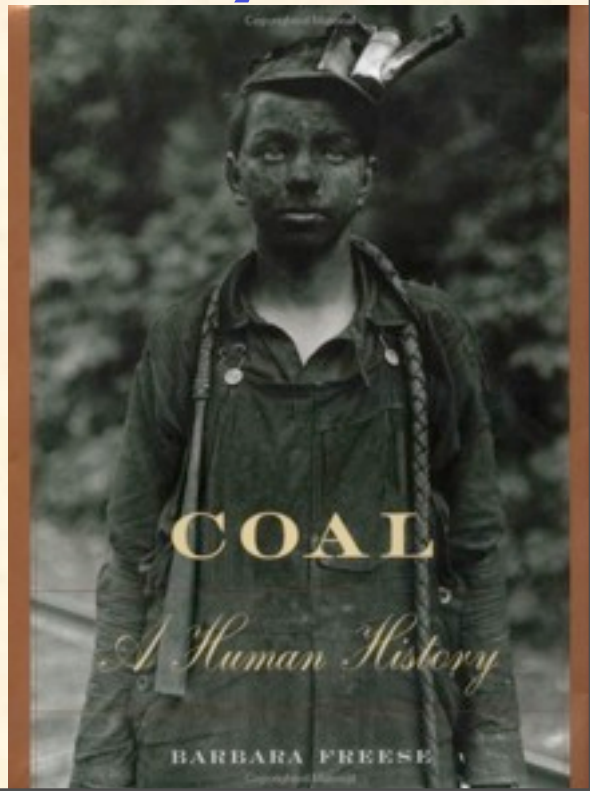
The expansion of Industry



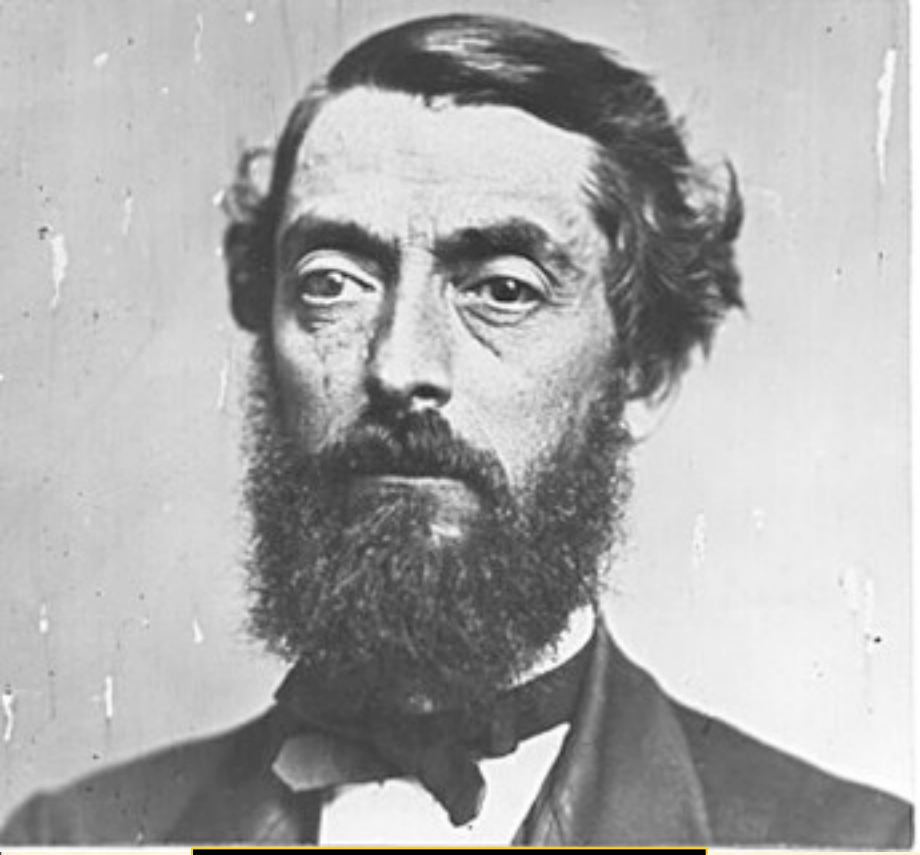
- By the 1920's, the U.S. had become the leading industrial power in the world, producing more than 1/3 of the world's manufactured goods.
    - Up until this time, the U.S. was primarily an agricultural nation – Tobacco, Cotton, sugar, Indigo, Rice, Etc.

- The reason for the change was because of three major factors:
- Natural Resources
  - Oil, Iron, & Coal
- Inventions
- Growing urban population
  - Which provided markets for the new products

Black Gold (Oil)

In 1840, Abraham Gesner- A canadian geologist realized that kerosene could be used to light lamps & he discovered how to distill it from oil or coal.

Distill - to concentrate, purify, or obtain. To separate through the process of distillation



Edwin L. Drake

Drake successfully used a steam engine to drill for oil near Titusville, Pennsylvania. This breakthrough started an oil boom that spread to Kentucky, Ohio, Illinois & Indiana.

Petroleum-refining industries arose in Cleveland & Pittsburgh.

Originally gasoline, which is a byproduct of the refining process was thrown away, but after the car became popular, gasoline became the most important form of oil.

Coal

Photo credit:
American Coal Foundation

Coal is found in many of the lower 48 states of U.S. and throughout the rest of the world. Coal is mined out of the ground using various methods. Some coal mines are dug by sinking vertical or horizontal shafts deep under ground, and coal miners travel by elevators or trains deep under ground to dig the coal. Other coal is mined in strip mines where huge steam shovels strip away the top layers above the coal. The layers are then restored after the coal is taken away.

Coal production in 1870 was 33 million tons. In 1900 – 250 million tons.

Uses of Coal

At one time coal was predominantly used to heat homes, as well as power railroad locomotives and factories. Today, however, Eighty-six percent of the coal used in the United States is burned by electric power plants to produce electricity.

Other uses include coking coal for steel manufacturing and industrial process heating.

A miner stoops to enter the mine.

A lone miner enters the mouth of a slope mine. Mines were supported solely by wooden timbers in the past. While modern roof bolting technologies are used today, wooden supports are still used in coal mines

A miner uses a hand drill to prepare a hole for setting an explosive charge to dislodge the coal.

Miners set timbers to support the mine roof. This was back-breaking work, but was necessary to ensure the main passage ways would remain passable.

After blasting the coal, miners hand load coal into the coal car. Miners were paid by the ton.

Black miner loading coal circa 1910.

Under the wathcful eye of the boss man and his whip, young boys pick slate from coal.

Young "breaker boys" were often used to pick slate from anthracite coal. They often shared this job with disabled older miners who were forced by poverty to continue working.

Boys working during World War I coal boom

While these boys may look to be "dressing up" like dad, they are not at play. Many boys accompanied their fathers into the mines at the turn of the century to perform "dead work" for which the miner was not paid. The boys pictured here worked in Wyoming mines during World War I to help their fathers supply coal to the war effort.

The coal miner's life was a hard one. They worked long hours for low wages. The environment they worked in was dangerous and certainly hazardous to their health and well being. Living conditions were also sub-standard, but the coal miner was resilient.

As a result of breathing in the coal dust, miners would get “Black Lung Disease”

Iron

In 1887, iron ore deposits was discovered in the Mesabi Range of Minnesota that were more than 100 miles long & up to 3 miles wide.

Removing the element carbon from iron produces **steel**

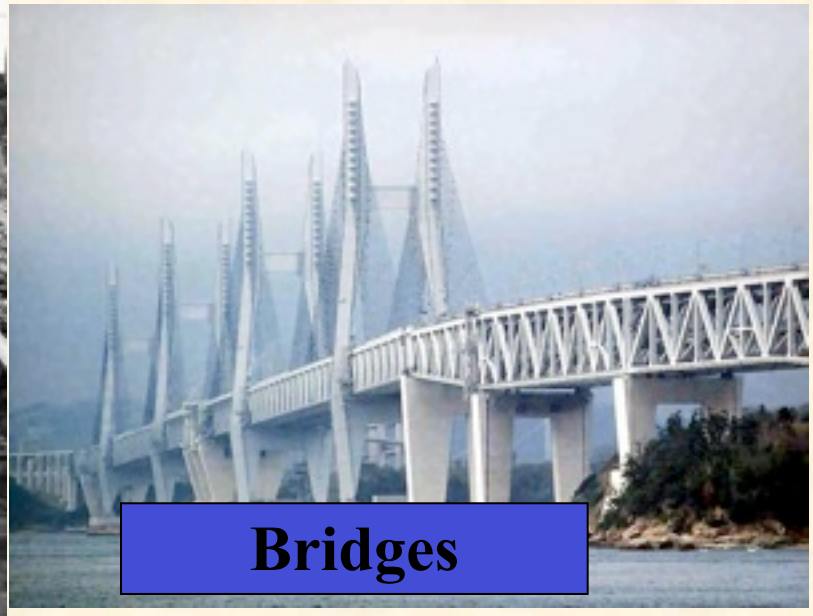
William Kelly

Henry Bessemer

The Bessemer Process – The process of injecting air into molten iron to remove the carbon & transform it into steel. They invented this technique around 1850. By 1880, manufacturers were using the method to produce more than 90% of the nations steel. By 1886, this process was improved & replaced with the open – hearth process. By doing this, manufactures could produce steel from scrap metal as well as from raw materials.

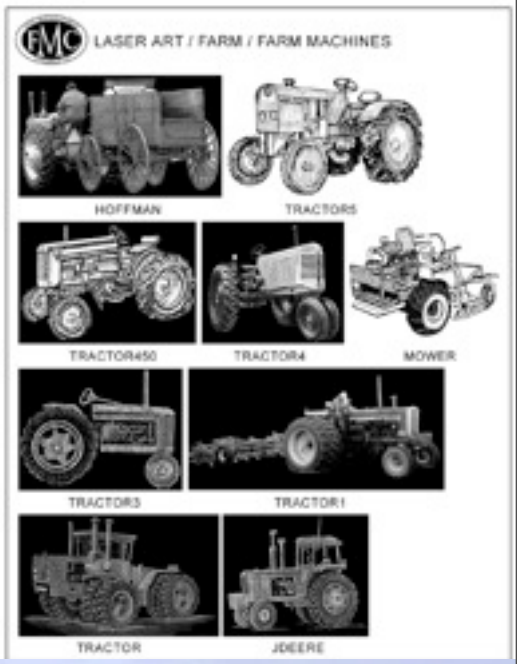
Uses for Steel

Railroads



Bridges

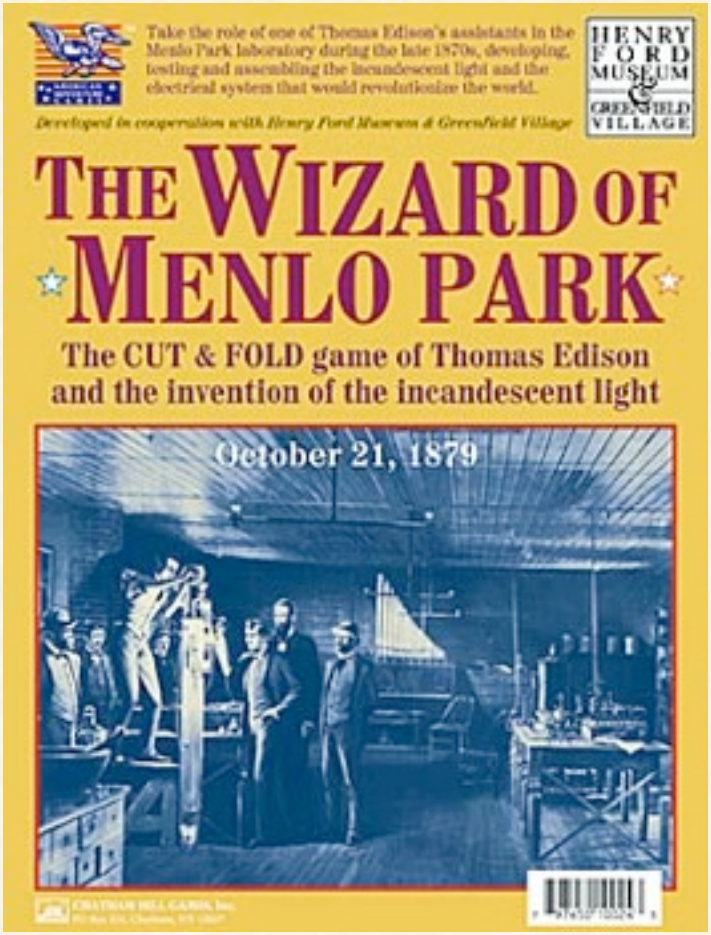
Farm Machines



Barbed Wire

Sky Scrapers

Inventions between 1826 - 1910



Thomas Alva Edison

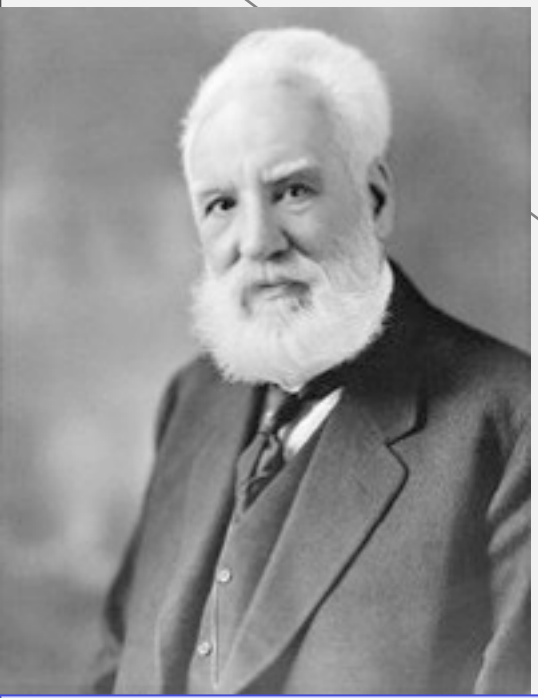
Thomas Edison began his career as an inventor in Newark, New Jersey with the automatic repeater and other improved telegraphic devices, but the invention which first gained Edison wide fame was the phonograph in 1877.

Edison became known as "The Wizard of Menlo Park" after the New Jersey town where he resided.

Edison's major innovation was the Menlo Park research lab. It was the first institution set up with the specific purpose of producing constant technological innovation and improvement.

Edison did not invent the electric light bulb, however In 1878, Edison applied the term *filament* to the element of glowing wire carrying the current, although English inventor Joseph Swan used the term prior to this. Edison took the features of these earlier designs and set his workers to the task of creating longer-lasting bulbs. After Edison purchased the Woodward and Evans patent of 1875, his employees experimented with a large number of different materials to increase the bulb's burning time. By 1879, they had increased the burning time enough to make the light bulb commercially viable. While the earlier inventors had produced electric lighting in laboratory conditions, Edison concentrated on commercial application and was able to sell the concept to homes & businesses by mass-producing relatively long-lasting light bulbs and creating a system for the generation and distribution of electricity.

Alexander Graham Bell



A scientist, inventor, and founder of the Bell Canada, who was known as the father of the telephone. In addition to his work in telecommunications technology, he was responsible for important advances in aviation and hydrofoil technology.

.

Bell filed an application to patent his speaking telephone in the United States on February 14, 1876, and by a strange coincidence, Mr. Elisha Gray applied on the same day for patent caveat (a preliminary notice of a patent application) of a similar kind only 2 hours after Bell had filed for his patent.

But Gray allowed his idea to slumber, whereas Bell continued to perfect the apparatus designed by Gray. An official at the patent office later admitted to selling Gray's idea to Bell's lawyers for money. Gray never knew this. However, when Bell achieved an unmistakable success, Gray brought a suit against him, which resulted in a compromise, one public company acquiring both patents.

Elisha Gray

The Age of Railroads

1829

George Stephensen launches the first locomotive in England & Europe

1830

Horacio Allen imports the first steam locomotive to U.S. from Britain.

1831

U.S. engineers invented <u>The swiveling truck</u>; allowing the engine to run around curves of almost any radius. & <u>The switchback</u>, which made it possible for trains to chug up steep inclines.

1856

Railroads extend west to the Mississippi River

1859

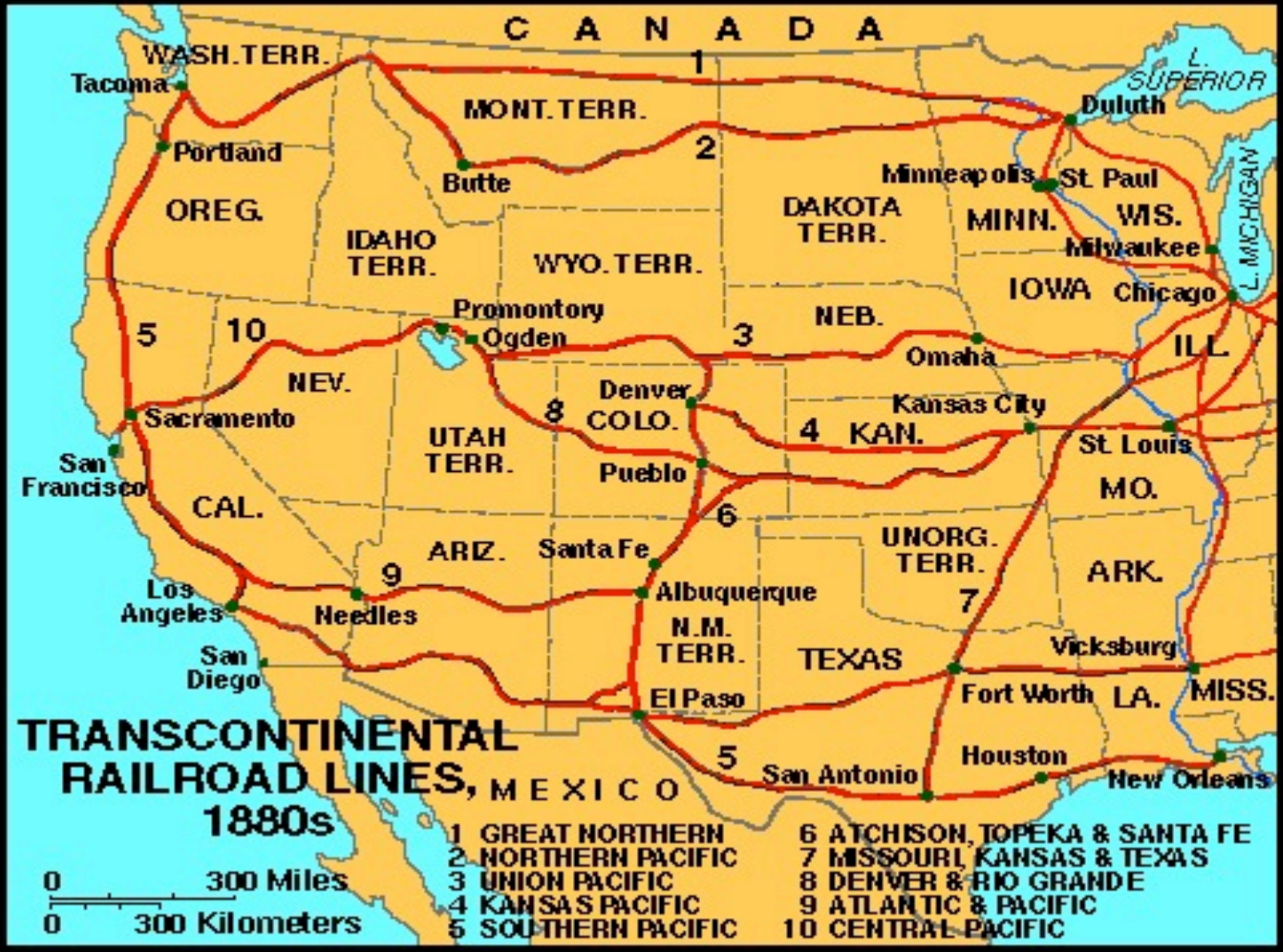
Railroads cross the Missouri

May 10, 1869

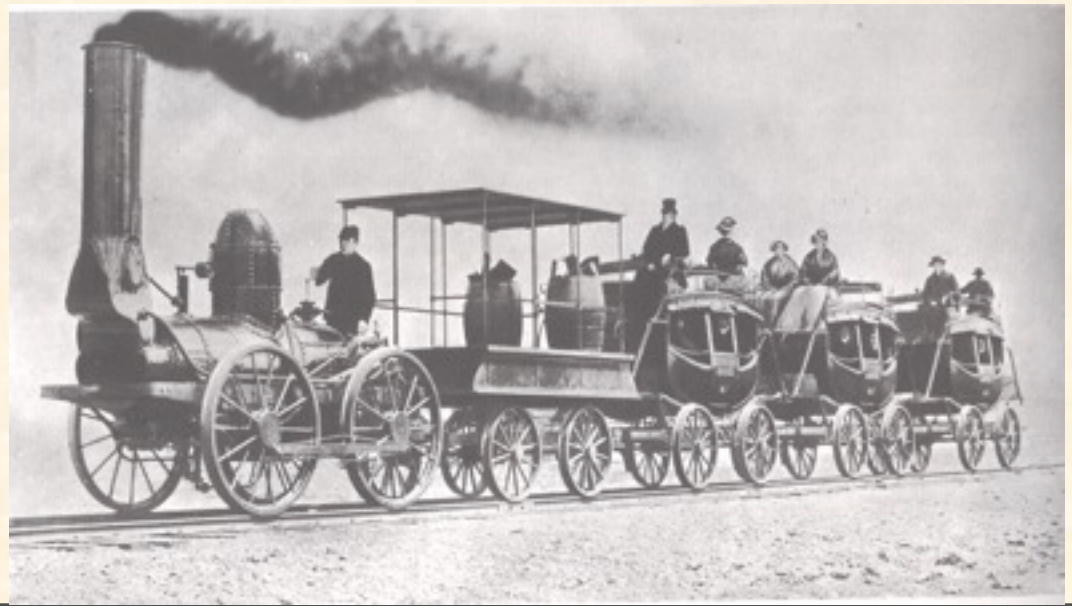
<u>The first Transcontinental Railroad:</u>

The Central Pacific & Union Pacific Railroads unite in Promontory, Utah

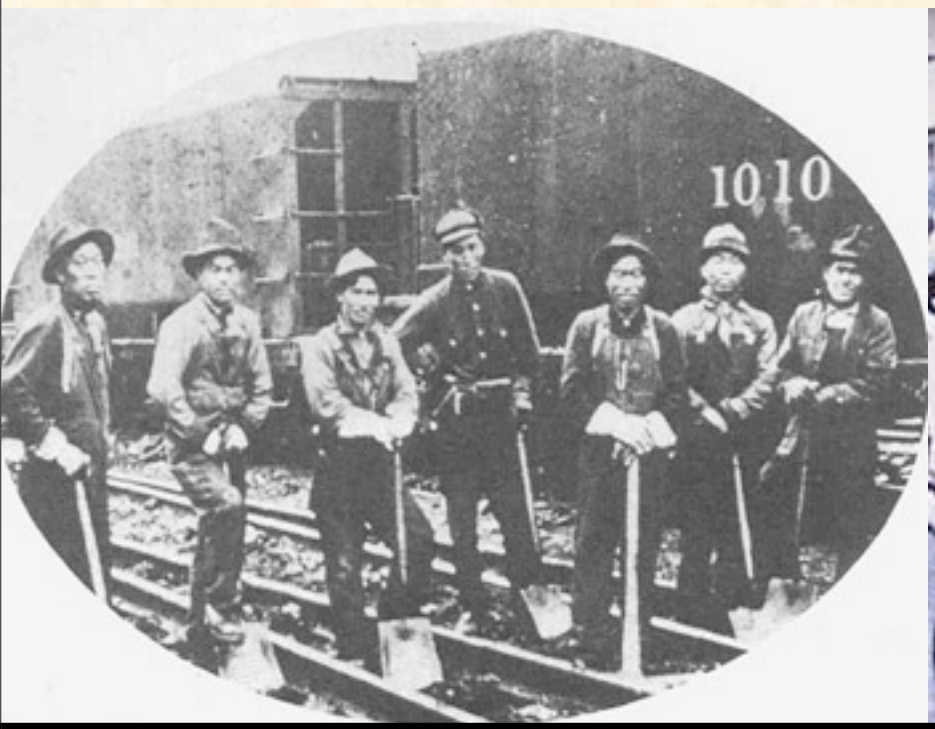
At the start of the Civil War, U.S. had about 30,000 miles of track. By 1890, that figure was 7 times greater.


C A N A D A
WASH.TERR.
Tacoma
Portland
OREG.
MONT.TERR.
Butte
IDAHO TERR.
WYO.TERR.
DAKOTA TERR.
L. SUPERIOR
Duluth
Minneapolis
St. Paul
MINN.
WIS.
Milwaukee
L. MICHIGAN
IOWA
Chicago
ILL.
NEB.
Omaha
Promontory
Ogden
NEV.
Sacramento
San Francisco
CAL.
UTAH TERR.
Denver
COLO.
Kansas City
KAN.
St. Louis
MO.
Pueblo
ARIZ.
Santa Fe
Albuquerque
UNORG. TERR.
ARK.
Los Angeles
Needles
San Diego
N.M. TERR.
TEXAS
Vicksburg
El Paso
Fort Worth
LA.
MISS.
San Antonio
Houston
New Orleans
1
2
3
4
5
6
7
8
9
10
TRANSCONTINENTAL RAILROAD LINES, 1880s
MEXICO
0 300 Miles
0 300 Kilometers
1 GREAT NORTHERN
2 NORTHERN PACIFIC
3 UNION PACIFIC
4 KANSAS PACIFIC
5 SOUTHERN PACIFIC
6 ATCHISON, TOPEKA & SANTA FE
7 MISSOURI, KANSAS & TEXAS
8 DENVER & RIO GRANDE
9 ATLANTIC & PACIFIC
10 CENTRAL PACIFIC

<u>The Beauty</u>: The railroad changed everything. It promised Americans that towns, cities, and industries could be anywhere as long as they were tied to the rest of the Union by track. Unlike the peddler with his horse-drawn wagon before him, the salesman needed only his order book as he rode the train from town-to-town to get the business, and then shipped it by rail to the far, rural outreaches of the country.



The Reality: The life of the railroad worker was stark & harsh. Many Chinese immigrants worked for Central Pacific Railroad & many Irish immigrants & out of work Civil War vets worked for Union Pacific Railroad.



Railroads paid employees poorly.

Asian & Blacks earned less than Whites.

Whites earned $40-$60 a month in a 10 hour work day; Blacks & Asians - $35 monthly.

The Southern Pacific Railroad brought the majority of early Chinese immigrants to Tucson. The Chinese had been brought to Arizona for the task of extending the railroad through the desert. The desert heat was the justification for importing Chinese laborers: Anglos could not be expected to put in a day's work under those conditions! In actuality, the railroad viewed the Chinese as cheap, reliable laborers. Their wages were $1.00 per day, 50 cents less than Anglo workers. From these wages the Chinese were also expected to pay for their own board.

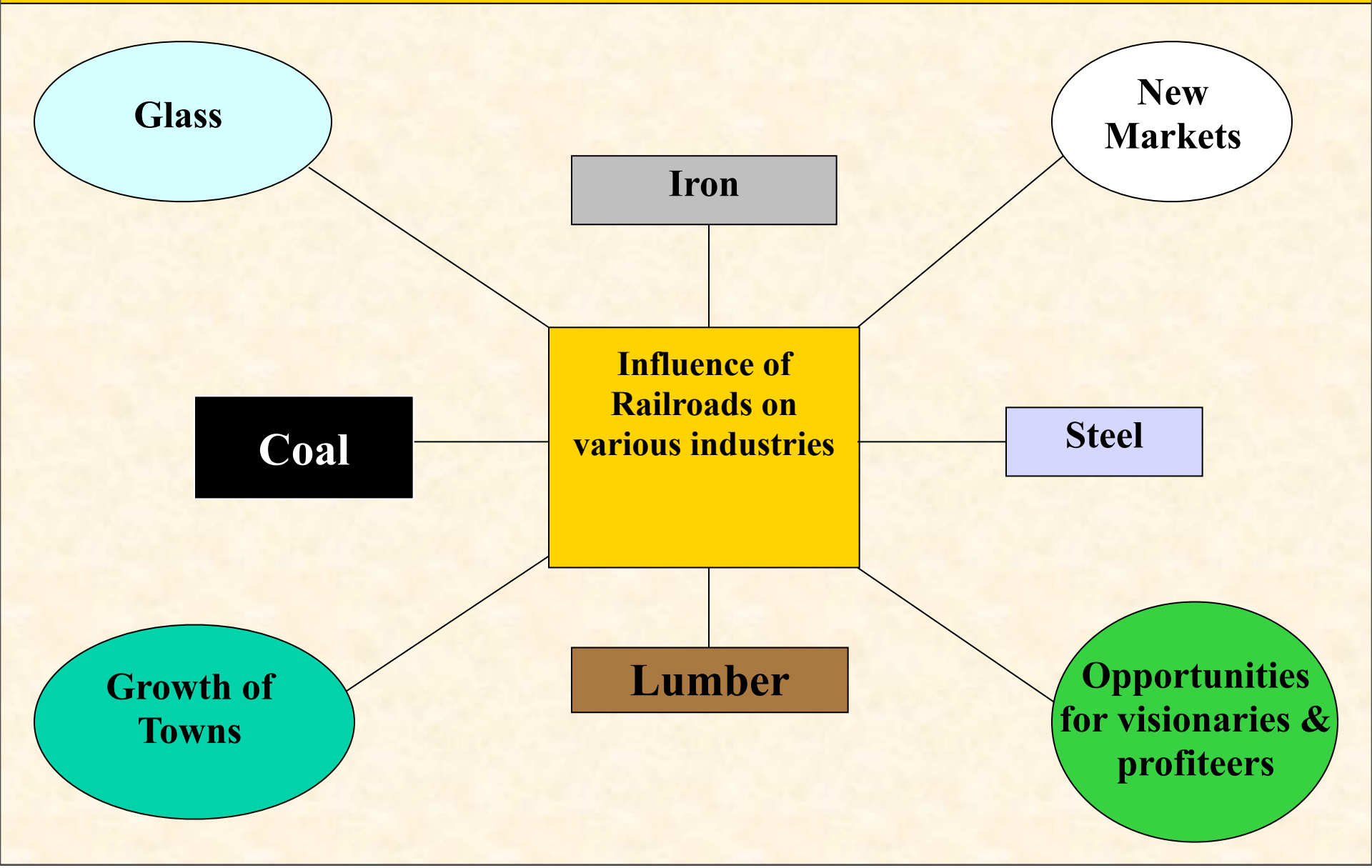
The Southern Pacific and other railroads continued to prefer Chinese laborers as rails were extended past Tucson, and as other lines were laid in northern Arizona. Chinese laborers were also sought by the owners of Arizona's copper mines. Again, they were a cheap, reliable source of workers and, according to James Colquhoun, "if occasionally a few were killed no questions were asked, and the work went on as usual".

By 1883, 100 of every 400 miners in Clifton were Chinese. Racism was rampant in Arizona at this time. Anglos and Mexicans did not understand the dress and customs of the Chinese newcomers. Also, Anglo and Mexican workers deeply resented the Chinese laborers adding competition to the job market, despite the difficulty and low wages of the jobs given to the Chinese. Articles in local papers indicate the racial hostility. A Prescott newspaper noted in 1869, "Three more Chinamen arrived here during the week and have gone to work. There are now four of them, which is quite enough."

The Arizona Weekly Star ran an editorial in 1879 portraying them as " an ignorant, filthy, leprous horde." The Tucson paper, *El Fronterizo*, described the Chinese in 1892 as "the most pernicious (highly injurious or destructive) & degraded race on the globe," & in 1894 as "a fungus that lives in isolation, sucking the sap of the other plants." This racism, & the fear of having to compete with Chinese workers for jobs, eventually led Anglo and Mexican laborers to violence. Chinese workers were attacked in railroad camps and mining towns. Instead of taking a stand against prejudice, railroad and mine managers chose to phase-out Chinese laborers as a "solution" to the violence and unrest. By the early 20th century, the Chinese had been driven out of Arizona's mines & railroads.

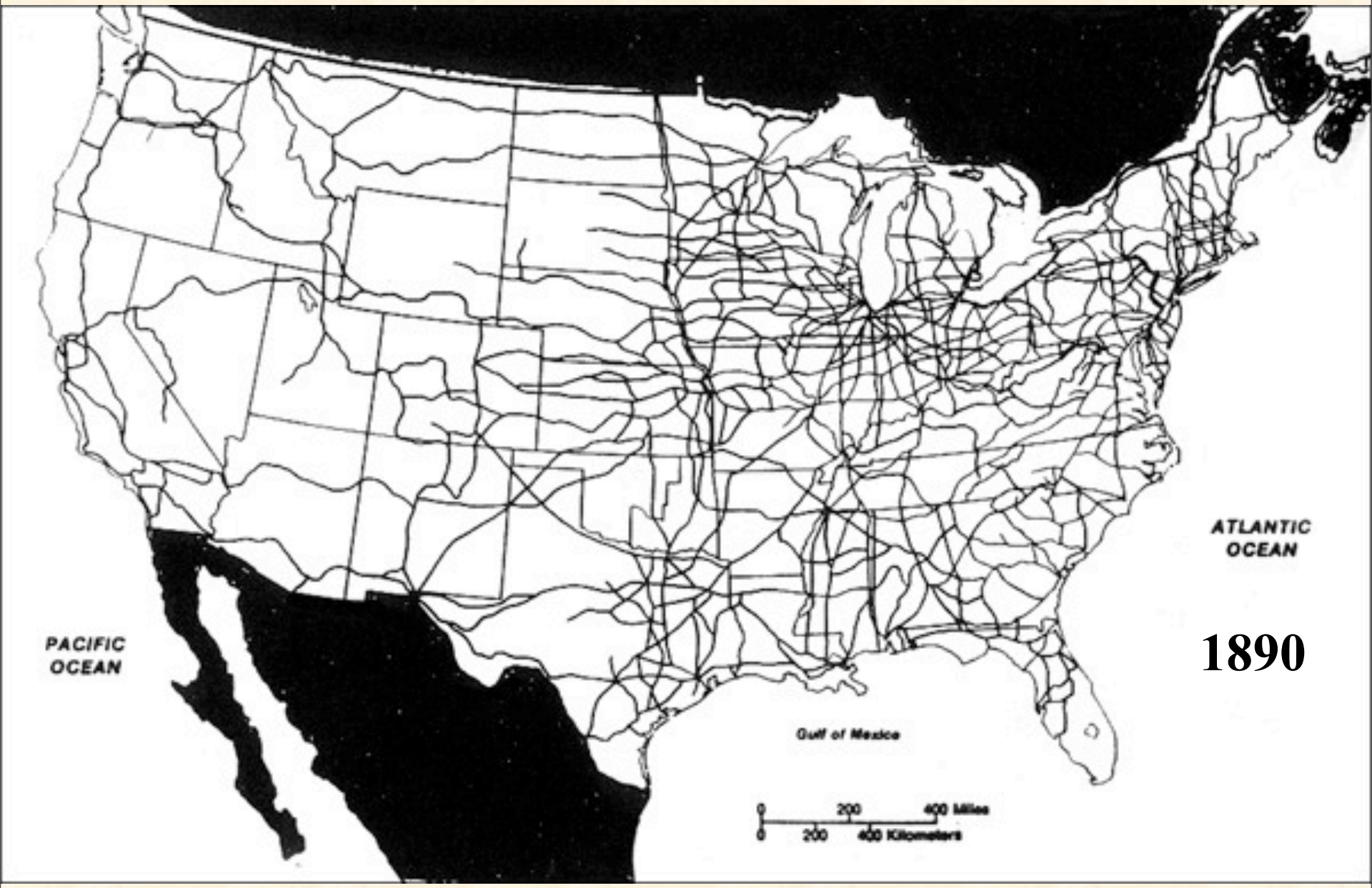
"Massacre of the Chinese at Rock Springs, Wyoming" in which 28 Chinese were killed by British and Swedish miners.

Before the 1870's, cities such as Chicago, Minneapolis & Denver only had one railroad running through them. After the 1870's, the railroads were a direct contributing factor to the population growth of these cities.



Interesting note

Railroad Time changes nation- Before 1870, there were different time zones in different cities (it was considered noon when the sun was overhead). In 1870, Professor C.F. Dowd proposed that the earth's surface be divided in 24 time zones (one for each hour of the day); the U.S. would contain 4 zones – Eastern, Central, Mountain, Pacific. Railroad companies endorsed his plans. Many towns followed suit. On Nov. 18, 1883, railroad crews & towns across the nation synchronized their watches. In 1884 an international conference set worldwide time zones that incorporated railroad time.


ATLANTIC
OCEAN
PACIFIC
OCEAN
Gulf of Mexico
0 200 400 Miles
0 200 400 Kilometers

1890

The railroads promoted trade & interdependence.

Cities such as Abilene, Kansas; Flagstaff, Arizona; & Seattle, Washington owe their prosperity; if not their very existence to the railroads.

Problems with the Railroads

- **Farmers paid outrageously high prices to transport grain.** It sometimes cost as much to ship a bushel of grain as they received from it. It might cost more to ship grain from the Dakotas to Minneapolis by rail than from Chicago to England by boat. In essence, the railroads demanded more for short hauls than for long hauls because the farmers had no other alternative to haul the freight.

- **Railroads made secret agreements with middlemen (Grain brokers & merchants) which allowed the railroads to control grain storage prices & to influence the market price of crops.**

- **Farmers were charged high rates of interest & sometimes charged more for items bought on credit than bought with cash.** Many farmers got caught in a cycle of credit, which meant longer hours & more debt.

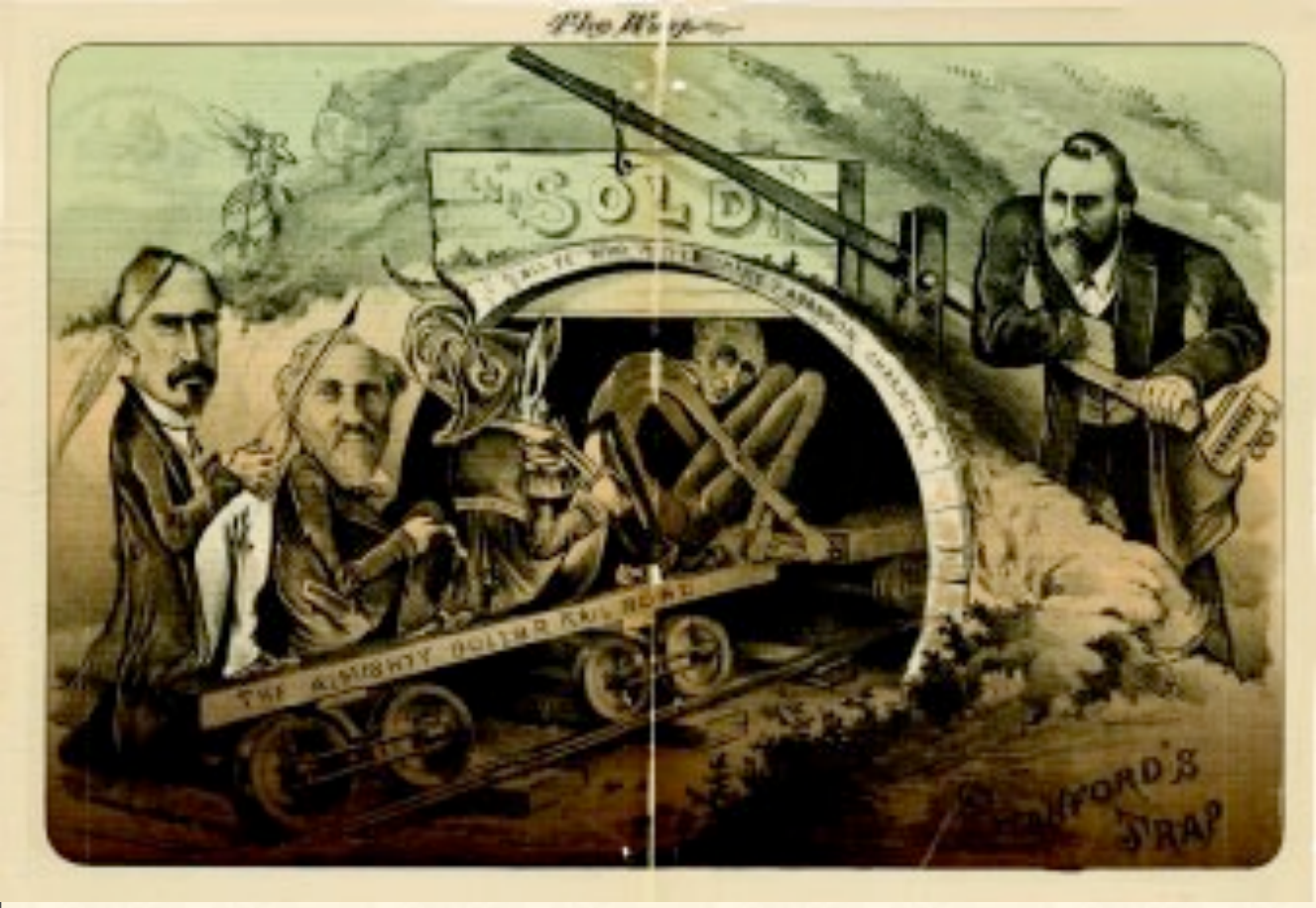
Problems Continued

Some railroad magnates & powerful, influential industrialists were corrupt.

One of the most famous schemes was a group of stock holders in the Union Pacific Railroad formed, in 1864, a construction company called Credit Mobilier that enabled them to skim off railroad $ for themselves. They gave this company a contract to lay track at 2 or 3 times the actual cost & pocketed the profits. To prevent government meddling, they donated shares of stock to about 20 representatives in Congress in 1867.

An investigation of the company, spurred by reports in the New York Sun found that the officers of the Union Pacific had pocketed up to $23 million in stocks, bonds & cash.

The congressmen made off with the profits scot-free , but the reputation of the Republican Party was tarnished.



The Wasp: Stinging Editorials and Political Cartoons

The Wasp, April 6, 1878. "Stanford's Trap." Railroad magnate Leland Stanford is shown leading California newspapermen and politicians into a dark tunnel. The words above the tunnel read,"All Ye Who Enter Here Abandon Character." In the upper left hand corner of the image sits a ubiquitous "wasp" with binoculars, observing all that happens in California

In Response to the Abuses by the Railroads:

- **<u>Grangers</u> (largely poor farmers) <u>took political action</u>**
- They sponsored political candidates (both state & local)
- Elected legislators (law makers)
- Pressed for laws that protected their interests - **<u>Granger Laws</u>**.
  - **As a result, State of Illinois authorized a commission:**
    - **To establish maximum freight & maximum passenger rates**
    - **To prohibit discrimination**
    - **Grangers set up a fund to help citizens sue for violations of the Granger Laws**

The Railroads fight back with legal proceedings, challenging the Granger laws – Are they constitutional?

In 1877, Supreme Court upholds the Granger laws in the **Munn v. Illinois** – States now have the right to regulate the railroads for the benefit of farmers & consumers.

This also helps to establish the important principle of the federal governments right to regulate private industry to serve public interest.

In 1886, The Supreme Court rules that a state could not set rates on interstate commerce. In other words, one state could not control the railroad traffic rates either coming from or going to another state.

In response to public outrage, Congress passes the **Interstate Commerce Act** in 1877. This act reestablished the right of the federal government to supervise railroad activities & establish the **ICC (Interstate Commerce Commission)**- who found it difficult to regulate railroad rates due to legal proceedings.

Ultimately, corporate abuses, mismanagement, overbuilding & competition pushed many railroads to bankruptcy. Since the railroads were so crucial to the nation's economy, their financial problems played a major role in a nationwide economic collapse.

By the end of 1893, 600 banks, 15,000 businesses failed & 3 million people lost their jobs.

By the middle of 1894, 25% of the nation's railroads were in the hands of banks, which allowed large firms like **J.P. Morgan & Co**. and entrepreneurs such as **Cornelius Vanderbilt** & his son William to seize many of the railroads.

Soon, by the beginning of the 20th century, the age of big business had begun.

Big Bu$iness Emerge$

- Andrew Carnegie
- John D. Rockefeller
- The Vanderbilts

Industrialism

- Merriam –Websters dictionary defines it as a social organization in which industries and especially large-scale industries are dominant.
- An economic organization of society built largely on mechanized industry rather than agriculture, craftsmanship, or commerce.

Socialism

A general term for the political and economic theory that advocates an economic & political system based on government control of business & property & equal distribution of wealth. Because of the collective nature of socialism, it is to be contrasted to the doctrine of the sanctity of private property that characterizes capitalism. Where capitalism stresses competition and profit, socialism calls for cooperation and social service.

In theory, the leaders of a socialist society would be industrialists who would found a national community based upon cooperation and who would eliminate the poverty of the lowest classes.

Were the founders of American industry “Robber Barons" or “Captains of Industry?"

The wave of industrialism that we have been studying was often driven by a few great men known as industrialists. There can be no mistaking their motives: **Wealth.** There is some debate, however, on the how history should portray these industrialists.

Some feel that the powerful industrialists of the gilded age should be referred to as “**Robber Barons.**" This view accentuates the negative. It portrays men like Vanderbilt and Rockefeller and Carnegie as cruel and ruthless businessmen who would stop at nothing to achieve great wealth. These "robber barons" were accused of exploiting workers and forcing horrible working conditions and unfair labor practices upon the laborer.

Another view of the industrialist is that of **“Captain of Industry."** The term captain views these men as viewed ingenious and industrious leaders who transformed the American economy with their business skills. They were praised for their skills as well as for their **philanthropy** (charity).

In reality the debate over robber barons and captains of industry mirrors views of industrialism itself. Just as their were both positives and negatives to industrialism there were positives and negatives to the leaders of industrialism.

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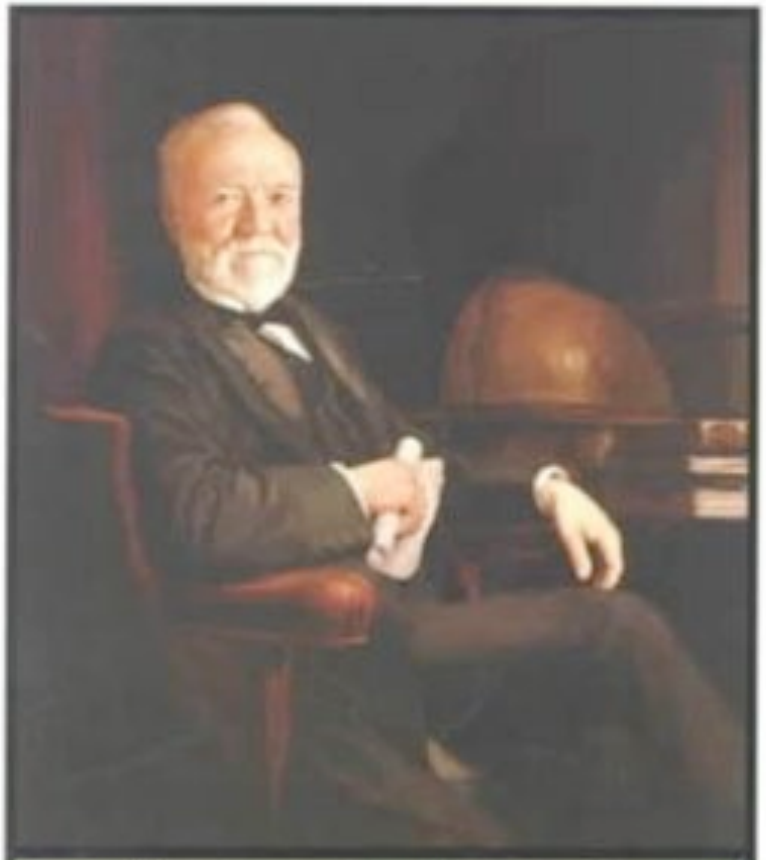
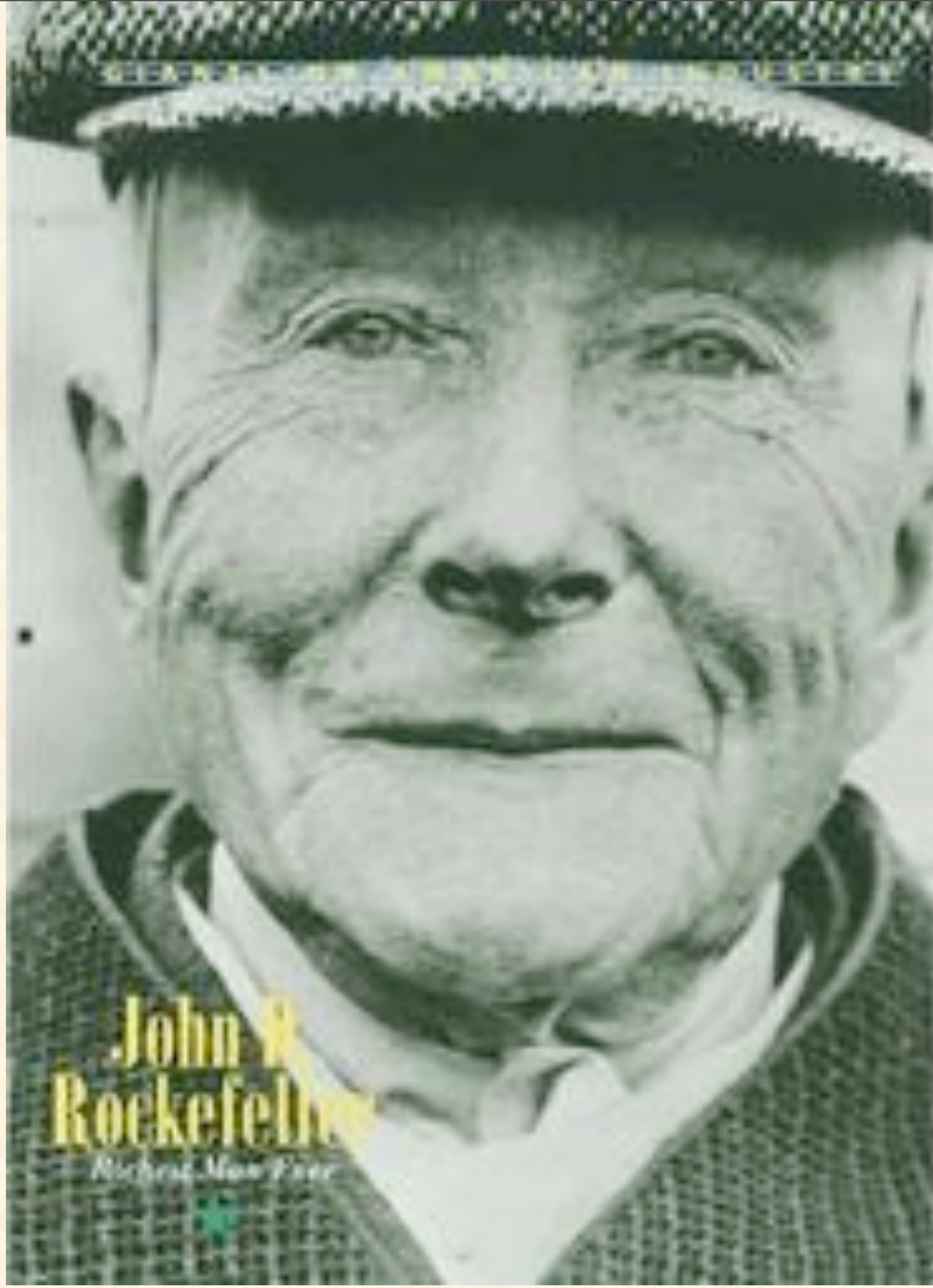
Second Edition



HAROLD C. LIVESAY

ANDREW CARNEGIE

and the Rise of Big Business


John
Rockefell

C Vanderbilt

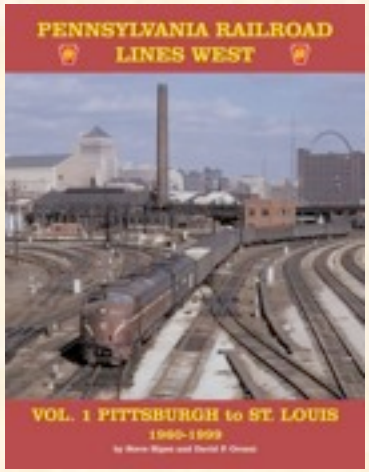
William Vanderbilt

Vertical Integration

Carnegie bought & controlled every stage of the steel industry giving him total power over the quality & cost of his product.

Steel Industry

Railroad lines

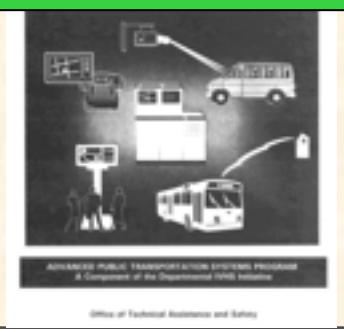


Suppliers

Coal & Iron Mines

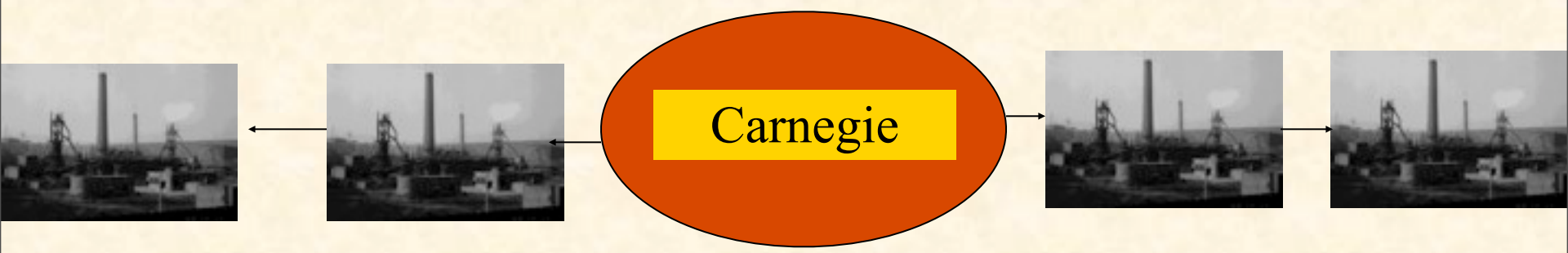
Raw materials

Transportation Systems



Ore Freighters

Horizontal Consolidation



Carnegie bought out competing steel producers in attempts to monopolize the steel industry.

SOCIAL DARWINISM

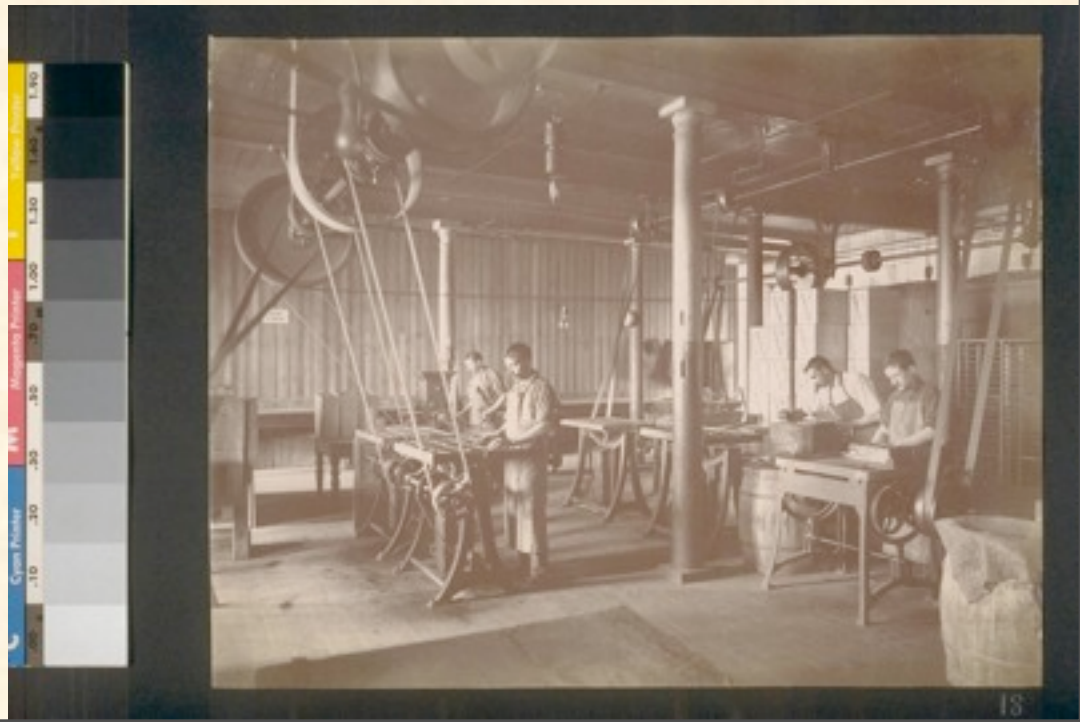
Social Darwinism was an application of Charles Darwin's theory of evolution to the field of social relations. Throughout human history, wrote the English philosopher Herbert Spencer, society had operated like a jungle, the strongest and best adapted—the "fittest"—survived. Although the process was a cruel one, it promised long-term in which only benefits, for humans were gradually evolving toward a wholly just and peaceful society. He emphasized, however, that this evolutionary process must proceed at its own slow pace; efforts to improve social conditions along the way would be both misguided and futile.

When Spencer's works became popular in the United States in the 1870s, the American business world had itself come to exemplify the struggle for existence that he described. Corporate leaders seized on Social Darwinism as "scientific" justification for their actions. Businessmen like Andrew Carnegie argued that unrestrained competition was simply natural selection at work, steadily improving the national economy by weeding out the unfit. Social Darwinism also appealed to those who opposed social legislation. Exponents of Spencer's work like Charles Sumner of Yale University quoted him to show that human intervention could not hasten the pace of evolution or ease the merciless struggle for existence dictated by natural law.

Exploitation of Workers

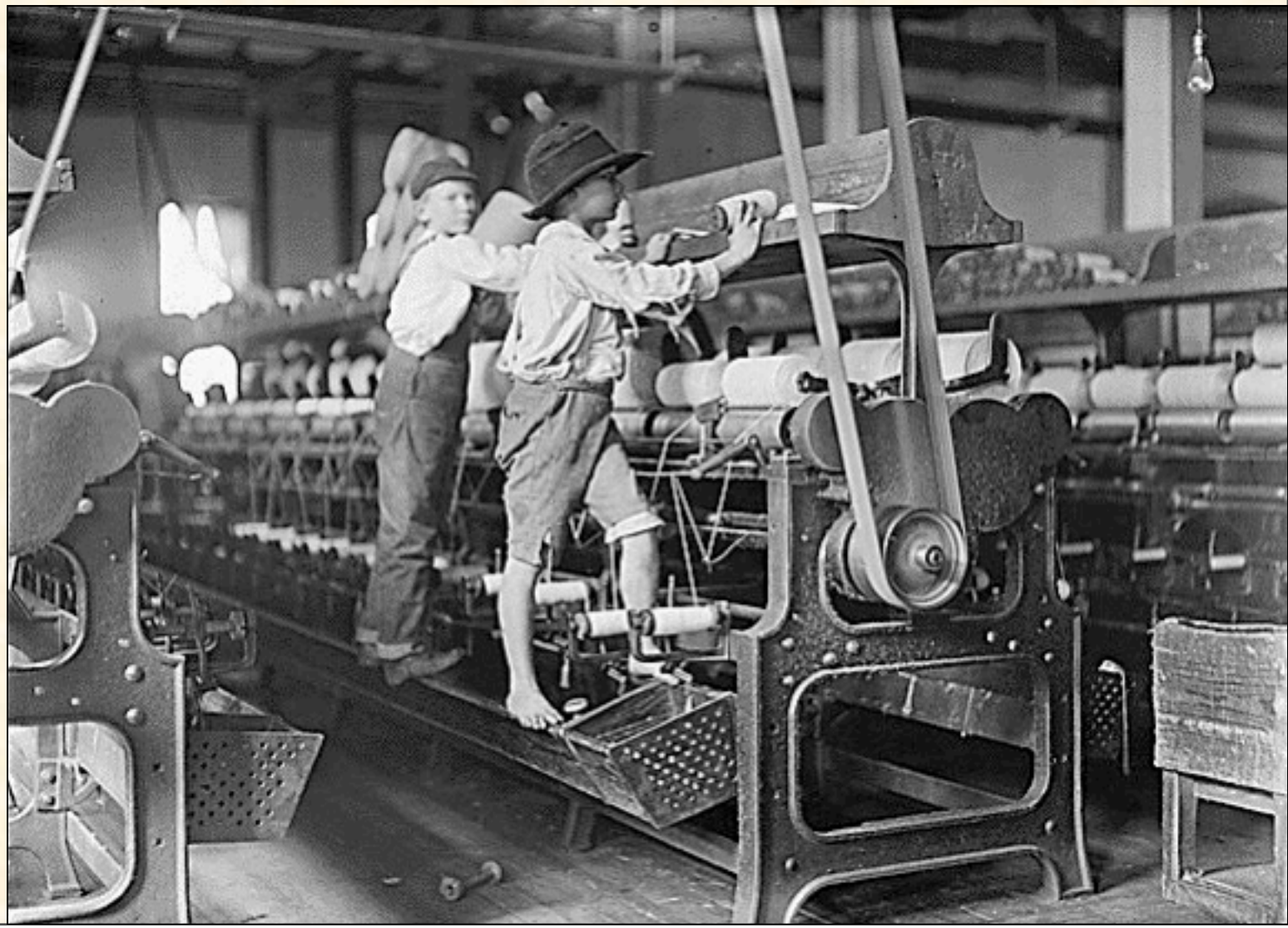
=

- **Long hours** (10 – 16 hours per day, 6 – 7 days a week)
- **Low Pay** (.20 - $1.50 per hour, depending on industry) Families struggled to survive unless everyone in the family had a job.
- **No benefits** (No vacations, sick leave, unemployment benefits, compensation for injury)
- **Substandard working conditions** (factories were poorly lit, poorly ventilated & dirty)



Child Labor

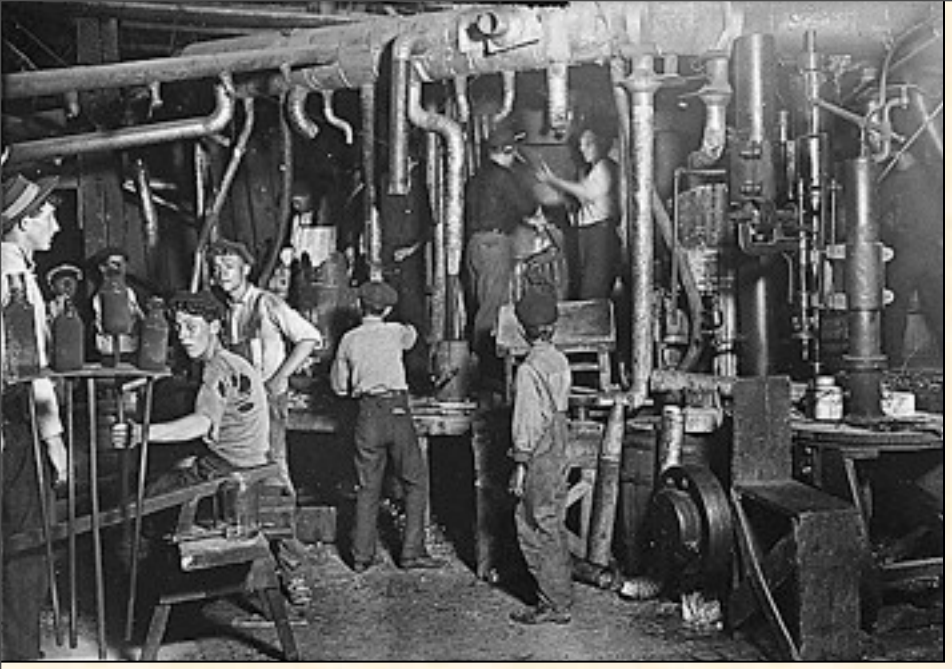
Some boys & girls were so small they had to climb up on to the spinning frame to mend broken threads and to put back the empty bobbins.

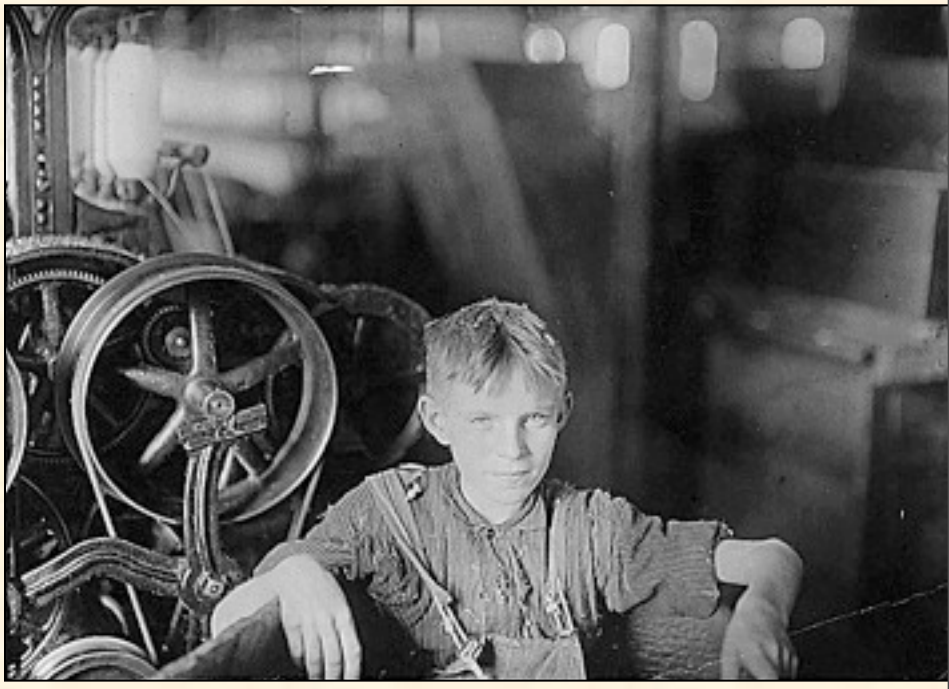


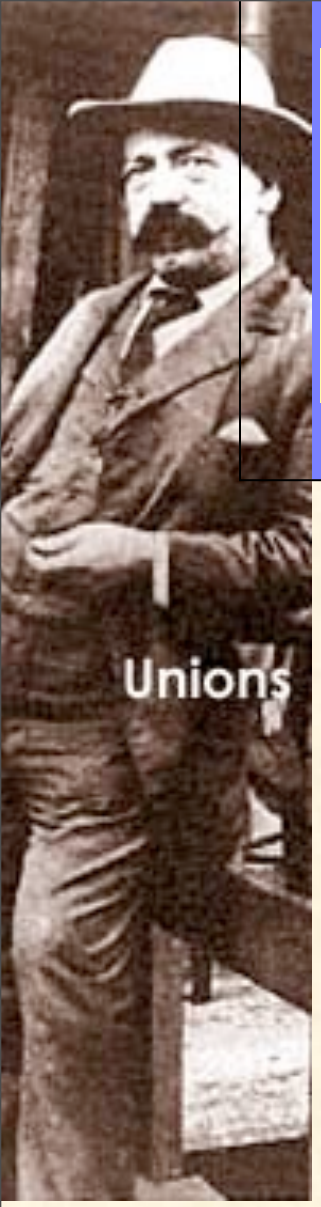
Child labor was common in garment trade & other industries. Shocked reformers in the 1890's told of the devastating effect of factory labor on children's lives. "The legs of a 7-year-old girl were paralyzed and deformed because she toiled day after day with little legs crossed, pulling out bastings from garments."

In the gritty coal mines of Pennsylvania, breaker boys, youths who stood on ladders to pluck waste matter from coal tumbling down long chutes, breathed harmful coal dust all day. Girls under sixteen made up half the work force in the silk mills of Scranton & Wilkes-Barre, Pennsylvania. Girls with missing fingers from mill accidents were a common sight in those towns.

By 1900, Pennsylvania and few other states had passed legislation regulating child labor, but enforcement of these laws was lax. Parents desperate for income often lied about their children's age, and authorities were often sympathetic toward mill or mine owners, who paid taxes and provided other civic benefits.







Employees became tired of seeing the rich get richer & the poor get poorer, so they decided to band together to demand better pay & better conditions; as a result, **Labor Unions Emerge**


And How!
INDUSTRIAL ORGANIZATION
...WE BETTER LAY OFF THAT GUY!!...
LONG HOURS
RUTHLESS EXPLOITATION
SLUG UGLY
WAGE CUT
STEEL INDUSTRY


Solving the Problem of Steel
STEEL
THE BIG QUESTIONS OF MODERN INDUSTRY
AUTO
RADIO
COURAGEOUS CONSTRUCTIVE UNIONISM
INDUSTRIAL ORGANIZATION

Workers Organize:

The growing power of industrial corporations and the declining power of workers generated social tensions reminiscent of the sectional crisis that triggered the Civil War. Two prolonged depressions, one beginning in 1873 and the other in 1893 put as many as 2 million laborers out of work. Skilled workers, their security undermined by deskilling and their hopes of becoming managers or starting their own businesses disappearing, saw the nation "drifting to that condition of society where a few were rich and the many very poor"