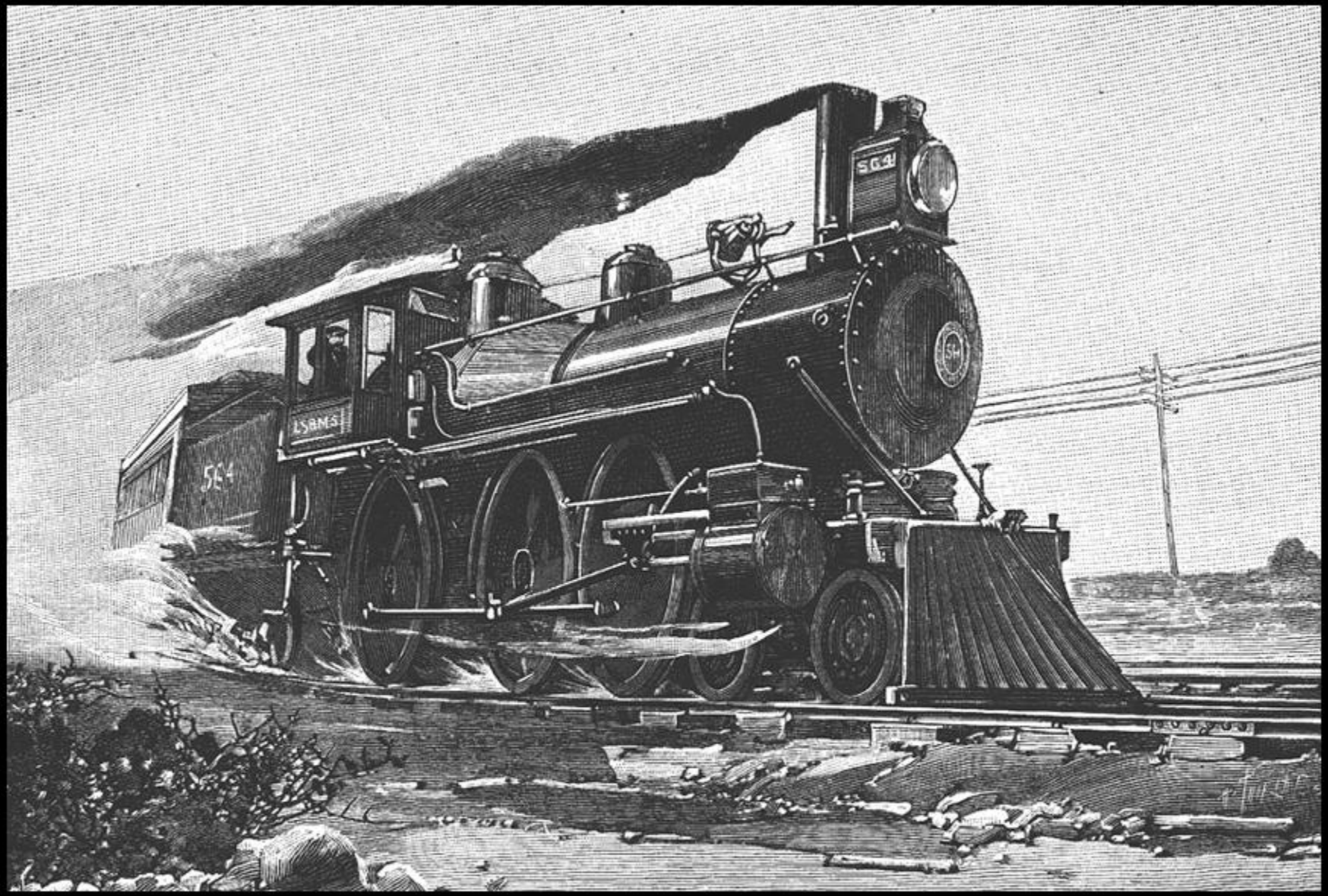
The Industrial Revolution, 1700–1900

The Industrial Revolution begins in Britain, spreads to other countries, and has a strong impact on economics, politics, and society.

Rail locomotives began connecting U.S. cities in the 1840s, enabling transport of goods between factories, cities, and ports.

Industry in Europe, 1870

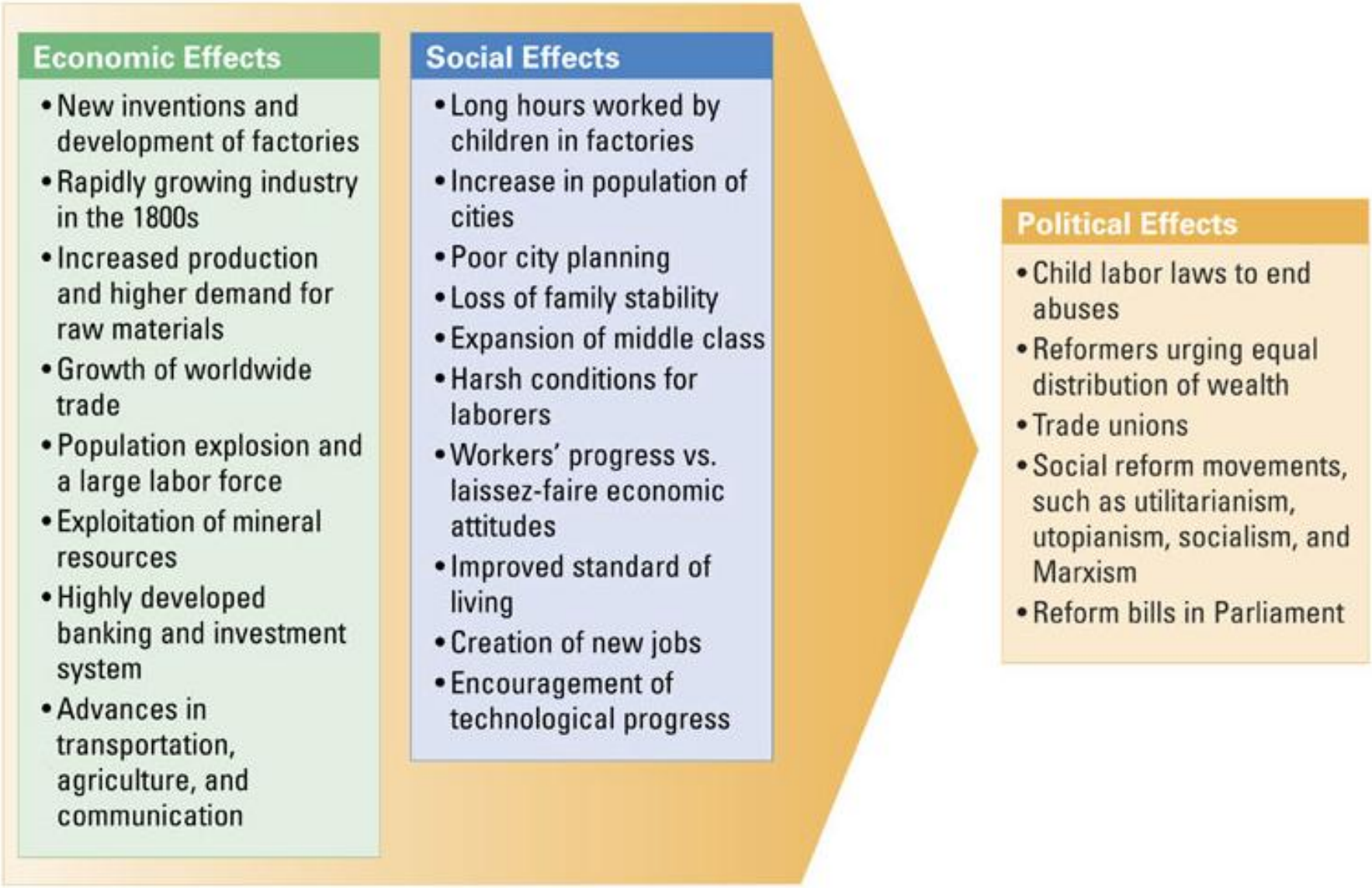
The Industrial Revolution



Rail locomotives began connecting U.S. cities in the 1840s, enabling transport of goods between factories, cities, and ports.


Industry in Europe, 1870
Industrialization 1870
City population greater than 250,000
Major railroads constructed by 1870
Industry
Ironworking
Textile industry
Coal mining
NORWAY
SWEDEN
UNITED KINGDOM
Glasgow
North Sea
DENMARK
Baltic Sea
Liverpool
Leeds
Manchester
NETHERLANDS
Birmingham
Amsterdam
BELGIUM
London
Berlin
Warsaw
Brussels
GERMANY
ATLANTIC OCEAN
LUX.
Paris
FRANCE
Vienna
SWITZERLAND
AUSTRIA-HUNGARY
Lyon
Milan
Marseille
SERBIA
PORTUGAL
ITALY
Madrid
Corsica
Adriatic Sea
SPAIN
Sardinia
Naples
Mediterranean Sea
GREECE
Sicily
0 200 400 Miles
0 200 400 Kilometers
Conic Projection

The Industrial Revolution

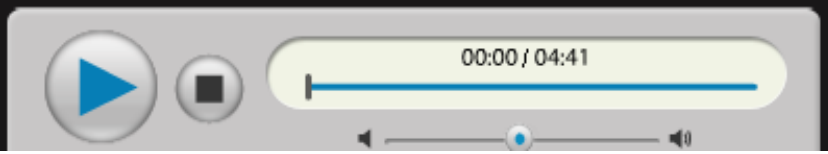


Voices From the Past

Charles Dickens: From Poor House to Mansion

Charles Dickens's childhood experience as a factory worker influenced his writing and helped bring about reform during the Industrial Revolution.

Portrait of Charles Dickens. Photograph (undated).



Section 1

The Beginnings of Industrialization

The Industrial Revolution starts in England and soon spreads to other countries.

Industrial Revolution Begins in Britain

New Ways of Working

- Industrial Revolution—greatly increases output of machine-made goods
- Revolution begins in England in the middle 1700s

The Agricultural Revolution Paves the Way

- Enclosures—large farm fields enclosed by fences or hedges *[Visual]*
- Wealthy landowners buy, enclose land once owned by village farmers
- Enclosures allow experimentation with new agricultural methods

Yorkshire Dales National Park, in Yorkshire, England.

Industrial Revolution Begins in Britain

Rotating Crops

- Crop rotation—switching crops each year to avoid depleting the soil
- Livestock breeders allow only the best to breed, improve food supply

Why the Industrial Revolution Began in England

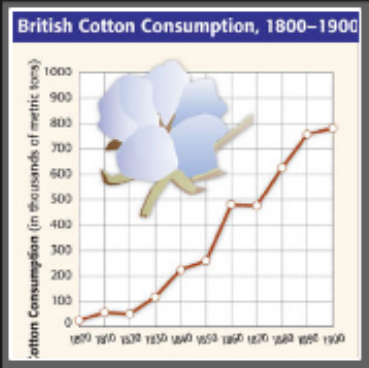
- Industrialization—move to machine production of goods
- Britain has natural resources—coal, iron, rivers, harbors
- Expanding economy in Britain encourages investment
- Britain has all needed factors of production—land, labor, capital

Inventions Spur Industrialization

Changes in the Textile Industry

- Weavers work faster with flying shuttles and spinning jennies *[Visual 1]*
- Water frame uses water power to drive spinning wheels
- Power loom, spinning mule speed up production, improve quality
- Factories—buildings that contain machinery for manufacturing
- Cotton gin boosts American cotton production to meet British demand *[Visual 2]*

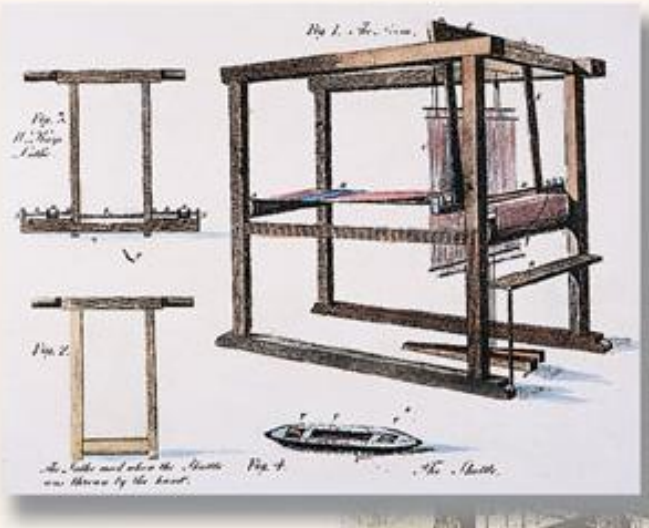
James Hargreaves's spinning jenny dramatically increased the output of spinners.



British Cotton Consumption, 1800–1900

Technology in the Textile Industry

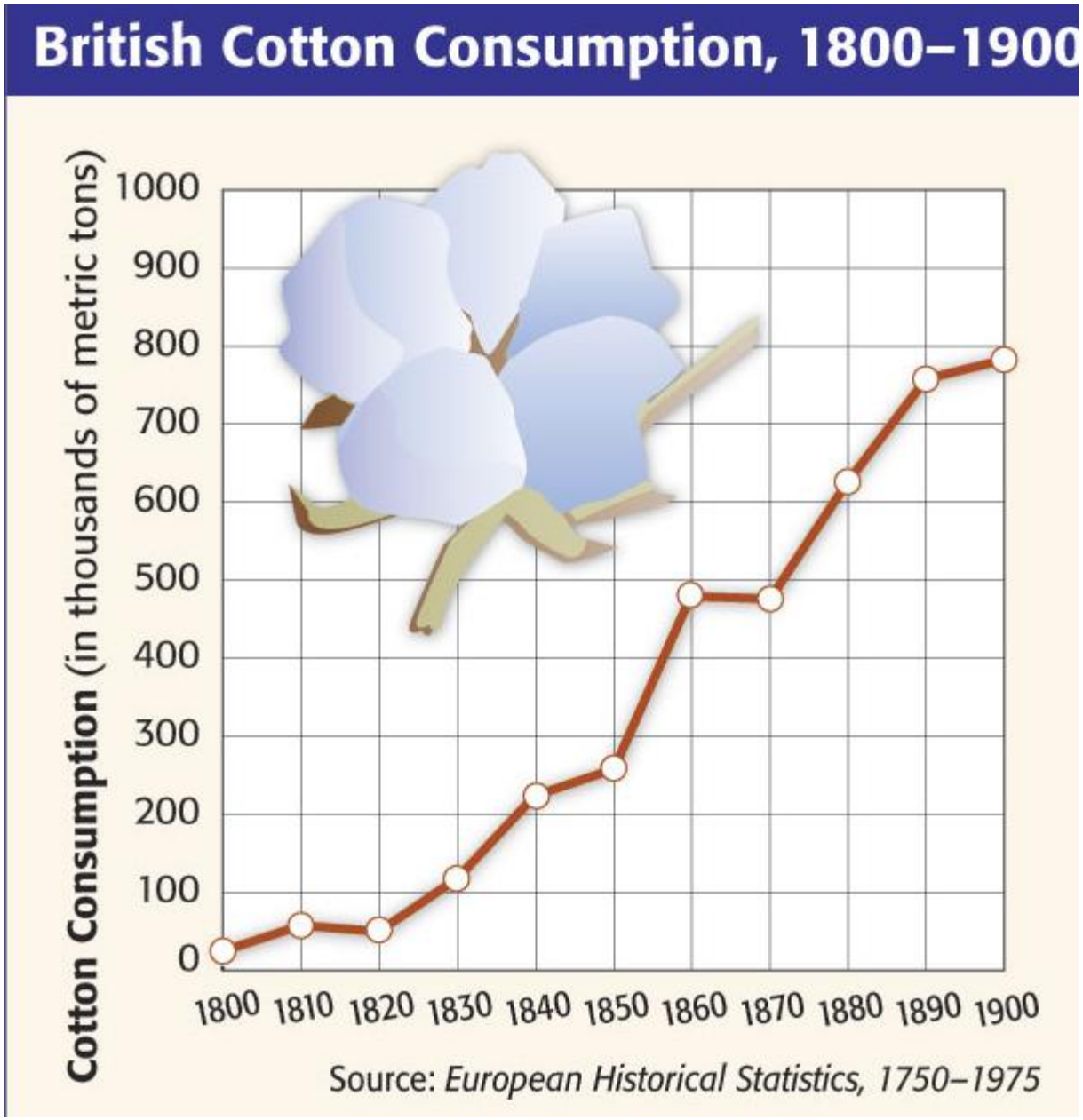
The Industrial Revolution that began in Britain was spurred by a revolution in technology. This is most obvious in the textile industry where inventions in the late 1700s transformed the manufacture of cloth. These developments, in turn, had an impact on the rest of the world. For example, England's cotton came from plantations in the American South, where cotton production skyrocketed from 1790 to 1810 in response to demand from the textile mills of England.



John Kay's flying shuttle speedily carried threads of yarn back and forth when the weaver pulled a handle. The flying shuttle greatly increased the productivity of weavers.

James Hargreaves's spinning jenny dramatically increased the output of spinners. It helped them to keep pace with the weavers.

British Cotton Consumption, 1800–1900



Improvements in Transportation

Watt's Steam Engine

- Need for cheap, convenient power spurs development of steam engine
- James Watt improves steam engine, financed by Matthew Boulton
- Boulton an entrepreneur—organizes, manages, takes business risks

Water Transportation

- Robert Fulton builds first steamboat, the *Clermont*, in 1807
- England's water transport improved by system of canals

Road Transportation

- British roads are improved; companies operate them as toll roads

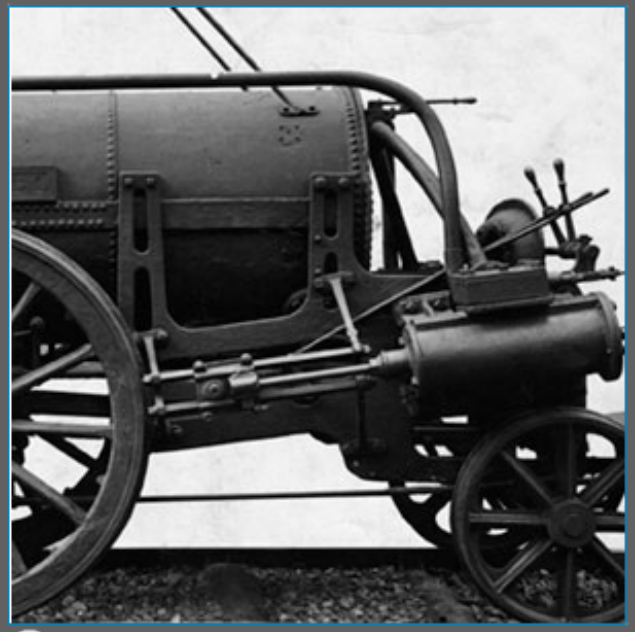
The Railway Age Begins

Steam-Driven Locomotives

- In 1804, Richard Trevithick builds first steam-driven locomotive
- In 1825, George Stephenson builds world's first railroad line

The Liverpool-Manchester Railroad

- Entrepreneurs build railroad from Liverpool to Manchester
- Stephenson's *Rocket* acknowledged as best locomotive (1829) *[Visual]*



George Stephenson's Rocket locomotive. Photograph, 19th century.

The Railway Age Begins

Railroads Revolutionize Life in Britain

- Railroads spur industrial growth, create jobs
- Cheaper transportation boosts many industries; people move to cities

Section 2

Industrialization

The factory system changes the way people live and work, introducing a variety of problems.

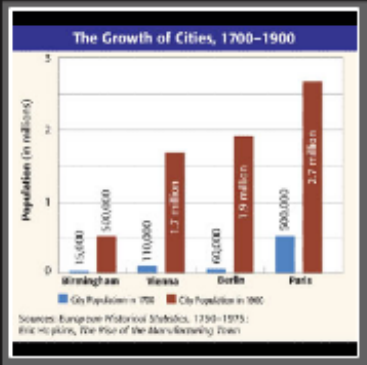
Industrialization Changes Life

Factory Work

- Factories pay more than farms, spur demand for more expensive goods

Industrial Cities Rise

- Urbanization—city-building and movement of people to cities *[Visual 1]*
- Growing population provides work force, market for factory goods
- British industrial cities: London, Birmingham, Manchester, Liverpool *[Visual 2]*



The Growth of Cities, 1700–1900

The Industrial Revolution in Great Britain, 1850

Industrialization Changes Life

Living Conditions

- Sickness widespread; epidemics, like cholera, sweep urban slums
- Life span in one large city is only 17 years
- Wealthy merchants, factory owners live in luxurious suburban homes
- Rapidly growing cities lack sanitary codes, building codes
- Cities also without adequate housing, education, police protection

Industrialization Changes Life

Working Conditions

- Average working day 14 hours for 6 days a week, year round
- Dirty, poorly lit factories injure workers
- Many coal miners killed by coal dust

Class Tensions Grow

The Middle Class

- Middle class—skilled workers, merchants, rich farmers, professionals
- Emerging middle class looked down on by landowners, aristocrats
- Middle class has comfortable standard of living

The Working Class

- Laborers' lives not improved; some laborers replaced by machines
- Luddites, other groups destroy machinery that puts them out of work
- Unemployment a serious problem; unemployed workers riot

Positive Effects of the Industrial Revolution

Immediate Benefits

- Creates jobs, enriches nation, encourages technological progress
- Education expands, clothing cheaper, diet and housing improve
- Workers eventually win shorter hours, better wages and conditions

Long-Term Effects

- Improved living and working conditions still evident today
- Governments use increased tax revenues for urban improvements

Case Study: Manchester

The Mills of Manchester

- Manchester has labor, water power, nearby port at Liverpool
- Poor live and work in unhealthy, even dangerous, environment *[Visual]*
- Business owners make profits by risking their own money on factories
- Eventually, working class sees its standard of living rise some

As cities grew, people crowded into tenements and row houses such as these in London.

Case Study: Manchester

Children in Manchester Factories

- Children as young as 6 work in factories; many are injured *[Visual]*
- 1819 Factory Act restricts working age, hours
- Factory pollution fouls air, poisons river
- Nonetheless, Manchester produces consumer goods and creates wealth

A young worker pulls thread from bobbin during spinning process at a textile mill. Photograph (1909), Lewis Hine.

Section 3

Industrialization Spreads

The industrialization that begins in Great Britain spreads to other parts of the world.

Industrial Development in the United States

Industrialization in the United States

- U.S. has natural and labor resources needed to industrialize
- Samuel Slater, English textile worker, builds textile mill in U.S.
- Lowell, Massachusetts a mechanized textile center by 1820
- Manufacturing towns spring up around factories across the country
- Young single women flock to factory towns, work in textile mills
- Clothing, shoemaking industries soon mechanize

Industrial Development in the United States

Later Expansion of U.S. Industry

- Industrialization picks up during post-Civil War technology boom
- Cities like Chicago expand rapidly due to location on railroad lines *[Visual]*
- Small companies merge to form larger, powerful companies

The Growth of Railroads in the United States

Industrial Development in the United States

The Rise of Corporations

- Stock—limited ownership rights for company, sold to raise money
- Corporation—company owned by stockholders, share profits not debts
- Large corporations attempt to control as much business as they can

Continental Europe Industrializes

Troubles in Continental Europe

- Revolution and Napoleonic wars disrupted early 19th-century economy

Beginnings in Belgium

- Belgium has iron ore, coal, water transportation
- British workers smuggle in machine plans, start companies (1799)

Continental Europe Industrializes

Germany Industrializes

- Political, economic barriers; but industry, railroads boom by mid-century

Expansion Elsewhere in Europe

- Bohemia develops spinning; Northern Italy mechanizes silk textiles
- Industrialization in France more measured; agriculture remains strong

The Impact of Industrialization

Rise of Global Inequality

- Wealth gap widens; non-industrialized countries fall further behind
- European nations, U.S., Japan exploit colonies for resources
- Imperialism spreads due to need for raw materials, markets

Transformation of Society

- Europe and U.S. gain economic power
- African and Asian economies lag, based on agriculture, crafts
- Rise of middle class strengthens democracy, calls for social reform

Section 4

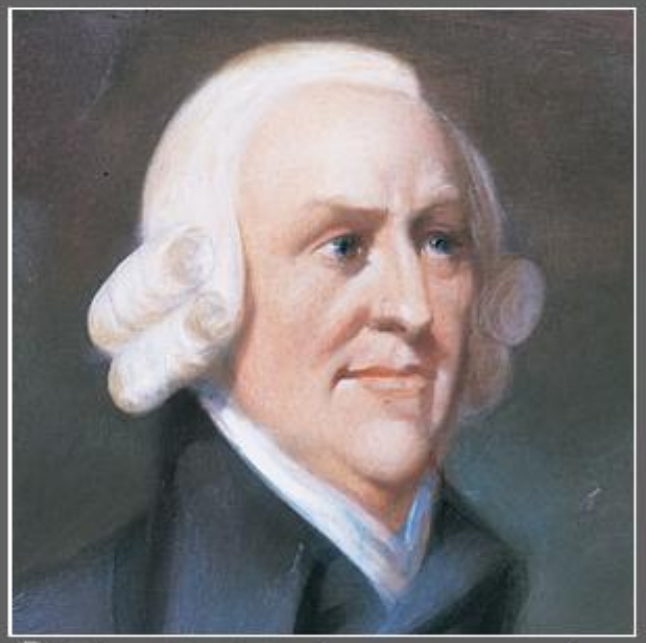
Reforming the Industrial World

The Industrial Revolution leads to economic, social, and political reforms.

The Philosophers of Industrialization

Laissez-faire Economics

- Laissez faire—economic policy of not interfering with businesses
- Originates with Enlightenment economic philosophers
- Adam Smith—defender of free markets, author of *The Wealth of Nations* [Visual]
- Believes economic liberty guarantees economic progress
- Economic natural laws—self-interest, competition, supply and demand



Adam Smith's ideas were central to the development of capitalism.

The Philosophers of Industrialization

The Economists of Capitalism

- Thomas Malthus, David Ricardo boost laissez-faire capitalism
- Capitalism—system of privately owned businesses seeking profits
- Malthus thinks populations grow faster than food supply
- Wars, epidemics kill off extra people or misery and poverty result
- Ricardo envisions a permanent, poor underclass providing cheap labor

The Rise of Socialism

Utilitarianism

- Jeremy Bentham's utilitarianism—judge things by their usefulness
- John Stuart Mill favors regulation to help workers, spread wealth

Utopian Ideas

- Robert Owen improves workers' conditions, rents cheap housing
- In 1824, Owen founds utopian community, New Harmony, Indiana

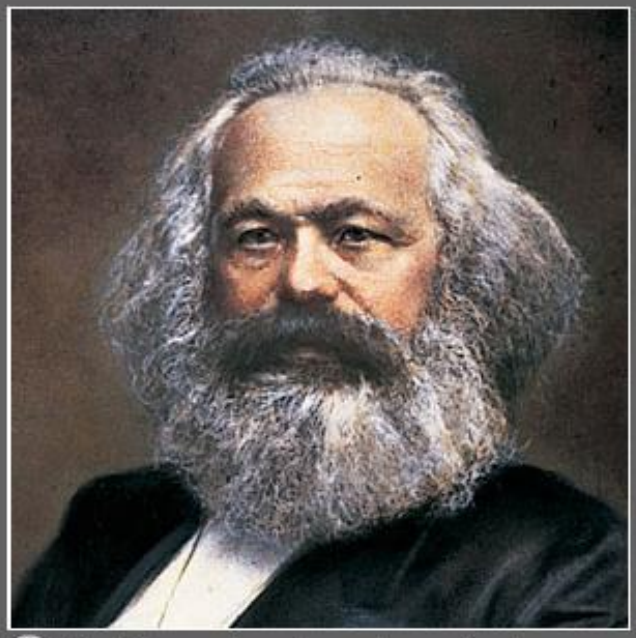
Socialism

- Socialism—factors of production owned by, operated for the people
- Socialists think government control can end poverty, bring equality

Marxism: Radical Socialism

Marxism's Prophets

- Karl Marx—German journalist proposes a radical socialism, Marxism *[Visual]*
- Friedrich Engels—German whose father owns a Manchester textile mill



Karl Marx developed a radical type of socialism known as Marxism.

Marxism: Radical Socialism

The Communist Manifesto

- Marx and Engels believe society is divided into warring classes
- Capitalism helps "haves," the employers known as the bourgeoisie
- Hurts "have-nots," the workers known as the proletariat
- Marx, Engels predict the workers will overthrow the owners

The Future According to Marx

- Marx believes that capitalism will eventually destroy itself
- Inequality would cause workers to revolt, seize factories and mills
- Communism—society where people own, share the means of production
- Marx's ideas later take root in Russia, China, Cuba
- Time has shown that society not controlled by economic forces alone

Labor Unions and Reform Laws

Unionization

- Unions—associations formed by laborers to work for change
- Unions negotiate for better pay, conditions with employers
- Sometimes they strike—call a work stoppage—to pressure owners
- Skilled workers are first to form unions
- Movement in Britain, U.S. must fight for right to form unions
- Union goals were higher wages, shorter hours, improved conditions

Labor Unions and Reform Laws

Reform Laws

- British, U.S. laws passed to stop worst abuses of industrialization
- 1842 Mines Act in Britain stops women, children working underground
- In 1847, workday for women, children limited to 10 hours in Britain
- U.S. ends child labor, sets maximum hours in 1904 *[Visual]*

The job of this young 'tipple boy' was to unload coal cars by tipping them over. Photograph, West Virginia, Lewis Hine.

The Reform Movement Spreads

The Abolition of Slavery

- In 1833, reformers help end slavery in British empire
- Slavery ends in U.S. in 1865; ends by 1888 in rest of Americas

The Fight for Women's Rights

- Women pursue economic and social rights as early as 1848
- International Council for Women founded 1888; worldwide membership *[Visual]*

Women march to commemorate the first suffragette arrested in London. Photograph (about 1905).

The Reform Movement Spreads

Reforms Spread to Many Areas of Life

- Reformers establish free public schools in Europe in late 1800s
- Public schools common in U.S. by 1850s; prison reform also sought

End of Chapter.