the first modern railways in Britain were built. George Stephenson's *Rocket* was used on the first public railway line, which opened in 1830, extending 32 miles from Liverpool to Manchester. *Rocket* sped along at 16 miles per hour. Within twenty years, locomotives had reached 50 miles per hour, an incredible speed to contemporary passengers. During the same period, new companies were formed to build additional railroads as the infant industry proved successful financially as well as technically. In 1840, Britain had almost 2,000 miles of railroads; by 1850, 6,000 miles of railroad track crisscrossed much of the country (see Map 20.1).

The railroad contributed significantly to the maturing of the Industrial Revolution. The railroad's demands for coal and iron furthered the growth of those industries. British supremacy in civil and mechanical engineering, so evident after 1840, was in large part based on the skills acquired in railway building. The huge capital demands necessary for railway construction encouraged a whole new group of middle-class investors to invest their money in joint-stock companies (see "Industrialization on the Continent" later in this chapter). Railway construction created new job opportunities, especially for farm laborers and peasants, who had long been accustomed to finding work outside their local villages. Perhaps most important, a cheaper and faster means of transportation had a rippling effect on the growth of an industrial economy. By reducing the price of goods, larger markets were created; increased sales necessitated more factories and more machinery, thereby reinforcing the self-sustaining nature of the Industrial Revolution, which marked a fundamental break with the traditional European economy. The great productivity of the Industrial Revolution enabled entrepreneurs to reinvest their profits in new capital equipment, further expanding the productive capacity of the economy. Continuous, even rapid, self-sustaining economic growth came to be seen as a fundamental characteristic of the new industrial economy.

The railroad was the perfect symbol of this aspect of the Industrial Revolution. The ability to transport goods and people at dramatic speeds also provided visible confirmation of a new sense of power. When railway engineers penetrated mountains with tunnels and spanned chasms with breathtaking bridges, contemporaries experienced a sense of power over nature not felt before in Western civilization.



Time Life Pictures/Getty Images

Railroad Line from Liverpool to Manchester. The railroad line from Liverpool to Manchester, opened in 1830, relied on steam locomotives. As is evident in this illustration, carrying passengers was the railroad's main business. First-class passengers rode in covered cars; second- and third-class passengers, in open cars.

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MAP 20.1 The Industrial Revolution in Britain by 1850. The Industrial Revolution began in the mid-1700s. Increased food production, rapid population growth, higher incomes, plentiful capital, solid banking and financial institutions, an abundance of mineral resources, and easy transport all furthered the process, making Britain the world's wealthiest country by 1850.

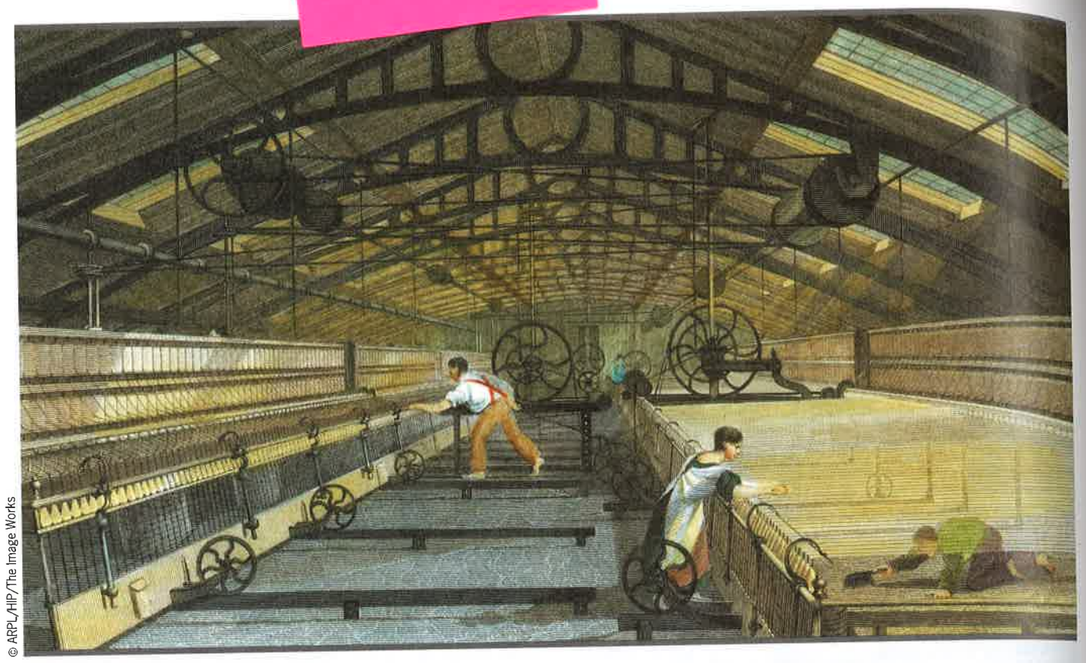
How well did the railroad system connect important British industrial areas?

THE INDUSTRIAL FACTORY Initially the product of the cotton industry, the factory became the chief means of organizing labor for the new machines. As the workplace shifted from the artisan's shop and the peasant's cottage to the factory, the latter was not viewed as just a larger work unit. Employers hired workers who no longer owned the means of production but were simply paid wages to run the machines.

From its beginning, the factory system demanded a new type of discipline from its employees. Factory owners could not afford to let their expensive machinery stand idle. Workers were forced to work regular hours and in shifts to keep the machines producing at a steady pace for maximum output. This represented a massive adjustment for early factory laborers.

Preindustrial workers were not accustomed to a timed format. Agricultural laborers had always kept irregular hours; hectic work at harvest time might be followed by weeks of inactivity. Even in the burgeoning cottage industry of the eighteenth century, weavers and spinners who worked at home might fulfill their weekly quotas by working around the clock for two or three days and then proceeding at a leisurely pace until the next week's demands forced another work spurt.

Factory owners therefore faced a formidable task. They had to create a system of time-work discipline that would accustom employees to working regular, unvarying hours during which they performed a set number of tasks over and



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A British Textile Factory. The development of the factory changed the relationship between workers and employers as workers were encouraged to adjust to a new system of discipline that forced them to work regular hours under close supervision. This 1835 illustration shows women and men working in a British textile factory.

over again as efficiently as possible. One early industrialist said that his aim was "to make such machines of the men as cannot err." Such work, of course, tended to be repetitive and boring, and factory owners resorted to tough methods to accomplish their goals. Factory regulations were minute and detailed (see the box on p. 603). Adult workers were fined for a wide variety of minor infractions, such as being a few minutes late for work, and dismissed for more serious misdoings, especially drunkenness. Drunkenness was viewed as particularly offensive because it set a bad example for younger workers and also courted disaster amid dangerous machinery. Employers found that dismissals and fines worked well for adult employees; in a time when great population growth had led to large numbers of unskilled workers, dismissal could be disastrous. Children were less likely to understand the implications of dismissal, so they were sometimes disciplined more directly—by beating.

The efforts of factory owners in the early Industrial Revolution to impose a new set of values were frequently reinforced by the new evangelical churches. Methodism, in particular, emphasized that people "reborn in Jesus" must forgo immoderation and follow a disciplined path. Laziness and wasteful habits were sinful. The acceptance of hardship in this life paved the way for the joys of the next. Evangelical values paralleled the efforts of the new factory owners to instill laborers with their own middle-class values of hard work, discipline, and thrift. In one crucial sense, the early industrialists proved successful. As the nineteenth century progressed, the second and third generations of workers came to view a regular working week as a natural way of life. It was, of course, an attitude that made possible Britain's incredible economic growth in that century.

Britain's Great Exhibition of 1851

In 1851, the British organized the world's first industrial fair. It was housed at Kensington in London in the Crystal Palace, an enormous structure made entirely of glass and iron, a tribute to British engineering skills. Covering 19 acres, the Crystal Palace contained 100,000 exhibits that displayed the wide variety of products created by the Industrial Revolution. Six million people visited the fair in six months. Though most of them were Britons who had traveled to London by train, foreign visitors were also prominent. The Great Exhibition displayed Britain's wealth to the world; it was a gigantic demonstration of British success. Even trees were brought inside the Crystal Palace as a visible symbol of how the Industrial Revolution had achieved human domination over nature. Prince Albert, Queen Victoria's husband, expressed the sentiments of the age when he described the exhibition as a sign that "man is approaching a more complete fulfillment of that great and sacred mission which he has to perform in this world . . . to conquer nature to his use." Not content with that, he also linked British success to divine will: "In promoting [the progress of the human race], we are accomplishing the will of the great and blessed God."[3]

In addition to demonstrating Britain's enormous industrial growth, the Crystal Palace exhibition also represented British imperial power. Goods from India were a highlight of the exhibition, and the East India Company drew attention to its role in India with exhibits of cotton, tea, and flax. But it was the display of Indian silks, jewels, shawls, and an elephant canopy that captured the attention of the British press and visitors. Despite the public interest in the ornate and intricate works from India, many British commentators, such as the scientist William Whewell, were less complimentary. They characterized the Indian handmade goods as typical of a system in which "tens of thousands" worked for a few despots. Moreover, these goods were examples of the "wasteful and ridiculous excess" of the labor-intensive production practices in the East, which could not compare to enlightened British labor practices.[4]

By the year of the Great Exhibition, Great Britain had become the world's first industrial nation and its wealthiest. Britain was the "workshop, banker, and trader of the world." It produced one-half of the world's coal and manufactured goods; its cotton industry alone in 1851 was equal in size to the industries of all other European countries combined. The quantity of goods produced was growing at three times the rate in 1780. Britain's certainty about its mission in the world in the nineteenth century was grounded in its incredible material success.

Discipline in the New Factories

Workers in the new factories of the Industrial Revolution had been accustomed to a lifestyle free of overseers. Unlike the cottages, where workers spun thread and wove cloth in their own rhythm and time, the factories demanded a new, rigorous discipline geared to the requirements of the machines. This selection is taken from a set of rules for a factory in Berlin in 1844. They were typical of company rules everywhere the factory system had been established.

Factory Rules, Foundry and Engineering Works of the Royal Overseas Trading Company, Berlin

In every large works, and in the co-ordination of any large number of workmen, good order and harmony must be looked upon as the fundamentals of success, and therefore the following rules shall be strictly observed.

1. The normal working day begins at all seasons at 6 A.M. precisely and ends, after the usual break of half an hour for breakfast, an hour for dinner and half an hour for tea, at 7 P.M. and it shall be strictly observed. . . . Workers arriving 2 minutes late shall lose half an hour's wages; whoever is more than 2 minutes late may not start work until after the next break; or at least shall lose his wages until then. Any disputes about the correct time shall be settled by the clock mounted above the gatekeeper's lodge. . . .
3. No workman, whether employed by time or piece, . may leave before the end of the working day, without having first received permission from the overseer and having given his name to the gatekeeper. Omission of these two actions shall lead to a fine of ten silver groschen [pennies] payable to the sick fund.
4. Repeated irregular arrival at work shall lead to dismissal. This shall also apply to those who are found idling by an official or overseer, and refused to obey their order to resume work. . . .
6. No worker may leave his place of work otherwise than for reasons connected with his work.
7. All conversation with fellow-workers is prohibited; if any worker requires information about his work, he must turn to the overseer, or to the particular fellow-worker designated for the purpose.
8. Smoking in the workshops or in the yard is prohibited during working hours; anyone caught smoking shall be fined five silver groschen for the sick fund for every such offense. . . .
10. Natural functions must be performed at the appropriate places, and whoever is found soiling walls, fences, squares, etc., and similarly, whoever is found washing his face and hands in the workshop and not in the places assigned for the purpose, shall be fined five silver groschen for the sick fund. . . .
12. It goes without saying that all overseers and officials of the firm shall be obeyed without question, and shall be treated with due deference. Disobedience will be punished by dismissal.
13. Immediate dismissal shall also be the fate of anyone found drunk in any of the workshops. . . .
14. Every workman is obliged to report to his superiors any acts of dishonesty or embezzlement on the part of his fellow workmen. If he omits to do so, and it is shown after subsequent discovery of a misdemeanor that he knew about it at the time, he shall be liable to be taken to court as an accessory after the fact and the wage due to him shall be retained as punishment.

Q *What impact did factories have on the lives of workers? To what extent have such "rules" determined much of modern industrial life?*