Regional Landscapes of the United States and Canada

The Manufacturing Core

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DEFINITION

MANUFACTURING is the large-scale transformation of raw materials (primary sector of economy) **into finished goods that have higher value** (secondary sector of the economy).

It uses machines, tools, labor and a power source to create products.

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North America's Manufacturing Core

Overlaps a number of regions including Megalopolis, the Canadian National Core, the Agricultural Core and Appalachia.

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Sub-regions of the Manufacturing Core

USA
Milwaukee
Chicago
Peoria
Gary
Detroit
Flint
Toledo
Cleveland
Akron
Dayton
Cincinnati
Wheeling
Pittsburgh
Erie
Philadelphia
Scranton
Buffalo
Rochester
Syracuse

USA
Utica
Schenectady
Troy
New York City
Baltimore
Patterson
Trenton
New Haven
Springfield
Boston
Worcester
Providence
Portsmouth
Portland
CANADA
Windsor
London
Hamilton
Toronto
Montreal

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Manufacturing Needs

All manufacturing is dependent on:

- **Space**
- **Raw materials**
- **Energy supply**
- **Water supply**
- **Transportation net-work** (accessibility: port facilities, railroads, high-ways, airports)
- **Labor supply** (various skill levels)
- **Financial centers**
- **Markets**
- **Political and legal variables that are favorable** (jurisdictions, laws, zoning, regulations)

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More Definitions

- **Connectivity**: nodes and linkages; time-distance
- **Comparative Advantage**: best suited to perform a task
- **Agglomeration**: clustering for mutual benefit
- **On-site Storage**: bulk buying; warehousing
- **Just-in-Time Systems**: buy and accept delivery when needed
- **Location Inertia**: tendency of an industry to stay in place and at a place

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Handling Bulk

Bulk - a large volume of material

Break bulk – to reduce the volume to manageable loads

Break-in-bulk Point

A transfer point on a transport route where the type of carrier changes, and where the volume of shipment is expanded or reduced in size.

All manufacturing sites have to deal with issues of bulk and storage for both the raw materials and the finished products.

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Manufacturing Core

The growth and development of the Core was directly related to the:

1. Quantity, quality and location of natural resources.

2. Availability to transport raw materials and the finished product.

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Growth of Manufacturing Core

Core region dates from the late-1800s.

- Before 1830, there was urban/manufacturing development along Atlantic Coast as the factory system transformed towns.
- Agricultural settlement between 1830 and 1860 brought people into the interior lands.
- Transportation advances were a factor:
  - **Erie Canal and the "canal fever"** (1820s-1850s)
  - **Railroads** (surpassed the canals in 1840s; flexibility). **Railroad companies sponsored manufacturing along their lines.**

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Manufacturing Core
after the end of the Civil War

In East Coast cities manufacturing grew after the Civil War because of:

a) **Labor supply, water power, good ports,** the siting of **railroad terminals** and **money**.

b) **European immigrants** with factory working experience entered the U.S. through these cities.

c) The **growth of the railroads** in the mid-1800s, esp. after the invention (1870s) of steel rails, allowed manufacturing to move inland along the tracks expanding the original core.

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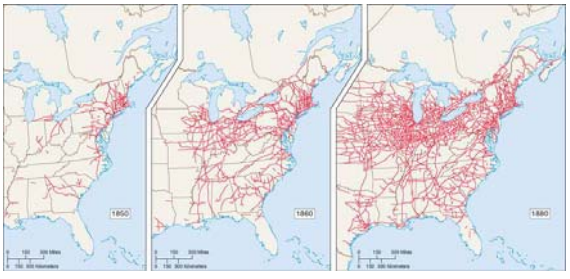
Growth of the Railroads
(1850-1880)



Note the increase of **density** of lines over the 30 yr period. 11

Mineral Resources

❖**Needed in the manufacture of many products.**

❖**Nearby sources reduced cost. It allowed an uninterrupted flow to the Core's factories.**

- **Metallic minerals** as iron ores, nickel, copper, zinc, galena, lead, silver, gold
- **Non-metallic minerals** as industrial garnets, asbestos, quartz, clay, emery, limestone, natural cement
- **Mineral fuels** as coal, petroleum and natural gas
- **Water supply** for power, processing, cooling and waste removal.

Proximity to the Great Lakes system was important.

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Comparison of Core Regions

Eastern Cities	Interior Cities
• Existed before industrialization • Developed because of commerce and finance • Hearth: New England • Specialization: light industry - Small amt of raw materials used - High value per unit weight added • Importance on services, esp. finance, education, culture • Sites: Boston, Providence, New York, Philadelphia, Baltimore	• Developed near mineral and agric resources after industrialization • Focus: water • Specialization: heavy ind'try – Used nearby metallic minerals and coal – Processing, metal smelting, machinery, vehicles • Sites: Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Gary, Chicago, Milwaukee, St. Louis; Toronto, Hamilton

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Rust Belt

A 20th century term used to describe the area in industrial decline stretching from Pennsylvania and western NYS through northern Illinois.

It is meant to evoke images of rusting manufacturing facilities, especially involving the manufacturing of steel, vehicles, and heavy machinery.

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Reasons for the "Rusting" of the Manufacturing Core

- **Population shifts** to new growth areas (SE and SW U.S., W. Canada)
- **Labor shortage**; young people not wanting to work in factories.
- **Competition** from manufacturers in other U.S. regions and in foreign countries.
- **Aging infrastructure**; costly to retro fit or come up to standards; limited space to expand.
- **New technologies** (hi tech), especially robotics.
- **Environmental issues**; cost factors.

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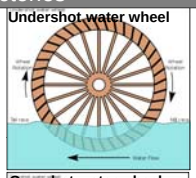
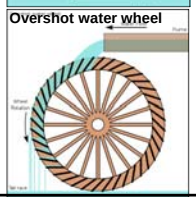
New England Watermills

the original factories





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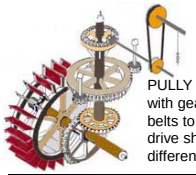
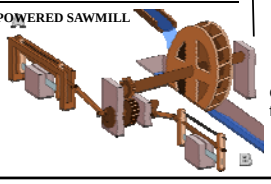
Inside a Watermill



PULLY SYSTEM with gears and belts to turn drive shafts at different levels

Gears and shafts for GRINDING action.

WATER-POWERED SAWMILL



Cranks and rods for SAWING action

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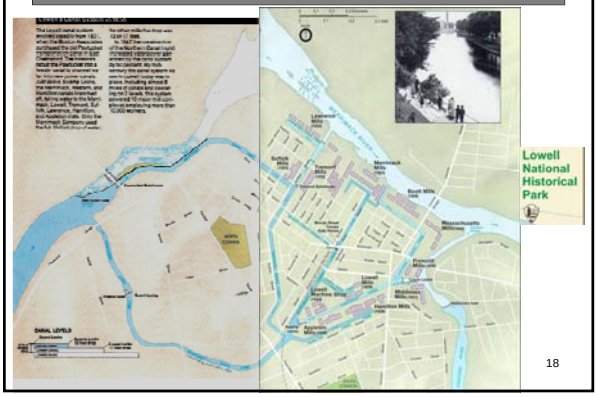
Canals of Lowell, MA - 1850



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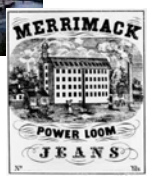
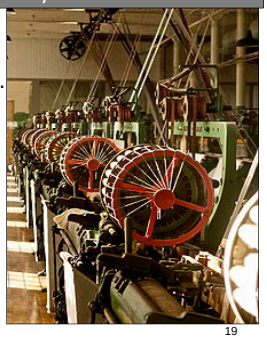
Cotton Manufacturing Museum
Lowell, MA

Machines (looms) are powered by water turning wheels.





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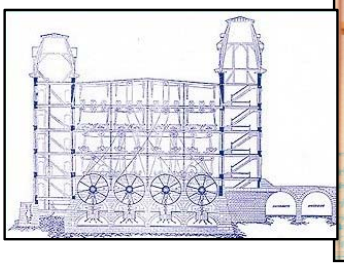
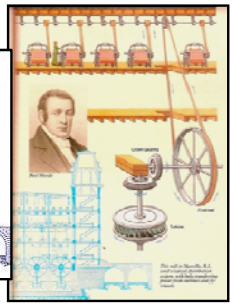
Mill at Manville, RI





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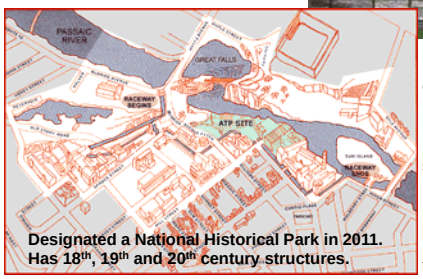
Great Falls of the Passaic River
Paterson, NJ



Designated a National Historical Park in 2011. Has 18th, 19th and 20th century structures.

It is home to the largest and best example of early manufacturing mills in the US.

It played a key role in shaping the American Industrial Revolution.

It contains waterpower remnants from the 1700s, including a 3-tiered raceway system.

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New England Factory Buildings

Salem, MA

Manchester, NH

Milton, MA

New England Factory Buildings

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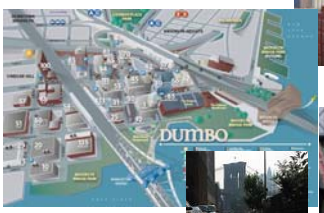
DUMBO, Brooklyn, NY



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Interior Lake Ports

- **Transfer of iron ore shipped on Great Lakes to rail cars at Great Lakes ports: *break-in-bulk***
- **Return rail cars carrying coal**
- **Development of steel and other industries at ports**

Cleveland
- Largest port city on Lake Erie
- Canal linkage to Ohio River

Buffalo
- Linked to NYC by Erie Canal
- Last port on "all American" route from Lake Superior
- Extensive rail yards interacted with port facilities

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Canadian Lake Ports

Hamilton (iron and steel)
Toronto (diversified)
Windsor (automobiles)

"**Golden Horseshoe**" of Canada – the area at the west end of Lake Ontario from Toronto to the Niagara River.

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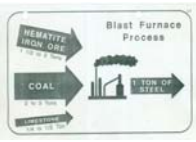
Recipe for Making Steel



Coal is moved by rail or water.
Iron ore is moved by water.
Steel mills are located along the shoreline.

Finished products are moved by water, rail or truck to their next destination.

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Chicago

- Dominant city in interior manufacturing core
- **Not a great site**
  - Swampy
  - Poor-quality drinking water
  - Non-navigable river
- **Has situational advantages**
  - Transfer of goods and people from west and southwest
  - Focus of inland water transportation (Illinois and Michigan Canal, 1848) connecting Lake Michigan to the Mississippi River system
  - Railroad center

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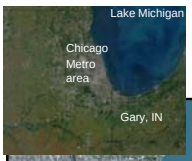

Chicago: Satellite images

- Originally, there were two rivers that flowed from the image's top and bottom.
- They joined and flowed east to Lake Michigan.
- In the 1890s the flow was reversed (**from** Lake Michigan inland) and a sanitary canal was created.

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Aerial Photograph of Cleveland

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Heavy industry on Cleveland's Cuyahoga River

Here water is used in processing, for waste disposal and as a means of transportation.

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Cuyahoga River Fire
June 22, 1969

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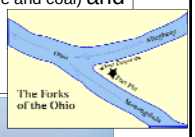
PITTSBURGH

- Strategic river junction (where the Monongahela and Allegheny rivers join to form the Ohio River)
- Access to raw materials (iron ore and coal) and down-river markets
- Steel making center



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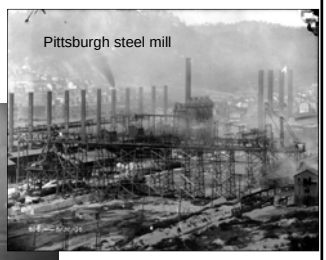
Vintage Photos of Pittsburgh



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Detroit: Satellite image

- **From the French, *de troit* – "of the narrows"**
- **Located along the Detroit River (a channel) that connects Lake Erie with Lake St. Clair.**
- **Located at a place to cross the river and also to control water traffic between the lakes.**
- **This was a site of colonial forts.**

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Detroit

Looking north from Detroit to Lake St. Clair (in the distance).

Windsor (Canada) is to the right.

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The Ford Plant at Rouge River
south of Detroit

Major manufacturing plants need a lot of space and are located outside of cities. Assembly line manufacturing is a one level, horizontal production line.
(As opposed to the multi-story East Coast factories located within a city.)

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Automobile Industry

Henry Ford **(1863-1947).** Industrialist, automobile manufacturer, and pioneer of the assembly line technique of mass production.

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A Modern Automobile Assembly Line

Some horizontal assemble lines can be over a quarter mile long.

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