The Industrial Revolution: Crash Course European History #24

Crash Course: European History
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Hi I'm John Green and this is Crash Course European History.

So we're going to turn our attention now to the Industrial Revolution, one of the most significant developments in human history. Like, imagine with me that it's 1820.

I got this idea from the economist Robert Gordon by the way. You live in, say, England. You probably work in agriculture.

When you walk to town, you're either pulling your own cart, or if you're lucky you have a horse. You have no running water or electricity. When you wash your few items of clothing, you do so by hand.

You cook over a fire. You think of time not primarily in minutes and hours, but mostly in relationship to solar cycles--how close it is to night, or to morning, or to midwinter. And in all these respects, your life in 1820 is basically identical to the lives of people in 1720, or 1520, or for that matter 1220.

That's not to say life hasn't changed in those hundreds of years--as we've explored in this series, lots has changed--but as Gregory Clark observed, in terms of standard of living, Europeans in 1800 basically led lives similar to those of Neandrathals. Now imagine that you close your eyes in 1820 and wake up in 1920. By now, most people in England do not work in agriculture.

They may work in shops, or transportation, or mining, oe workshops, or in factories. They measure time in minutes. Cars exist.

Some people have radios, which transmitted information through thin air. A few people even have refrigerators, which dramatically decrease food spoilage and the risk of food-borne illness. Occasionally you might even see an airplane flying in the sky.

Oh, and also, your country has just emerged from an astonishingly deadly war fought with highly lethal weapons such as chlorine gas, weapons that people of 1820 could not possibly have imagined. Welcome to the Industrial Revolution. [Intro] In this series, we've already talked about revolutions in agriculture that increased European productivity and revolutions in trade that increasingly distributed goods among people in towns and cities instead of having each individual family produce everything it needed. And these forces combined to help create more division of labor: like, farmers could focus on farming, and textile workers could focus on textile creation, which was more efficient than having each family do every kind of work.

So let's begin in the eighteenth century, when European industrial production is said to have begun. Europe's population was growing after centuries of non-stop wars, plagues, and the worst of the little ice age. Meanwhile, products such as coffee, tea, and chocolate made with heated water killed bacteria, while products from abroad expanded and varied the pool of nutrients, with corn and potatoes, for instance, generally more calorie-dense per acre than wheat.

In short, lives were getting longer and populations rising. This meant that on average people had a little more time to learn, tinker, and experiment. Many different artisans invented small improvements to existing mechanical devices.

Perhaps most famously, John Kay's flying shuttle increased the pace and productivity of weaving. Weavers then needed a greater amount of thread. So tinkerers made that happen by producing inventions such as the spinning jenny, created around 1764 by craftsman James Hargreaves.

The spinning jenny was a machine used by individual women working at home. And it allowed a person, using just the power of their hand, to spin not one bobbin of thread, but up to 120 at once. In England, Ellen Hacking and her husband John were among those devising carding machines to straighten cotton and wool fibers for spinning.

And at about the same time, Richard Arkwright and his partners invented the water frame, another kind of spinning machine that used water power. And when spinning machines could be linked to a central power source such as water, many could be placed in a single building. So, the world's first factories arose in part from the pressure to increase production of English cloth for global and domestic markets.

Did the center of the world just open? Is one of my Polo shirts in there? This cost like $41.

Twice a year I go to a Polo outlet in Southern Indiana and just buy as many of these things as they'll sell to me. And look, I'm not here to advertise Polo shirts, but this thing is incredibly comfortable, and also, it's like dyed a specific color. Everything about this was completely unimaginable in the early nineteenth century.

In fact, you know what? It's so soft to the touch, I think I'm going to put it on. Is that weird.

Oh yeah! I feel like I'm the bad guy in an 80s movie. How do I look, Stan?

Oh, Stan says I look like Steve Bannon. OK. Thus ends that experiment, now back to the show.

Let's talk about porcelain. Another tinkerer was the alchemist Johann Friedrich Böttger who promised the king of Saxony that he could figure out how to make porcelain. Porcelain was such an obsession that wealthy people collected it and even those with far less would try to buy a piece or two—a cup or plate—as we see in many Dutch, French, and other paintings.

Two things you see a lot in European paintings of the affluent or those who aspired to affluence: porcelain and pineapples, which were also quite rare and expensive and difficult to produce domestically. Porcelain was also practical, because Europeans did not know other ways to make heat resistant dishware for their hot drinks. So Böttger was virtually imprisoned until around 1708 when he figured out how to make porcelain, although not as beautifully as the Chinese or Japanese did.

What we're trying to get at here is that while people love a great story of an inventor and their invention, the Industrial Revolution was the story of lots and lots of people working together, making a series of incremental improvements, rather than, like, geniuses from on high creating amazing things. The real genius of humans is collaboration, and also spying. Like for instance, Industrial spies helped with every development because other regions were far more advanced than Europe in manufacturing, for instance, color fast dyes and heat-resistant dishware, fine weaving and spinning, or even metallurgy.

Arkwright, for example, mostly copied designs from imported textiles. And it was those cotton textiles that caught the imagination of consumers and filled pockets, first of the people who imported textiles from India and China, and then of the daring manufacturers who were successful at copying the lightweight, and colorful, and washable cotton clothing. But industrial production of cotton was really risky—the rate of business failure during the Industrial Revolution was over 50 percent.

Because of that, experimenting manufacturers worked to keep labor

costs as low as they could. One way was to use unpaid orphans from government, religious or charitable institutions as labour. At a time when people didn't know a lot about steam powered machinery and its dangers, industrial accidents happened all the time, and children were often the victims.

Children worked incredibly long hours and deaths were common. Little Mary Richards was caught up in a machine and six- and seven- year old orphans working alongside her witnessed the quote "bones of her arms, legs, thighs, etc successively snap... her head appeared dashed to pieces... her blood thrown about like water from a twirled mop."2 Now I know that's very graphic, but I think it's important to understand the extent of industrial oppression, including the industrial oppression of children. Workers lost arms, eyes, breasts, and fingers or were otherwise disfigured.

Production and profits came first to avoid financial ruin. And industry had other repercussions. It initially increased the demand for slaves even more.

Slaves produced food for workers who had left farms for factories. Slaves also produced tropical crops such as sugar, and tobacco, and coffee that boosted the energy of many types of workers. And slaves provided the palm and other tropical oils to keep machinery running as well as the raw materials for industry, especially cotton.

It's important to understand that industry thrived due to slave labor and inexpensive child labor, and also through the labor of women, who were paid less than men. Over time, more and more people began working in industrialized settings, or in economic sectors that supported industry due in part to the development of the steam engine. In 1776, English inventor James Watt launched a steam engine that improved earlier models.

Now as far back as Roman Egypt and then Ottoman Egypt and China, people had known about steam engines, But Watt's engine was more efficient, which made it useful in replacing animal and water power, not just in mines but also powering textile factories, and then other machinery. For millennia, almost all human power came from our muscles. Then we harnessed some animal power, and eventually some wind and water power.

But steam power completely revolutionized how much work could be done on behalf of humans, and also of course changed transportation when it was attached to covered and uncovered wagons and ships to make trains and steamships and eventually automobiles. And the train created another kind of demand: as urbanization soared around railway hubs, small and grand train stations were built along with all the other buildings to house the railway's primary and secondary employees. By secondary employees I mean, it wasn't just station-masters, ticket-sellers, and conductors, there was a need for shopkeepers, and pharmacists, and construction workers, and teachers, and doctors, and and drivers of coaches, not to mention sanitation workers, police, and urban administrators.

Industrialization had a snowball effect and it wasn't gonna be turned back. And all this mean that everyday life also transformed. Two classes became prominent alongside the aristocracy and peasants in the social structure: the bourgeoisie and proletariat or working class.

The bourgeoisie initially referred to people who lived in towns and cities or burgs/bourgs. But the term came to refer to those who owned factories, banks, transportation networks, and large tracts of land for raising livestock and crops. The proletariat comprise the many factory and other workers who lacked tools or land to support themselves but instead rather labored for factory owners and others who had the means to produce.

In between were the rising professional groups, called the middle class in Europe: the doctors, lawyers, teachers, and others with special skills that serviced society as a whole. We will see this configuration change over the next two centuries and watch tensions unfold among these groups, and at times boil over. Women also experienced a transformation of everyday life.

In the preceding centuries, they had generally worked on farms or in workshops alongside their artisan husbands or on their own as hat-makers, and seamstresses, and weavers, and spinners. During the early days of industrialization, women who had been spinning or weaving at home often switched to factories. And they did many other kinds of work; for example, eighteen-year-old Ann Eggly with her younger sister worked twelve-hour days in the coal mines pushing carriages filled with 800 pounds of coal (which was then used to make steam power).

She had done this kind of work since she was seven. I don't know if you know any seven year olds, but they should not be working in coal mines. Now you'll recall that the French and American revolutions, with their emphasis on motherhood and laws stripping women of their property, led to women being discouraged from work.

But many continued to do so even when their wages belonged to their husbands. Factories also created (and still create) outwork done by women at home: polishing knives or painting porcelain buttons for example. But, ideology simultaneously shifted to say that women were to be "angels in the household," providing comfort from the horrors of industrial life, a cultural norm that discouraged work outside the home.

In the meantime, the classes became aware of their individual identities. The French had outlawed guilds during the revolution. Industrial and other workers formed their own clubs to protect their interests.

They created singing, gymnastic, and sports clubs--this is why early English football teams had names like Royal Engineers AFC and Civil Service FC. These groups often had a lively cafe culture, where they discussed politics and read newspapers, often allowed to their comrades because each cafe usually only had one newspaper. Manufacturers and wealthy individuals in cities likewise formed groups based on their common class position; they founded chambers of commerce to protect their financial interests and museums to show off their city's achievements and good taste.

Let's go to the Thought Bubble. 1. Initially, the rise of factories saw those left out of industrial work life, 2. such as artisans and small farmers, 3. protest by breaking machinery or threatening to do so. 4. The "Swing riots" in Britain are one example of what has been called "primitive" rebellion. 5.

Instead of dealing with change by organizing to benefit from and shape the change, 6. so-called primitive rebels went about breaking things. 7. Wreckers of machinery were called Luddites 8. (as they still are today) 9. because menacing notes found alongside sabotage were often signed Ned Ludd. 10. Ludd was an inspirational figure -- a weaver who allegedly smashed a textile machine in the 18th century. 11.

But gradually, workers inside the factories formed mutual aid societies 12. and eventually unions that negotiated for better terms with owners. And when negotiations failed, 13. they went on strike as a group instead of wrecking the machines with which they earned their living. 14. All in all, industrialization wreaked havoc on people's lives even as it provided many with livelihoods. 15.

Towns grew astronomically: like textile center Manchester England

went from 20,000 people in the 1750s to 400,000 a century later. 16. Conditions in Manchester were abominable, including the development of slums, and the spread of disease. 17. They came to lack fresh and safe supplies of water. 18.

Garbage and sewage, not to mention animal excrement, filled muddy streets, 19. creating, in the words of one commentator, “a universal atmosphere of filth and stink.”[1] 20. and Conditions in other industrial cities hardly differed. Thanks Thought Bubble. So, Industrialization spread from England and the low countries where it began thanks to the capital raised by worldwide trade, and because that trade made possible successful imitation of foreign products.

But industrialization then spread. It traveled the continent through the 19th century, although industrialization was less dense in eastern Europe. There, many peasants continued to live hand-to-mouth, but as we’ve seen, so did the poor in industrial cities.

So was the Industrial Revolution a revolution? Well, if a revolution is an event full of impact on people’s lives, it certainly was. But often historians look at revolutions as, like, ending, which the Industrial Revolution really hasn’t.

Unlike the comparatively brief English Revolution or American Revolution, many see the Industrial Revolution as continuing to make dramatic changes in our way of life today. Today, we expect technologies to change dramatically in our lifetimes. We expect to use different tools to communicate and work than our parents used.

But that expectation is only a couple hundred years old. It makes you wonder. If you closed your eyes in 2020, and woke up in 2120, how weird is the world gonna be.

Ugh. Thinking about that is stressing me out. Next time, we’ll look further at the cultural and political aspects of industrialization.

I’ll see you then. Thanks for watching.

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[1] Quoted in Lynn Hunt et al., The Making of the West: Peoples and Cultures, 6th ed. (Boston: Bedford St. Martin’s, 2019) 21.