

Chapter 1 : What is factory system? definition and meaning - calendrierdelascience.com

The factory system is a method of manufacturing using machinery and division of labour. Because of the high capital cost of machinery and factory buildings, factories were typically privatized and owned by wealthy individuals who employed the operative labour.

The early British factory system may be said have been the most obvious feature of the Industrial Revolution. Forecasting as it did the trend of subsequent industrial development, judgments passed upon it will largely determine the attitude taken with regard to the modern industrial system. There are still parts of the world where industrial conditions seem to resemble those which existed here a century ago, and a recent article on conditions in China reads, in parts, exactly like a quotation from one of the history books which describe the early English system [1]. One suspects that the similarity is partly due to the author having read these modern history books, but a more or less parallel situation undoubtedly exists. In the course of another line of inquiry, the writer of this essay was led to study a selection of the voluminous parliamentary reports and other literature of the early nineteenth century bearing on labour conditions. He was struck with the fact that the impressions he obtained from these publications were very different from those which certain modern works on the early factory system had given him, namely, A History of Factory Legislation by Hutchins and Harrison and The Town Labourer and Lord Shaftsbury by J L and Barbara Hammond. As these works are practically the standard modern works, he felt that a critical examination of the main evidence and more important discussions of the subject was necessary. This essay is the result of an attempt at such an examination. The report of this committee gives us a dreary picture of cruelty, misery, disease and deformity among the factory children, and this picture is generally accepted as authentic. Its pages bring before the reader in the vivid form of dialogue the kind of life that was led by the victims of the new system. When it came up for second reading, the House decided that a committee should be set up to investigate the story of gross brutalities in the factories, which he had described at great length and with much eloquence. Sadler himself presided, and it was agreed, for reasons of economy and convenience, that he should call his witnesses first, after which the opponents of the bill should put their case. He exercised the greatest energy to get his case complete by the end of the session, and then, ignoring the demands of justice, he immediately published the evidence "and gave to the world such a mass of ex-parte statements, and of gross falsehoods and calumnies" as probably never before found their way into any public document. It consists chiefly of individual and carefully selected instances. Moreover, Sadler had made use of an effective propagandist device in calling evidence of what happened in earlier times and presenting it in such a way as to suggest that the same abuses were still in operation. A serious defect in the evidence is that it was not given on oath. If we take into account the religious feeling of the day, the importance of this must be clear. Of the three witnesses who came from Manchester, [8] only one could be got to repeat his evidence before the subsequent commission, and then he would not do so on oath. His evidence was found by the commission to be "absolutely false. In the reports issued by the subsequent commission [13] we can find effective answers to nearly all the charges made before the committee, but few writers mention this; for the most part they proceed as though the stories brought before the committee were confirmed. A good deal, perhaps the most valuable part, of our information comes from the evidence of medical men, but neither the Hammonds nor Hutchins and Harrison make any attempt to assess the value of their evidence. It is not an easy thing to do, even when we believe the doctors to have been free from a particular bias. There are two main difficulties. First, the state of mind of many of those who set out to observe the state of health of a particular group of people suggests le malade imaginaire; second, the condition of medical knowledge was such that medical opinions as opposed to observations are valueless. One would almost think that the Hammonds and Hutchins and Harrison hold the reverse. Let us compare the medical evidence contained in the reports of these two committees. They were questioned in the following style: Hutchins and Harrison say: Again and again before this committee we come across the declaration that a speculative opinion, or one founded on abstract grounds only, as to the number of hours a child could work with-out harm was impossible. He was hardly less indignant over the schools which

the children of the well-to-do were forced to attend than he was over factories. It is surprising that the relevance of his evidence has not been more widely realized. Hutchins and Harrison give one quotation from his book but entirely ignore his general conclusions. He gave no support to the view that the coming of the factories had coincided with. So long as home education is not found for them, and they are left to live as savages, they are to some extent better situated when engaged in light labour, and the labour generally is light which falls to their share. He undoubtedly very much exaggerated the extent of the vice and degradation which existed. A Poor Law Commission some years before had painted a very gloomy picture, and he seems to have accepted quite uncritically the charges made by opponents of the system. Not only was Gaskell influenced by it, but Dr. Hence we can fairly assume that the following compliment to a foreign power expresses a point of view not uncommon in those days among the educated classes. Spain, the most ignorant, degraded, and uncommercial of all countries pretending to civilisation is, in respect of crimes against property, three times less vicious than France, and more than seven times less vicious than England. This fact is a fearful one and speaks volumes. Spain ranks cannibalism among her list of crimes, but robbery is rare, and petty theft still rarer. The factories were blamed for this. The weight that can be attached to such opinions can be judged by a further quotation from the same essay in which tea-drinking is condemned as a sign of demoralization! Under any circumstances we should deprecate the too liberal use of weak tea, as extremely debilitating to the stomach; but the practice is fatal to the constitution of all hard working men—it affords a temporary relief at the expense of a subsequent reaction, which, in its turn, calls for another and stronger stimulus. The opinion was common. Kay who later became famous as Sir James Kay-Shuttleworth said exactly the same thing in almost the same words the following year. But this way of thinking was general in all camps. The first is the high earnings of the operatives which led to intemperance. Both Thackeray and Gaskell treat this as axiomatic. Hence they are often very dissipated. Engels believed that the continued expansion of English industry could never have occurred had there not been this reserve at hand. As they replaced children, the effect upon wages was probably not very great. Family earnings must have suffered, particularly where the displaced children could not get work in the mines or agriculture. It is said that Oastler had noticed for many years the prevalence of deformity and lameness among factory operatives but that the causes were unknown to him. There is ample confirmation of this opinion in the evidence from many sources contained in the reports issued by the Factory Commission in and If there was a slightly larger proportion of deformity or puniness among the factory children, this might be accounted for by bearing in mind the frequent statement that children who were insufficiently strong for other employments were sent to the cotton factories because of the lightness of the work there. There never was an age more fond of sickly sentiment. It was the age of Mrs. Hemans, and is it to be wondered at that many of her admirers sought inspiration for tears in the factories? It was easy to make an impression on the Tories, who for the most part not only were ignorant of the conditions in the factories [51] but were predisposed to condemn the factory owners. This attitude goaded William Cooke Taylor into the deepest irony. William Cooke Taylor says that they were persuaded that the calumnies which were circulated would never have been credited, but that their silence in trusting to the common sense of their countrymen was taken for a confession of guilt. He said that he would not "go into minute details" of his calculation because he would be "obliged to use terms that the ordinary reader would not understand. As a matter of fact R. Greg did make detailed calculations and set them forth clearly. The average distance a piecer could cover in a day he showed to be not more than eight miles. Let us try to take a balanced and detached view of conditions in those days, at the same time passing judgments only in the light of contemporary standards. The salient fact, and one which most writers fail to stress, is that, in so far as the work people then had a "choice of alternative benefits," they chose the conditions which the reformers condemned. Not only did higher wages cause them to prefer factory work to other occupations, but, as some of the reformers admitted, when one factory reduced its hours, it would tend to lose its operatives as they would transfer their services to establishments where they could earn more. The support of the artisan class for the Factory Acts could be obtained only by persuading them that as a result they would get the same or more money for less work. Later, the operatives were brought to look upon children as competitors to themselves, and this possibly acted as an even stronger motive in the support of the Factory Acts, particularly when the idea of working children in shifts developed. We can ignore

the platitude that the child, at least, was not a free agent. There were two lines of argument. On one side, "Against none do children more need protection than against their own parents"; and, on the other, "The parent is the only natural and efficient guardian of the child. The human emotions from which parental affections spring were no different then from what they are today, and it is to the different social and economic medium in which they were expressed that we must look for the cause of apparent callousness and cruelty. It is hard to believe that rich philanthropists felt more strongly than parents about the welfare of their children. Protection against the effects of drunkenness may, perhaps, have been needed, but, in general, upper-class support for legal restrictions on child labor was based upon a complete lack of understanding of the difficulties with which the working masses had to contend. Until the development of the industrial system had caused a general rise in material prosperity, such restrictions could only have added misery. No careful attempt to estimate the sufferings of children who were driven from employment by the various Factory Acts is known to the writer. Their condition was described by some of the first factory inspectors appointed in , but the evil was soon lost sight of in the general prosperity following. Moreover, until man has something to do in leisure, or until the commodities for use in leisure are sufficiently cheap and plentiful, what is the use of it to him? When he has these things, he can make a "choice between benefits," between leisure, and other things. Legal enactments often enforce the choice of an authority, which thinks it knows better. Perhaps, in the case of factory legislation, the authority was, indirectly, right. By bringing the operative a greater degree of leisure "artificially," it may have taught him to value it for its own sake and prefer it to the extra money which he habitually spent in the "alehouse" or the "dram shop. In the same way the moral welfare of children was probably safer in the factory than in the home before the social and moral changes, which the new industrial system made possible, had matured. That the apparent benefits wrought by the early Factory Acts are largely illusory is suggested by the steady improvement which was undoubtedly taking place before , partly as a result of the development of the factory system itself. All authorities, it is believed, admit that conditions were at their worst where domestic work prevailed and in the smaller factories and workshops, and there was a constant tendency for these to be eliminated through the competition of larger and more up-to-date establishments. The effect of the Act of was actually to set up a countertendency, for work was inclined to drift to workshops and the smaller factories which were more easily able to evade its provisions. The chief obstacle to amelioration appears to have been apathy - the apathy of ignorance - rather than the cupidity of manufacturers. Masters and men, particularly the men, simply could not be brought to believe that certain practices were dangerous or injurious to health. The operatives were very slow to learn. Efforts to improve the factories had to be carried out in face of the opposition of the very workers whom it was intended to benefit. But it was not until the sixties and seventies, when the ignorance of the operatives had been largely overcome, that "dangerous trades," as such, were subjected to state regulation. The effect of the Factory Acts upon production is a question which has not been squarely faced in modern treatises. There was obviously a sacrifice of productive power. A child can acquire dexterity much more easily than an adult, but such skill acquired in childhood is not easily lost. We get vague theories about "the economy of short hours. Hutchins and Harrison make the common assumption that the reductions of hours were actually a main cause of the greater productivity which followed.

Chapter 2 : Architecting the Modern Software Factory - CA Technologies

*The Modern Factory System (Classic Reprint) [Richard Whately Cooke Taylor] on calendrierdelascience.com *FREE* shipping on qualifying offers. Excerpt from The Modern Factory System India was the typical country in this case.*

Our 12 system largely still adheres to the century-old, industrial-age factory model of education. A century ago, maybe it made sense to adopt seat-time requirements for graduation and pay teachers based on their educational credentials and seniority. Educators were right to fear the large class sizes that prevailed in many schools. But the factory model of education is the wrong model for the 21st century. There were laws on the books in Colonial America, for example, demanding children be educated although not that schools be established. Textbook companies were already thriving before Horace Mann or the Committee of Ten came along to decide what should be part of the curriculum. Another was the requirement that, in order to demonstrate accountability, schools maintain records on attendance, salaries, and other expenditures. And there have always been objections from multiple quarters, particularly from religious groups, to the shape that schooling has taken. Arguments over what public education should look like and what purpose public education should serve — God, country, community, the economy, the self — are not new. Here he is in Very few places in the world were back then. Training future factory workers, docile or not, was not really the point. Nevertheless industrialization is often touted as both the model and the rationale for the public education system past and present. Mass education was the ingenious machine constructed by industrialism to produce the kind of adults it needed. The problem was inordinately complex. How to pre-adapt children for a new world — a world of repetitive indoor toil, smoke, noise, machines, crowded living conditions, collective discipline, a world in which time was to be regulated not by the cycle of sun and moon, but by the factory whistle and the clock. The solution was an educational system that, in its very structure, simulated this new world. This system did not emerge instantly. Even today it retains throw-back elements from pre-industrial society. Yet the whole idea of assembling masses of students raw material to be processed by teachers workers in a centrally located school factory was a stroke of industrial genius. The whole administrative hierarchy of education, as it grew up, followed the model of industrial bureaucracy. The very organization of knowledge into permanent disciplines was grounded on industrial assumptions. Children marched from place to place and sat in assigned stations. Bells rang to announce changes of time. The inner life of the school thus became an anticipatory mirror, a perfect introduction to industrial society. The most criticized features of education today — the regimentation, lack of individualization, the rigid systems of seating, grouping, grading and marking, the authoritarian role of the teacher — are precisely those that made mass public education so effective an instrument of adaptation for its place and time. That is the era of tremendous experimentation in the forms of schools, from legacy one-room village schools in the hinterlands to giant monitorial schools in cities to academies and normal schools and colleges and the earliest high schools in various places. It is the era of charity schools in cities and the earliest and incomplete state subsidies to education, a period when many states had subsidies to what we would call private or parochial schools. It is also the start of the common-school reform era, the era when both workers and common-school reformers began to talk about schooling as a right attached to citizenship, and the era when primary schooling in the North became coeducational almost everywhere. It was an era of mass-produced textbooks. It was an era when rote learning was highly valued in school, despite arguments against the same. And, yes, the first compulsory-school law was passed before the Civil War — but it was not enforced. Maybe you think industrialization is the development of railroads, monopolies, national general strikes, metastasizing metropolises, and mechanized production. Then you mean the second half of the nineteenth century, and that is the era where the structural dreams of common-school reformers largely came to pass with tuition-free schooling spreading in the North, the slow victory of high schools over academies, more unenforced compulsory school laws, a pan-Protestant flavor to schooling without official religious education, the initial development of a parallel Catholic parochial school system when Catholic leaders became convinced the public schools were hostile to their interests, the first research-oriented universities, a broad diversity of languages of instruction through the Midwest and south to

Texas, the development of extensive age-graded self-contained elementary classrooms in urban school systems, the bureaucratization of many such systems, the contentious development of public schooling in the South, and the era when segregation laws were written at the tail end of the 19th century. It was also an era of mass-produced textbooks, and an era when rote learning was highly valued in school, despite arguments against the same. Or maybe you think industrialization was assembly-line factories, private-worker unionization supported by federal law, the maturation of marketing techniques and the growth of a consumer economy, major economic crises, the introduction of cars and trucks, the mechanization of agriculture, and brutal, mechanized wars. That was an era of rural-school consolidation forced by states, continued racial segregation, efforts to Americanize immigrant children and force them to speak English only in schools, the first legal successes in undermining segregation, the growth of mostly small high schools across the U. It was the era when several regions of the country first experienced a majority of teenagers graduating from high school. It was an era when compulsory school laws were finally enforced at selective ages, when child-labor opponents first failed and then succeeded at efforts to limit child labor by legislation—aided significantly by the Great Depression and the mechanization of agriculture, as teenagers found fewer opportunities for full-time work.

What Do Factories Look Like? Schools might feel highly de-personalized institutions; they might routinely demand compliance and frequently squelch creativity. The monitorial system and its variants—the Lancaster, the Bell, and the Madras systems, involved schools that were housed in large warehouses—larger often than many of the nascent factories at the time—with hundreds of students in one massive classroom with one teacher. Due to labor costs alone, the monitorial system was actually far cheaper. After all, the major innovation of the Prussian model was in levying a tax to fund compulsory schooling, not in establishing a method for instruction. From the perpetual agency of this system, idleness cannot exist. On entering the school, you can discover no individual unemployed, no boy looking vacantly round him: In other words, the monitorial system expressly operated like a factory. The Madras System consists in conducting a school, by a single Master, THROUGH THE MEDIUM OF THE SCHOLARS THEMSELVES, by a uniform and almost insensibly progressive course of study, whereby the mind of the child is often exercised in anticipating and dictating for himself his successive lessons, by which the memory is improved, the understanding cultivated, and knowledge uniformly increased—a course in which reading and writing are carried on in the same act, with a law of classification by which every scholar finds his level, is happily, busily, and profitably employed every moment, is necessarily made perfectly acquainted with every lesson as he goes along, and without the use or the need of corporeal infliction, acquires habits of method, order, and good conduct, and is advanced in his learning, according to the full measure of his capacity. As Victor Cousin wrote in his Report on the State of Education in Prussia—a report commissioned by the French government but, once translated into English, with great influence in the US: Our principal aim, in each kind of instruction, is to induce the young men to think and judge for themselves. We are opposed to all mechanical study and servile transcripts. The masters of our primary schools must possess intelligence themselves, in order to be able to awaken it in their pupils; otherwise, the state would doubtless prefer the less expensive schools of Bell and Lancaster. And the way to make it less like a factory is to bring in the expertise of a craftsman, in this case, the trained teachers that were the heart of the Mannian, Glasgow, and Prussian systems. That argument is now and has been for a century the rationale for education technology. But the economic depression may here work beneficially, in that it may force the consideration of efficiency and the need for laborsaving devices in education. Education is a large-scale industry; it should use quantity production methods. This does not mean, in any unfortunate sense, the mechanization of education. It does mean freeing the teacher from the drudgeries of her work so that she may do more real teaching, giving the pupil more adequate guidance in his learning. The ultimate results should be highly beneficial. Perhaps only by such means can universal education be made effective. The automation of the menial tasks of instruction would enable education to scale, Pressey—presaging MOOC proponents—asserted. Image credits We tend to not see automation today as mechanization as much as algorithmization—the promise and potential in artificial intelligence and virtualization, as if this magically makes these new systems of standardization and control lighter and liberatory.

Chapter 3 : Factory system - Wikipedia

Factory system: Factory system, system of manufacturing that began in the 18th century and is based on the concentration of industry into specialized and often large establishments.

Over time the nature of technological change shifted from the introduction of new mechanical contrivances to developments in the application of power primarily water and wind to old devices and even more significantly to the organization of work that would allow production on a larger scale. The factory system replaced the domestic system, in which individual workers used hand tools or simple machinery to fabricate goods in their own homes or in workshops attached to their homes. The use of waterpower and then the steam engine to mechanize processes such as cloth weaving in England in the second half of the 18th century marked the beginning of the factory system. This system was enhanced at the end of the 18th century by the introduction of interchangeable parts in the manufacture of muskets and, subsequently, other types of goods. Prior to this, each part of a musket or anything else assembled from multiple components had been individually shaped by a workman to fit with the other parts. In the new system, the musket parts were machined to such precise specifications that a part of any musket could be replaced by the same part from any other musket of the same design. This advance signaled the onset of mass production, in which standardized parts could be assembled by relatively unskilled workmen into complete finished products. The resulting system, in which work was organized to utilize power-driven machinery and produce goods on a large scale, had important social consequences: The location of work also changed. Whereas many workers had inhabited rural areas under the domestic system, the factory system concentrated workers in cities and towns, because the new factories had to be located near waterpower and transportation alongside waterways, roads, or railways. The movement toward industrialization often led to crowded, substandard housing and poor sanitary conditions for the workers. Moreover, many of the new unskilled jobs could be performed equally well by women, men, or children, thus tending to drive down factory wages to subsistence levels. Factories tended to be poorly lit, cluttered, and unsafe places where workers put in long hours for low pay. These harsh conditions gave rise in the second half of the 19th century to the trade-union movement, in which workers organized in an attempt to improve their lot through collective action. Two major advances in the factory system occurred in the early 20th century with the introduction of management science and the assembly line. Scientific management, such as time-and-motion studies, helped rationalize production processes by reducing or eliminating unnecessary and repetitious tasks performed by individual workers. The old system in which workers carried their parts to a stationary assembly point was replaced by the assembly line, in which the product being assembled would pass on a mechanized conveyor from one stationary worker to the next until it was completely assembled. By the second half of the 20th century, enormous increases in worker productivity fostered by mechanization and the factory system had yielded unprecedentedly high standards of living in industrialized nations. Ideally, the modern factory was a well-lit, well-ventilated building that was designed to ensure safe and healthy working conditions mandated by government regulations. The main advance in the factory system in the latter part of the century was that of automation, in which machines were integrated into systems governed by automatic controls, thereby eliminating the need for manual labour while attaining greater consistency and quality in the finished product. Factory production became increasingly globalized, with parts for products originating in different countries and being shipped to their point of assembly. As labour costs in the developed countries continued to rise, many companies in labour-intensive industries relocated their factories to developing nations, where both overhead and labour were cheaper. Learn More in these related Britannica articles:

Chapter 4 : Lecture The Origins of the Industrial Revolution in England

The Modern Factory System by Richard Whately Cooke Taylor. Download. Read. Paperback. Premium. Clothbound. Excerpt. India was the typical country in this case. But.

Characteristics[edit] The defining characteristics of the factory system are: The factory system is considered a form of production. The operative labour generally does not own a significant share of the enterprise. The capitalist owners provide all machinery, buildings, management and administration, raw or semi-finished materials and are responsible for the sale of all production, as well as any resulting losses. Use of Unskilled labour “ Before the factory some systems had many products such as shoes and muskets were made by skilled craftsmen who usually custom-made an entire article. In contrast, factories practiced division of labour , in which most workers were either low skilled labourers who tended or operated machinery, or unskilled labourers who moved materials, semi-finished and finished goods. There were a few skilled mechanics. Division of labour was also practiced by the putting out system in which, for example, pieces of leather were cut off-site and brought to a central shop to be made into shoes or other articles. Because factories could oversupply local markets, access to transportation was important so that goods could be widely distributed. Factories used far less manpower per unit of production and therefore lowered product cost. Location “ Before the widespread use of steam engines and railroads, most factories were located at water power sites and near water transportation. The exception was the sewing machine, which allowed putting out of sewing to continue for decades after the rise of factories. Home spinning and weaving were displaced in the years following the introduction of factory production, especially as distribution became easier. Although the earliest factories were usually all under one roof, different operations might be done on different floors. Multi-story buildings were common because they facilitated transmission of power through line shafts. In large factories, such as Baldwin locomotive works , different processes were performed in different buildings. Because of this, the smallest steam engines were about 2 horsepower, which was larger than needed by most workshops. Consequently until electrification in the s and s most workshops relied on manual power or rented space in power buildings which provided a centrally powered line shaft. Uniformity was mainly due to the precision possible from machinery, but also, quality was overseen by management. The quality of many machine operations such as sewing was superior to hand methods. Factories were able to produce and distribute a steady supply of goods. Workers were paid either daily wages or for piece work , either in the form of money or some combination of money, housing, meals and goods from a company store the truck system. Piece work presented accounting difficulties, especially as volumes increased and workers did a narrower scope of work on each piece. Piece work went out of favor with the advent of the production line, which was designed on standard times for each operation in the sequence, and workers had to keep up with the work flow. By , an integrated brass mill was working at Warmley near Bristol. Raw material went in at one end, was smelted into brass and was turned into pans, pins, wire, and other goods. Housing was provided for workers on site. Josiah Wedgwood in Staffordshire and Matthew Boulton at his Soho Manufactory were other prominent early industrialists, who employed the factory system. The factory system began widespread use somewhat later when cotton spinning was mechanized. The first use of an integrated system, where cotton came in and was spun, bleached dyed and woven into finished cloth, was at mills in Waltham and Lowell, Massachusetts. These became known as Lowell Mills and the Waltham-Lowell system. Richard Arkwright is the person credited with being the brains behind the growth of factories and the Derwent Valley Mills. After he patented his water frame in , he established Cromford Mill , in Derbyshire , England. Working hours were as long as they had been for the farmer, that is, from dawn to dusk, six days per week. Overall, this practice essentially reduced skilled and unskilled workers to replaceable commodities. By annual production had reached , sailing blocks. Societal effects[edit] Much manufacturing in the 18th century was carried out in homes under the domestic or putting-out system , especially the weaving of cloth and spinning of thread and yarn, often with just a single loom or spinning wheel. As these devices were mechanized, machine made goods were able to underprice the cottagers, leaving them unable to earn enough to make their effort

worthwhile. Other products such as nails had long been produced in factory workshops, increasingly diversified using the division of labour to increase the efficiency of the system. Factory workers typically lived within walking distance to work until the introduction of bicycles and electric street railways in the 1850s. Thus the factory system was partly responsible for the rise of urban living, as large numbers of workers migrated into the towns in search of employment in the factories. Many mills had to provide dormitories for workers, especially for girls and women. The transition to industrialisation was not without difficulty. For example, a group of English workers known as Luddites formed to protest against industrialisation and sometimes sabotaged factories. They continued an already established tradition of workers opposing labour saving machinery. Numerous inventors in the textile industry such as John Kay and Samuel Crompton, suffered harassment when developing their machines or devices. The Soho Manufactory in In other industries the transition to factory production was not so divisive. Until the late 19th century it was common to work 12 hours a day, six days a week in most factories; however long hours were also common outside factories. Debate arose concerning the morality of the system, as workers complained about unfair working conditions prior to the passage of labour laws. Child labour was also a major part of the system, and was vehemently argued by those who deemed it immoral. However, in the early 19th century, education was not compulsory and in many families having children work was necessary due to low incomes Samuel Slater employed children but was required to provide basic education. Children commonly did farm labour and produced goods for the household. Besides working in factories children worked in mines. Automation in the late 19th century is credited with displacing child labour, with the automatic glass bottle blowing machine ca. 1850. Years of schooling began to increase sharply from the end of the 19th century. Some industrialists themselves tried to improve factory and living conditions for their workers. One of the earliest such reformers was Robert Owen, known for his pioneering efforts in improving conditions for workers at the New Lanark mills, and often regarded as one of the key thinkers of the early socialist movement. Karl Marx worried that the capitalist system would eventually lead to wages only sufficient for subsistence due to the tendency of the rate of profit to fall. Subsistence wages were indeed the case in parts of England. The British Agricultural Revolution had been reducing the need for labour on farms for over a century and these workers were forced to sell their labour wherever they could. Conditions were particularly bad during the depression years of the late 1840s to early 1850s. The depression was immediately followed by the Irish famine of 1845-50 which brought large numbers of Irish immigrants to seek work in the English and American factories. By the late 1850s Engels noted that the extreme poverty and lack of sanitation he wrote about in 1845 had largely disappeared.

Chapter 5 : The Modern Factory System

The early British factory system may be said have been the most obvious feature of the Industrial Revolution. Forecasting as it did the trend of subsequent industrial development, judgments passed upon it will largely determine the attitude taken with regard to the modern industrial system.

The Philosophy of the Manufacturers, Andrew Ure , a professor at the University of Glasgow, was an enthusiast for the new manufacturing system. Here he represents the views of a new class: This island is pre-eminent among civilized nations for the prodigious development of its factory wealth, and has been therefore long viewed with a jealous admiration by foreign powers. This very pre-eminence, however, has been contemplated in a very different light by many influential members of our own community, and has been even denounced by them as the certain origin of innumerable evils to the people, and of revolutionary convulsions to the state. If the affairs of the kingdom be wisely administered, I believe such allegations and fears will prove to be groundless, and to proceed more from the envy of one ancient and powerful order of the commonwealth, towards another suddenly grown into political importance, than from the nature of things. The blessings which physio-mechanical science has bestowed on society, and the means it has still in store for ameliorating the lot of mankind, have been too little dwelt upon; while, on the other hand, it has been accused of lending itself to the rich capitalists as an instrument for harassing the poor, and of exacting from the operative an accelerated rate of work. It has been said, for example, that the steam-engine now drives the power-looms with such velocity as to urge on their attendant weavers at the same rapid pace; but that the hand-weaver, not being subjected to this restless agent, can throw his shuttle and move his treddles at his convenience. There is, however, this difference in the two cases, that in the factory, every member of the loom is so adjusted, that the driving force leaves the attendant nearly nothing at all to do, certainly no muscular fatigue to sustain, while it procures for him good, unfailing wages, besides a healthy workshop gratis: The constant aim and effect of scientific improvement in manufactures are philanthropic, as they tend to relieve the workmen either from niceties of adjustment which exhaust his mind and fatigue his eyes, or from painful repetition of efforts which distort or wear out his frame. At every step of each manufacturing process described in this volume the humanity of science will be manifest. In its precise acceptance, the Factory system is of recent origin, and may claim England for its birthplace. The mills for throwing silk, or making organzine, which were mounted centuries ago in several of the Italian states, and furtively transferred to this country by Sir Thomas Lombe in , contained indeed certain elements of a factory, and probably suggested some hints of those grander and more complex combinations of self-acting machines, which were first embodied half a century later in our cotton manufacture by Richard Arkwright, assisted by gentlemen of Derby, well acquainted with its celebrated silk establishment. But the spinning of an entangled flock of fibres into a smooth thread, which constitutes the main operation with cotton, is in silk superfluous; being already performed by the unerring instinct of a worm, which leaves to human art the simple task of doubling and twisting its regular filaments. The apparatus requisite for this purpose is more elementary, and calls for few of those gradations of machinery which are needed in the carding, drawing, roving, and spinning processes of a cotton-mill. When the first water-frames for spinning cotton were erected at Cromford, in the romantic valley of the Derwent, about sixty years ago, mankind were little aware of the mighty revolution which the new system of labour was destined by Providence to achieve, not only in the structure of British society, but in the fortunes of the world at large. Arkwright alone had the sagacity to discern, and the boldness to predict in glowing language, how vastly productive human industry would become, when no longer proportioned in its results to muscular effort, which is by its nature fitful and capricious, but when made to consist in the task of guiding the work of mechanical fingers and arms, regularly impelled with great velocity by some indefatigable physical power. What his judgment so clearly led him to perceive, his energy of will enabled him to realize with such rapidity and success, as would have done honour to the most influential individuals, but were truly wonderful in that obscure and indigent artisan. The principle of the factory system then is, to substitute mechanical science for hand skill, and the partition of a process into its essential constituents, for the division

or graduation of labour among artisans. On the handicraft plan, labour more or less skilled was usually the most expensive element of production. By the infirmity of human nature it happens, that the more skilful the workman, the more self-willed and intractable he is apt to become, and, of course, the less fit a component of a mechanical system, in which, by occasional irregularities, he may do great damage to the whole. The grand object therefore of the modern manufacturer is, through the union of capital and science, to reduce the task of his work-people to the exercise of vigilance and dexterity, - faculties, when centred to one process, speedily brought to perfection in the young. In the infancy of mechanical engineering, a machine-factory displayed the division of labour in manifold gradations - the file, the drill, the lathe, having each its different workmen in the order of skill: It is, in fact, the constant aim and tendency of every improvement in machinery to supersede human labour altogether, or to diminish its cost, by substituting the industry of women and children for that of men; or that of ordinary labourers for trained artisans. In most of the water-twist, or throstle cotton-mills, the spinning is entirely managed by females of sixteen years and upwards. The effect of substituting the self-acting mule for the common mule, is to discharge the greater part of the men spinners, and to retain adolescents and children. The proprietor of a factory near Stockport states, in evidence to the commissioners, that, by such substitution, he would save Steam-engines furnish the means not only of their support but of their multiplication. They create a vast demand for fuel; and, while they lend their powerful arms to drain the pits and to raise the coals, they call into employment multitudes of miners, engineers, shipbuilders, and sailors, and cause the construction of canals and railways. Thus therefore, in enabling these rich fields of industry to be cultivated to the utmost, they leave thousands of fine arable fields free for the production of food to man, which must have been otherwise allotted to the food of horses. Steam-engines moreover, by the cheapness and steadiness of their action, fabricate cheap goods, and procure in their exchange a liberal supply of the necessaries and comforts of life produced in foreign lands. Improvements in the machinery have a three-fold bearing: They make it possible to fabricate some articles which, but for them, could not be fabricated at all. They enable an operative to turn out a greater quantity of work than he could before, - time, labour, and quality of work remaining constant. They effect a substitution of labour comparatively unskilled, for that which is more skilled. Knight, pp. 22, 23. This text is part of the Internet Modern History Sourcebook. The Sourcebook is a collection of public domain and copy-permitted texts for introductory level classes in modern European and World history. Unless otherwise indicated the specific electronic form of the document is copyright. Permission is granted for electronic copying, distribution in print form for educational purposes and personal use. If you do reduplicate the document, indicate the source. No permission is granted for commercial use of the Sourcebook.

Chapter 6 : The Modern Factory System: By R. Whately Cooke Taylor - Richard Whately Cooke-Taylor - G

Richard Arkwright did not only made cotton one of the main Britain's exports but he also paved the way to the Industrial Revolution and the modern factory system.

Preindustrial England was largely organized around localized forms of production. Goods were produced on family-centered farms, and items such as yarn and other textiles were contracted for larger distribution or produced independently to be sold at a market. After technological innovations created the ability to produce textiles using waterpower, production became centralized in a single place: While this mode of production began with the cotton and textile industries, it was the development of the steam engine that fully established the shift from craftspeople and localized production into production under the factory system. There are several interconnected factors beyond technological innovation that created the factory system in England in its particular moment in history. One was the development of banking institutions, which were able to channel investments into the establishment of factories, and which were also able to facilitate economic exchange. At the same time, a rise in the British population not only increased demand for goods, but also created a large pool of laborers who would eventually work for a wage after the development of the factory system. Finally, social changes in Britain at the time both facilitated the training of upper-middle-class men who would administrate the factory system and also the development of British persons as free workers, as opposed to serfs, who could sell their labor power in exchange for a wage. As such, the development of the factory system was central to the eventual entrenchment of capitalism on a world scale. It was this very shift in production and landownership, combined with the legal backing of free individuals who may enter into a state-sanctioned contractual relationship, that created what Karl Marx would identify as the two classes in capitalist society: Although both workers and owners share the distinction of equality under the law, it was the old aristocrats who were able to develop the infrastructure and purchase the land to develop factories, and the old serfs who had nothing to sell and exchange but their capacity for labor. The factory system was not only the foundation for the development of capitalism; it also radically shifted many aspects of social organization and daily life. Agricultural families were largely disenfranchised by this process, and in many cases were required to move to industrial centers in order to survive. They were thrust into the system of wage labor, fundamentally changing relationships between men and women. Whereas in preindustrial societies, all members of the family were involved in production work, the advent of the factory system created a gendered division of labor for middle- and working-class families, whereby men went to work for a wage and women were relegated to household work. In poor and nonwhite families, women worked for a wage outside the home in both formal and informal settings. Men were nearly always wageworkers, while women were either relegated to unpaid work to support the work of the men in their families or themselves worked for wages as a means of survival. The link of the wage system to factory production created not only a different work process and a gendered division of labor, but also a new form of work. Whereas work under preindustrial forms of organization was often exploitative, particularly under systems of slavery and feudalism, the development of the factory system as a defining feature of capitalism created alienated work for the first time. Work is said to be alienated when the worker is in a relationship of production whereby he or she has no autonomy or control over what he or she is producing, where the goods being produced belong exclusively to the owner of the factory, and whereby this process makes the worker alien to himself or herself and his or her community. Marx, in his book *Capital: A Critique of Political Economy* argued that workers are alienated to the same extent that they are subject to livelihood exclusively through the wage labor market. This same process has created a social life whereby workers are more fundamentally tied to the workplace than to their homes in terms of livelihood and dependence. This process has also created levels of bureaucracy that divide labor into segmented, de-skilled tasks. There has been tremendous resistance to the organization of work and social life under the factory system of production. Historically, that resistance has resulted in the abolition of child labor, the creation of the eight-hour workday, and various other labor laws regulating the extent to which owners of the means of production may exploit their workers. Moral arguments about whose labor is fair to exploit, and

under which conditions that labor power may be extracted, have resulted in change. Many of the first nations to develop the factory system are now seeing a decline in factory production, as its mode of efficiency under capitalism seeks ever-cheaper ways to produce goods outside the limits of environmental and labor laws. These same nations have seen a shift from factory production to a service economy. However, the fundamental form of factory production, and the inherent link to exploitative relationships under capitalism, is as yet unaltered. A Critique of Political Economy. The Making of the English Working Class. The Factory System, Vol. The Factory System and Society.

Chapter 7 : Factory - Wikipedia

The system of producing goods made on a mass scale by machines in a factory which replaced goods made by individual craftsmen. The factory system evolved in England in the eighteenth century as part of the Industrial Revolution.

Early Life Richard Arkwright was born as the 13th child to a family of humble origin on December 23, 1732, in Preston, Lancashire, England. Little is known about his early life except that his parents did not have the money to send him to school and that he was taught to read and write by his cousin. He was apprenticed as a barber in Preston and about 1750, he moved to the town of Bolton where he opened his own barber shop that was doing quite well. However, he soon experienced a personal tragedy. His first wife, Patience Holt whom he married in 1754 and who bore him a son, Richard Arkwright Junior died only one year after they got married. He remarried with Margaret Biggins in 1757, got into wig-making business and soon become a relatively successful entrepreneur. Invention of the Water Frame By the early 1780s, Arkwright become interested into cotton production machinery which progressed tremendously by that time. However, none of the solutions was suitable for industrial cotton production. Arkwright sensed the opportunity and started working on improvement of the machine for spinning. Together with a clockmaker, John Kay he managed to create the so-called water frame which produced a stronger length-wise thread – the warp. Arkwright patented his spinning machine in 1769 but his collaboration with Kay would later cause him problems with his patents. He found two business partners in Nottingham where they built a small horse-powered mill in 1769. But Arkwright soon became convinced that horse power is not the best solution and turned his attention to water power. In 1771, he moved to Cromford and together Jedediah Strutt and Samuel Need built the Cromford Mill which was not only the first successful water-powered cotton mill but it is also considered to be the first modern factory in the world. By 1780, Arkwright perfected cotton production process and patented improved carding machine which along with other inventions enabled him to increase the production of high quality thread at a lower cost. Soon, he set up new mills throughout Britain and became one of the most successful entrepreneurs of the Industrial Revolution. John Kay, the clockmaker who helped him make the water frame previously worked for Thomas Highs, an inventor who also experimented with textile machinery and accused Arkwright and Kay of using his designs to make the water frame. However, he had already established himself in the cotton industry, while his achievements were formally recognized in 1776 when he was knighted by King George III. **Death and Legacy** Richard Arkwright died a wealthy man on August 3, 1792. Although his inventor status remains a matter of debate, there is no doubt about his contribution to the Industrial Revolution in Europe as well as in America. He built a replicated water-powered cotton mill in Rhode Island which was a major step forward in industrialization of the United States. The credit, however, should perhaps be given to Richard Arkwright whose manufacturing model Slater brought to the United States.

Chapter 8 : The First American Factories [calendrierdelascience.com]

factory system A system of manufacturing involving the concentration of materials, fixed capital, and a labour-force, in one or more workplaces or plants. The reasons why factory production developed and largely displaced scattered domestic manufacture are a matter of debate in economic and social history.

The First American Factories Slater Mill, founded in by Samuel Slater, is now used as a museum dedicated to textile manufacturing. There was more than one kind of frontier and one kind of pioneer in early America. While many people were trying to carve out a new existence in states and territories continually stretching to the West, another group pioneered the American Industrial Revolution. They developed new, large forms of business enterprise that involved the use of power-driven machinery to produce products and goods previously produced in the home or small shop. The machinery was grouped together in factories. Part of the technology used in forming these new business enterprises came from England, however, increasingly they came from American inventors and scientists and mechanics. Although the Lowell mills had better conditions than British textile mills, workers still suffered long hours and excessive restrictions on their activities. The factory had 72 spindles, powered by by nine children pushing foot treadles, soon replaced by water power. Three years later, John and Arthur Shofield, who also came from England, built the first factory to manufacture woolens in Massachusetts. From these humble beginnings to the time of the Civil War there were over two million spindles in over cotton factories and woolen factories in the United States. Dear Father, I received your letter on Thursday the 14th with much pleasure. I am well, which is one comfort. My life and health are spared while others are cut off. Last Thursday one girl fell down and broke her neck, which caused instant death. She was going in or coming out of the mill and slipped down, it being very icy. The same day a man was killed by the [railroad] cars. Another had nearly all of his ribs broken. Another was nearly killed by falling down and having a bale of cotton fall on him. Last Tuesday we were paid. With the rest I got me a pair of rubbers and a pair of 50 cent shoes. Next payment I am to have a dollar a week beside my board I think that the factory is the best place for me and if any girl wants employment, I advise them to come to Lowell. From the textile industry, the factory spread to many other areas. In Pennsylvania, large furnaces and rolling mills supplanted small local forges and blacksmiths. In Connecticut, tin ware and clocks were produced. Soon reapers and sewing machines would be manufactured. The invention of interchangeable parts allowed factories to create clocks like this one in mass quantities. At first, these new factories were financed by business partnerships, where several individuals invested in the factory and paid for business expenses like advertising and product distribution. Shortly after the War of , a new form of business enterprise became prominent "the corporation. In a corporation, individual investors are financially responsible for business debts only to the extent of their investment, rather than extending to their full net worth, which included his house and property. First used by bankers and builders, the corporation concept spread to manufacturing. Over the next 15 years they charted additional companies in Massachusetts and New Hampshire. Others copied their corporation model and by the corporate manufacturer was commonplace. Lowell and his associates hoped to avoid the worst evils of British industry. They built their production facilities at Massachusetts. To work in the textile mills, Lowell hired young, unmarried women from New England farms. The "mill girls" were chaperoned by matrons and were held to a strict curfew and moral code. Although the work was tedious 12 hours per day, 6 days per week , many women enjoyed a sense of independence they had not known on the farm. The wages were about triple the going rate for a domestic servant at the time. The impact of the creation of all these factories and corporations was to drive people from rural areas to the cities where factories were located. This movement was well underway by the Civil War. Furnace Town History Many factory towns grew up seemingly overnight and disappeared as quickly. Furnace Town, chartered in , was a ghost town by , but at one time had over residents. This website from the Furnace Town Village interpretive museum tells the story. Lowell Mill Girls For a first-hand account of factory life, read this excerpt from the autobiography of a woman who worked at a cotton mill from the ages of ten to twenty-six. She was a witness to, if not a participant in, one of the first labor strikes in the country, and she offers insights into the reasons women and girls joined the

factories and turned out in protest. Lowell, Massachusetts This extraordinary site from the National Park Service, examines the history of Lowell, Massachusetts, a city built entirely upon the textile industry. Now the mill he built is a museum dedicated to the history of textile manufacture. Workers in 19th Century Britain Industrialization began earlier in England than it did in the United States, and the extremes of harsh labor conditions, especially for children, were reached and denounced there before the sudden growth of American factories. Although American factories were intended to be socially progressive, American views on children and women and the working classes in general stemmed from their English roots. This site offers original source material on investigations into the horrifying conditions in the English textile and mining industries.

Chapter 9 : Internet History Sourcebooks

The factory system is a system of manufacturing goods. The goods are made in a factory, a building where only manufacturing takes place. In the factory, workers produce goods on a large scale.

Cromford mill as it is today. By , an integrated brass mill was working at Warmley near Bristol. Raw material went in at one end, was smelted into brass and was turned into pans, pins, wire, and other goods. Housing was provided for workers on site. Josiah Wedgwood in Staffordshire and Matthew Boulton at his Soho Manufactory were other prominent early industrialists, who employed the factory system. The factory system began widespread use somewhat later when cotton spinning was mechanized. Richard Arkwright is the person credited with inventing the prototype of the modern factory. After he patented his water frame in , he established Cromford Mill , in Derbyshire , England, significantly expanding the village of Cromford to accommodate the migrant workers new to the area. Working hours were as long as they had been for the farmer, that is, from dawn to dusk, six days per week. Overall, this practice essentially reduced skilled and unskilled workers to replaceable commodities. Between and mechanized factories supplanted traditional artisan shops as the predominant form of manufacturing institution, because the larger-scale factories enjoyed a significant technological advantage over the small artisan shops. The earliest factories using the factory system developed in the cotton and wool textiles industry. Later generations of factories included mechanized shoe production and manufacturing of machinery, including machine tools. Factories that supplied the railroad industry included rolling mills, foundries and locomotive works. Agricultural-equipment factories produced cast-steel plows and reapers. Bicycles were mass-produced beginning in the s. Eliminating line shafts freed factories of layout constraints and allowed factory layout to be more efficient. Electrification enabled sequential automation using relay logic. Assembly line Factory Automation with industrial robots for palletizing food products like bread and toast at a bakery in Germany. Henry Ford further revolutionized the factory concept in the early 20th century, with the innovation of the mass production. This concept dramatically decreased production costs for virtually all manufactured goods and brought about the age of consumerism. Advanced statistical methods of quality control , pioneered by the American mathematician William Edwards Deming , whom his home country initially ignored. Quality control turned Japanese factories into world leaders in cost-effectiveness and production quality. Industrial robots on the factory floor, introduced in the late s. These computer-controlled welding arms and grippers could perform simple tasks such as attaching a car door quickly and flawlessly 24 hours a day. This too cut costs and improved speed. Some speculation [27] as to the future of the factory includes scenarios with rapid prototyping , nanotechnology , and orbital zero- gravity facilities [28]. Historically significant factories[edit].