
1 Early Industrialization

Several factors help to explain why the Industrial Revolution began in Great Britain. That country had an abundant labor supply, large deposits of coal and iron ore, and capital available for investing in new industries. A large domestic middle class and overseas colonies provided markets for manufactured goods. Colonies were also a source for raw materials, particularly cotton for the textile industry. The Scientific Revolution and an enthusiasm for engineering fostered a spirit of curiosity and inventiveness. Britain had enterprising and daring entrepreneurs who organized new businesses and discovered new methods of production.

Edward Baines

BRITAIN'S INDUSTRIAL ADVANTAGES AND THE FACTORY SYSTEM

In 1835, Edward Baines (1800–1890), an early student of industrialization, wrote *The History of the Cotton Manufacture in Great Britain*—about one of the leading industries in the early days of the Industrial Revolution. In the passages that follow, Baines discusses the reasons for Britain's industrial transformation and the advantages of the factory system.

Three things may be regarded as of primary importance for the successful prosecution of manufactures, namely, water-power, fuel, and iron. Wherever these exist in combination, and where they are abundant and cheap, machinery may be manufactured and put in motion at small cost; and most of the processes of making

and finishing cloth, whether chemical or mechanical, depending, as they do, mainly on the two great agents of water and heat, may likewise be performed with advantage.

... A great number of streams ... furnish water-power adequate to turn many hundred mills: they afford the element of water,

indispensable for scouring, bleaching, printing, dyeing, and other processes of manufacture: and when collected in their larger channels, or employed to feed canals, they supply a superior inland navigation, so important for the transit of raw materials and merchandise.

Not less important for manufactures than the copious supply of good water, is the great abundance of coal. . . . This mineral fuel animates the thousand arms of the steam-engine, and furnishes the most powerful agent in all chemical and mechanical operations.

In mentioning the advantages which Lancashire [the major cotton manufacturing area] possesses as a seat of manufactures, we must not omit its ready communication with the sea by means of its well-situated port, Liverpool, through the medium of which it receives, from Ireland, a large proportion of the food that supports its population, and whose commerce brings from distant shores the raw materials of its manufactures, and again distributes them, converted into useful and elegant clothing, amongst all the nations of the earth. Through the same means a plentiful supply of timber is obtained, so needful for building purposes.

To the above natural advantages, we must add, the acquired advantage of a canal communication, which ramifies itself through all the populous parts of this country, and connects it with the inland counties, the seats of other flourishing manufactures, and the sources whence iron, lime, salt, stone, and other articles in which Lancashire is deficient, are obtained. By this means Lancashire, being already possessed of the primary requisites for manufactures, is enabled, at a very small expense, to command things of secondary importance, and to appropriate to its use the natural advantages of the whole kingdom. The canals, having been accomplished by individual enterprise, not by national funds, were constructed to supply a want already existing: they were not, therefore, original sources of the manufactures, but have extended together with them, and are to be considered as having essentially aided and accelerated that prosperity from

whose beginnings they themselves arose. The recent introduction of railways will have a great effect in making the operations of trade more intensely active, and perfecting the division of labour, already carried to so high a point. By the railway and the locomotive engine, the extremities of the land will, for every beneficial purpose, be united.

In comparing the advantages of England for manufactures with those of other countries, we can by no means overlook the excellent commercial position of the country—intermediate between the north and south of Europe; and its insular situation, which, combined with the command of the seas, secures our territory from invasion or annoyance. The German ocean, the Baltic, and the Mediterranean are the regular highways for our ships; and our western ports command an unobstructed passage to the Atlantic, and to every quarter of the world.

A temperate climate, and a hardy race of men, have also greatly contributed to promote the manufacturing industry of England.

The political and moral advantages of this country, as a seat of manufactures, are not less remarkable than its physical advantages. The arts are the daughters of peace and liberty. In no country have these blessings been enjoyed in so high a degree, or for so long a continuance, as in England. Under the reign of just laws, personal liberty and property have been secure; mercantile enterprise has been allowed to reap its reward; capital has accumulated in safety; the workman has "gone forth to his work and to his labour until the evening;" and, thus protected and favoured, the manufacturing prosperity of the country has struck its roots deep, and spread forth its branches to the ends of the earth.

England has also gained by the calamities of other countries, and the intolerance of other governments. At different periods, the Flemish and French protestants, expelled from their native lands, have taken refuge in England, and have repaid the protection given them by practising and teaching branches of industry, in

which the English were then less expert than their neighbours. The wars which have at different times desolated the rest of Europe, and especially those which followed the French revolution, (when mechanical invention was producing the most wonderful effects in England,) checked the progress of manufacturing improvement on the continent, and left England for many years without a competitor. At the same time, the English navy held the sovereignty of the ocean, and under its protection the commerce of this country extended beyond all former bounds, and established a firm connexion between the manufacturers of Lancashire and their customers in the most distant lands.

When the natural, political, and adventitious causes, thus enumerated, are viewed together, it cannot be [a] matter of surprise that England has obtained a preeminence over the rest of the world in manufactures.

A crucial feature of the industrial Revolution was a new production system—the making of goods in factories. By bringing all the operations of manufacturing under one roof, industrialists made the process of production more efficient. Baines describes the factory system's advantages over former methods.

... Hitherto the cotton manufacture had been carried on almost entirely in the houses of the workmen: the hand or stock cards,¹ the spinning wheel, and the loom, required no larger apartment than that of a cottage. A spinning jenny² of small size might also be used in a cottage, and in many instances was so used: when the number of spindles was considerably increased, adjacent work-shops were used. But the water-frame, the carding engine, and the

¹Prior to spinning, raw fibers had to be carded with a brushlike tool that cleaned and separated them.

²The spinning jenny, which was hand-powered, was the first machine that spun fiber onto multiple spindles at the same time; that is, it produced more thread or yarn in less time than the single-thread spinning wheel.

other machines which [Richard] Arkwright brought out in a finished state, required both more space than could be found in a cottage, and more power than could be applied by the human arm. Their weight also rendered it necessary to place them in strongly-built mills, and they could not be advantageously turned by any power then known but that of water.

The use of machinery was accompanied by a greater division of labour than existed in the primitive state of the manufacture; the material went through many more processes; and of course the loss of time and the risk of waste would have been much increased, if its removal from house to house at every stage of the manufacture had been necessary. It became obvious that there were several important advantages in carrying on the numerous operations of an extensive manufacture in the same building. Where water power was required, it was economy to build one mill, and put up one water-wheel, rather than several. This arrangement also enabled the master spinner himself to superintend every stage of the manufacture: it gave him a greater security against the wasteful or fraudulent consumption of the material: it saved time in the transference of the work from hand to hand: and it prevented the extreme inconvenience which would have resulted from the failure of one class of workmen to perform their part, when several other classes of workmen were dependent upon them. Another circumstance which made it advantageous to have a large number of machines in one manufactory was, that mechanics must be employed on the spot, to construct and repair the machinery, and that their time could not be fully occupied with only a few machines.

All these considerations drove the cotton spinners to that important change in the economy of English manufactures, the introduction of the factory system; and when that system had once been adopted, such were its pecuniary advantages, that mercantile competition would have rendered it impossible, even had it been desirable, to abandon it.