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1. The Beginnings of Industrialization in England

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1. The Beginnings of Industrialization in England

Abstract

The most momentous development of the last century and a half has been the industrialization of Western society and, more recently, the spread of that industrialization to other parts of the world. No subsequent chapter of this book can be written without taking into account the fundamental cultural transformations involved in the Industrial Revolution and which, since its course is not yet run, are still being involved. Neither the foods we eat, the clothes we wear, the houses in which we live, the vehicles in which we transport ourselves, the amusements through which we seek diversion, the weapons with which we wage war nor the values which guide our lives have been immune from the influence of industrialization, fraught with its possibility of both good and ill for mankind. [*excerpt*]

Keywords

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Disciplines

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Comments

This is a part of [Section XIV: The Industrial Revolution, Classical Economics, and Economic Liberalism](#). The [Contemporary Civilization](#) page lists all additional sections of *Ideas and Institutions of Western Man*, as well as the [Table of Contents](#) for both volumes.

More About Contemporary Civilization:

From 1947 through 1969, all first-year Gettysburg College students took a two-semester course called Contemporary Civilization. The course was developed at President Henry W.A. Hanson's request with the goal of "introducing the student to the backgrounds of contemporary social problems through the major concepts, ideals, hopes and motivations of western culture since the Middle Ages."

Gettysburg College professors from the history, philosophy, and religion departments developed a textbook for the course. The first edition, published in 1955, was called *An Introduction to Contemporary Civilization and Its Problems*. A second edition, retitled *Ideas and Institutions of Western Man*, was published in 1958 and 1960. It is this second edition that we include here. The copy we digitized is from the Gary T. Hawbaker '66 Collection and the marginalia are his.

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XIV. THE INDUSTRIAL REVOLUTION, CLASSICAL ECONOMICS, AND ECONOMIC LIBERALISM

1. The Beginnings of Industrialization in England

Exam Quest. ???

The most momentous development of the last century and a half has been the industrialization of Western society and, more recently, the spread of that industrialization to other parts of the world. No subsequent chapter of this book can be written without taking into account the fundamental cultural transformations involved in the Industrial Revolution and which, since its course is not yet run, are still being involved. Neither the foods we eat, the clothes we wear, the houses in which we live, the vehicles in which we transport ourselves, the amusements through which we seek diversion, the weapons with which we wage war nor the values which guide our lives have been immune from the influence of industrialization, fraught with its possibility of both good and ill for mankind. Change itself is one of the most permanent factors of human existence, but the industrialization of society has accelerated the rate of change beyond anything hitherto known to human experience. As a result, the mode of life to which George Washington and his contemporaries were accustomed at the close of the eighteenth century had more in common in many ways with that of Aquinas, even that of Caesar Augustus, than it does with the modes of our own day.

The term "Industrial Revolution" was popularized in the 1880's by the writings of an English sociologist, Arnold Toynbee (1852-1883). As used for many years it referred particularly to a series of technological and managerial developments which apparently had their beginnings in later eighteenth century England, and which centered in the cotton textile industry. In more recent years the validity of the term has been questioned. Some students have stressed that the element of violence which is usually associated with the word "revolution" was lacking here, and that what occurred more resembled an industrial evolution than a revolution. Other students have argued that the element of suddenness which is implicit in the idea of a revolution was definitely not present, since certain aspects of industrialization (such as, for example, large-scale operations in mining and metallurgy) can be clearly traced back to the late Middle Ages, not only in England but also elsewhere in Europe. But even if these reservations be granted, valid as

they are, it cannot be denied that the events which we are about to follow have brought about such a drastic change in virtually every area of the life of Western man, and have created or aggravated so many of his present problems, that they have been fully revolutionary in their implications. With this as our justification we shall continue to use the time-honored term.

In earlier chapters we traced the inroads made by the revival of trade upon the agrarian and relatively self-sufficient economy of medieval western Europe. We followed the return of a money economy; the gradual decline of the manorial system; the rise of capitalism and of the capitalistic spirit, especially in commerce; the early use of the domestic system in industry; and the expansion of Europe. Also, we studied many contemporary developments in politics, religion, philosophy, and science, all of which, it should be remembered, had potential implications of one kind or another for the ways in which men make their living. Seen in this perspective, what the Industrial Revolution did was usher in another stage in the history of the Western economy. It drew from the strong national state, mercantilism, the Protestant ethic, the secularization of society, rationalism, empiricism, and the theory and practice of early modern science. At the same time, it added significant new features to those carried over from the past.

Many reasons have been advanced to explain why in the eighteenth century England pulled ahead of her neighbors to become in the nineteenth the world's first industrialized state. First, she had water-power resources, deposits of coal and iron which were located near each other, an abundance of raw wool, easy access to New World cotton, and a damp climate favorable to the manufacture of cotton textiles. Furthermore, England was a relatively small country, in which distances were less of a problem than, say, in France. Second, she had capital from previous activity in agriculture, trade, and many types of industry which was available for investment in mills and factories. Third, she had expanding markets, especially on the Continent but also in the New World and India, as well as from a growing population at home. These were primarily markets for textiles and other necessities rather than for luxury goods. Fourth, she had a good supply of available labor and a wealth of experience in the old handicraft and other industries. Fifth, the attitude of most segments of English society was generally favorable to business activity, and to scientific and technological progress. There were no internal trade barriers. Government policy regarding private property and contracts encouraged individual initiative, as did the operations of the Bank of England and, probably, those of the patent system. Finally, the guilds which might have tried to prevent industrial change had little influence in England after about 1700.

Taken either singly or together, these factors, some of which applied also to other European states, merely suggest

*Economic
Rev.*

→ Industrial Rev. - In ind, coming up, persons of two. org. population. Not just industry that was affected, but many areas. Consider these as mutually supporting. Railroad - increased production for increased holding power. Why increase ag. if there isn't an urban pop. If there isn't an urban pop. (no industry) no need for food. Time of Ind. Rev. relies on diff. countries. But it did start in Eng.

possible explanations for the events occurring in eighteenth century England which conventionally mark the beginning of the Industrial Revolution. The most important of these events can be discussed conveniently under four main categories.

First, there was a series of inventions which transformed the cotton textile industry. It should be noted that important changes were taking place in English textile markets in the eighteenth century. At home there was an increasing preference for calico (cotton cloth) over woollens, the product of one of England's most venerable industries. Abroad, English businessmen, whose most valuable single export item was textiles, were seeking markets in climates which were too warm for woollens and where cotton could provide the desired lighter fabric. This stimulated the relatively small and hitherto minor cotton industry to greater efficiency and production, a goal which a series of improvements and inventions helped it accomplish. The flying shuttle on the loom was patented in 1733; the spinning jenny was invented about 1764; the spinning frame driven by water power was patented in 1769; the spinning mule, also power driven, was completed by 1779; and the power loom was patented in 1785. About this time better methods of bleaching, dyeing, and printing cloth came into use. These innovations did two things. First, they successively increased the capacity of spinning and weaving machinery. Second, they adapted it to the use of mechanical power, first that of water and later steam. Although improvements are still being made, there have since been relatively few basic changes in cotton industry technology comparable to those of the eighteenth century. *demand for cotton is elastic.*

Second, there were innovations in the English iron industry. About 1709 an ironworker began making cast iron from ore by using coke instead of charcoal to produce the necessary heat. Although this process did not supersede the older method for about a century, it was of great significance in saving a key industry from the real threat of extinction. England's forests were rapidly dwindling, and charcoal was becoming increasingly difficult to obtain. Coal, on the other hand, was readily available in large quantities. An equally significant development during this period was the process devised about 1784 for making wrought iron with coke. Though not as strong as steel, wrought iron was malleable as cast iron was not, and could therefore be worked. The invention of the rolling mill and the steam hammer greatly facilitated the fabricating of iron products just as they were beginning to replace wood for many uses. *not steel but iron.*

Third, a more efficient steam engine was developed. The Newcomen engine, invented in 1705, was used almost exclusively to pump water from coal mines. One of these pumps belonging to the University of Glasgow was given for repair to James Watt (1736-1819), an instrument maker whom the school employed. This gave Watt the occasion to resume his attempts to improve upon the very inefficient Newcomen engine. In 1769 he received the first of numerous patents granted him as the Watt engine

*1750-1850 - in England. By 1830 in Pr. and Belgium, also U.S.
1870, going in Germany, 1908 - in Russia; 1920 - China + India
some places haven't started yet.*

which he devised was steadily improved and adapted to wider uses. In 1775 Watt formed a most fruitful partnership with Matthew Boulton (1728-1809), a Birmingham manufacturer who provided much of the capital needed to produce the steam engine commercially.

The labors of James Watt resulted in one of the most significant inventions of all time. For long ages man in his efforts to turn the resources of nature to his own benefit had been forced to rely on the energy which he could harness from the wind, water, animals he had domesticated, or his own muscle. The steam engine provided him with a great emancipator, for the energy which it made available, derived largely from fossil fuel, was more dependable than that of the wind, more mobile than that of water, and more powerful than animate energy. Watt and his contemporaries soon began to realize the almost incredible potentialities of his invention. It could be used to run industrial machinery. It could draw men and freight across the hills and valleys of the land. It could power ships on the high seas. In sum, it could provide man with a strength far beyond his natural endowment which could be used in hundreds of ways to refashion nature in the image he desired. There is ample reason for calling the nineteenth century the Age of Steam.

Fourth, the modern factory system appeared, first in the cotton industry. As long as the improvements made to spinning and weaving machinery were relatively simple, there was no threat to the domestic system, which was the most important organization of production then in use. But when power-driven machinery was devised, it was both far too large and expensive to be used in the homes. Some other arrangement of the factors of production was necessary. One of the first men to gather labor, machines, and raw materials under one roof was Richard Arkwright (1732-1792), who opened a factory at Nottingham in 1768. Others soon followed his example.

Much of significance can be said about the factory system. It had definite advantages over the old domestic system. It allowed for a division of labor and a greater use of power machinery, both of which increased the productivity of each worker as well as the total volume of production. It permitted the entrepreneur to exercise greater control over his workers for such purposes as regulating quality and minimizing stealing. *V But,* At the same time, the factory required what were for that day enormous amounts of capital. Money was needed not only to acquire buildings and equipment, but also, since production was carried on ahead of demand, to buy raw materials and pay wages until income from sales was available. Particularly since much of this capital was often borrowed, perhaps at high rates of interest, many entrepreneurs, with no similar experience from the past to draw upon, felt that they had to devote their every energy to making a large profit in order to recover this investment as quickly as possible. Such an attitude was undoubtedly a major factor in explaining the intractable views of these

Ind. Introduction of new use of power, factory system, more machinery used than before (more complicated)

Comm. - transportation of goods cheaper & faster. telephone, graph.

a.g. - consolidation, new types of machinery (reaper) new crops, new techniques fertility capitalist agriculture. Raising to sell

early industrial entrepreneurs on the subjects of wages, hours, and profits.

The four categories of developments which have just been described began in the eighteenth century, but they did not transform England overnight. Although the demands made by the wars of the French Revolution and Napoleon spurred her industry and pushed her ahead of her economic rivals on the Continent, it was not until a decade or two after the Congress of Vienna at the earliest that England could really be called an industrial state. Although the power loom had been patented in 1785, it was not perfected until the 1820's, and did not replace the hand loom generally for another decade. The Watt steam engine soon displaced the Newcomen in English mines, but as late as 1800 there were only about 300 of these in operation anywhere. Even into the early nineteenth century the factory system was limited largely to cotton textiles. The world's first mill which combined the processes of cotton spinning and weaving under one roof was not in operation until 1813, in Waltham, Massachusetts. In woolens, for example, the handicraftsman and the domestic system still existed alongside the factory as late as 1850.

It was largely during the second quarter of the nineteenth century that England became the "workshop of the world." From a total of about 70,000 tons in 1788, the production of pig iron increased to well over 2,000,000 tons in 1850. Coal production more than tripled between 1815 and 1850. Assured an ample supply of raw material by the invention of the cotton gin (1793), the cotton textile industry continued to increase in size and importance. Much of this industrial activity was concentrated in the Black Country of the Midlands, where Birmingham became almost synonymous with the production of iron, and in the area to the north, where Manchester achieved worldwide fame as a textile center. By 1850 England had begun building a railway system, and her overseas trade was growing rapidly. Not only had she given up trying to prevent the export of machines and technical ability, but she was also already providing foreigners with the capital necessary to strengthen their own economies. Eventually some of these economies were to offer her the stiffest of competition.