Regional Landscapes of the United States and Canada

The Manufacturing Core

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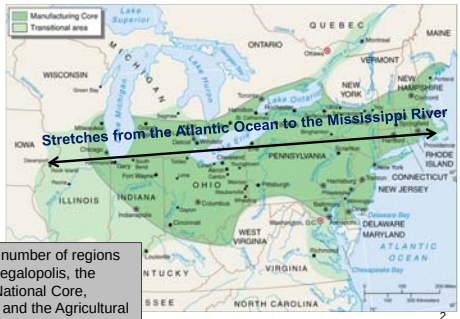
North America's Manufacturing Core



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

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Sub-regions of the Manufacturing Core

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Major Manufacturing Cities

UNITED STATES

- Milwaukee (WI)
- Chicago, Peoria (IL)
- Gary (IN)
- Detroit, Flint (MI)
- Toledo, Cleveland, Akron, Cincinnati (OH)
- Wheeling (WV)
- Pittsburgh, Philadelphia, Erie, Scranton (PA)
- Buffalo, Rochester, Syracuse, Utica, Troy, Schenectady, NYC (NY)
- Baltimore (MD)
- Trenton, Patterson (NJ)
- New Haven (CT)
- Springfield, Worcester, Boston (MA)
- Providence (RI)
- Portsmouth (NH)
- Portland (ME)

CANADA

- Windsor, London, Hamilton, Toronto (ON)
- Montreal (QC)

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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 source of power to create products.

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Geographic Spatial Analysis for Manufacturing

1. **Location factors** (site and situation)
2. **Spatial Patterns** (relationship between places; includes production vs. need, bulk handling, and perishability of product)
3. **Transportation** (routes, networks; includes ease of access and speed)
4. **Economic Factors** (supply and demand; cost of doing business; human elements; environmental issues)

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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)
- Locational Inertia (tendency of an industry to stay in 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 Needs

All types of manufacturing are 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** (jurisdictions, laws, zoning, regulations)

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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 resources, 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.
- 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; more flexible routes and could run year round). **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 who had experience working in factories entered the U.S. through these cities.

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

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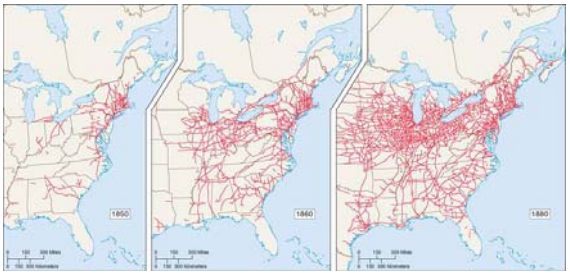
Growth of the Railroads
(1850-1880)



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

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Mineral Resources

- **Mineral resources are used 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.

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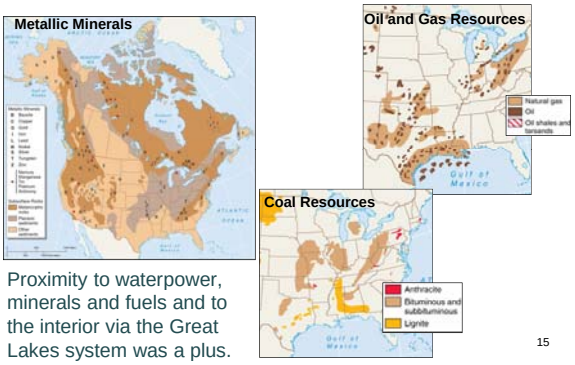
Advantages of Location



Proximity to waterpower, minerals and fuels and to the interior via the Great Lakes system was a plus.

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Historical Sequence (see textbook)

- **Sailing Ship-Wagon Epoch (1790-1830).** Water transportation (ocean/river/canal) was key; overland via horse-drawn wagons; Boston, New York, and Philadelphia most important cities
- **Iron Horse Epoch (1830-1870).** Steam powered railroads; expansion inland; growth of Pittsburgh, Chicago, Detroit and others
- **Steel Rail Epoch (1870-1920).** Major growth of the steel industry; demand for bituminous coal; spread of the electrical grid.
- **Auto-Air-Amenity Epoch (1920-1960).** Automobiles, trucks, and airplanes speed travel and reduce shipping costs; need space for parking and storage; narrow streets hamper trucks.
- **Information Technology Epoch (1960-1990s)** Production and exchange of information rather than physical manufacturing; not necessarily location oriented. Decline in manufacturing for various reasons including costs, aging infrastructure and environmental concerns. Movement out of the Core. "Rust Belt" tag.

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Rust Belt

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

It is meant to evoke images of abandoned and 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 away from the Core to new growth areas (SE and SW U.S., W. Canada)
- 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 and cost factors.

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Comparison of Core Regions: Eastern Cities

- Part of **Megalopolis**
- Existed before manufacturing; founded on **commerce** and **finance**
- Manufacturing hearth: **New England**
- Specialization in **light industry**
  - Moderate amounts of partially processed materials
  - High value per unit weight (consumer goods)
- People placed an importance on **services,** especially finance, education, culture
- Boston, New York, Philadelphia, Baltimore

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Comparison of Core regions: Interior Cities

- Location near **rich mineral and agricultural** resources.
- Almost all the large cities are located along the Great Lakes shoreline and the Ohio River.
- **Metallic minerals** from nearby Canadian Shield mines
  - Mesabi Range (Minnesota)
  - Steep Rock (Ontario)
  - Gogebic, Marquette, Menominee Ranges (Michigan/Wisconsin)
- **Coal** from Appalachians (Pennsylvania/West Virginia)
- Concentration in **heavy industry** (processing, metal smelting, machinery making, vehicles)
- Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Gary, Chicago, Milwaukee, St. Louis; Toronto, Hamilton

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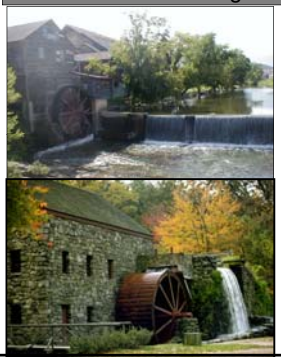
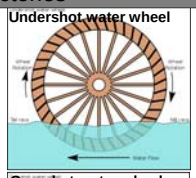
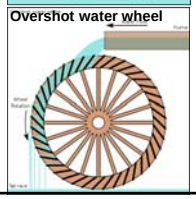
New England Watermills
the original factories







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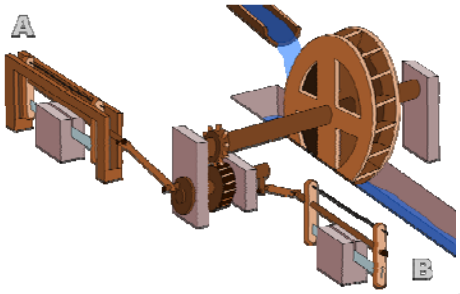
Inside a Watermill



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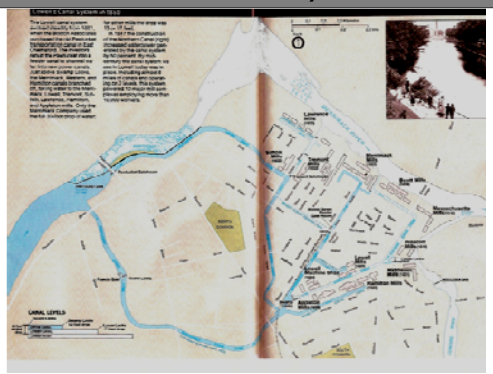
Canals of Lowell, MA -1850



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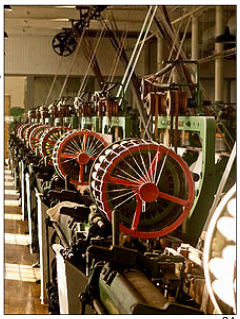
Cotton Manufacturing Museum
Lowell, MA

Machines (looms) are powered by water turning wheels.



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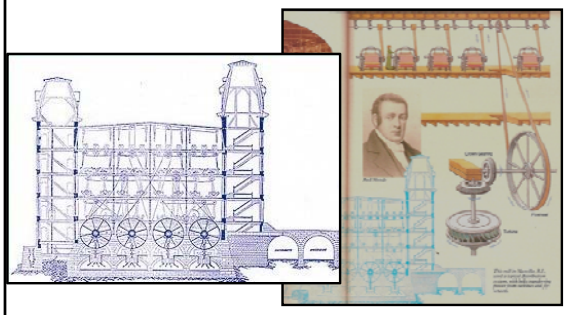
Mill at Manville, RI



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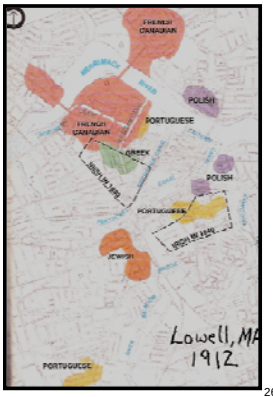
Lowell 1912 Immigrant Neighborhoods

Factory workers congregated in neighborhoods, each with their distinctive flavor.



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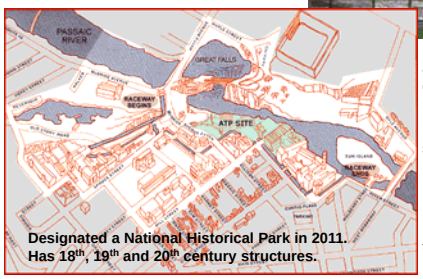
Great Falls of the Passaic River

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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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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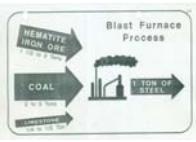
Recipe for Making Steel



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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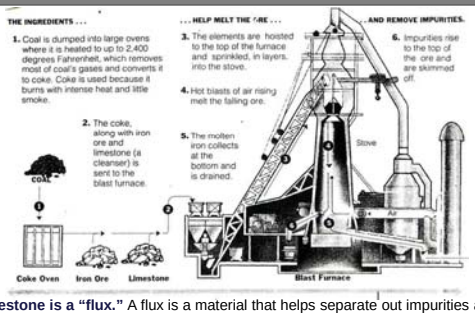
Steel making Process



Limestone is a "flux." A flux is a material that helps separate out impurities and helps metals fuse together. It is important in the iron and steel making processes.

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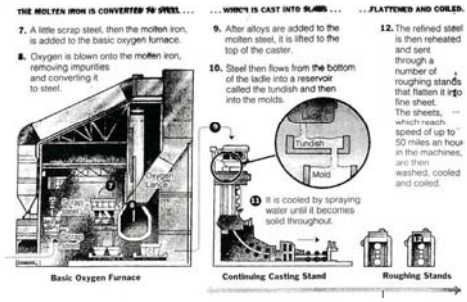
Steel making Process cont'd



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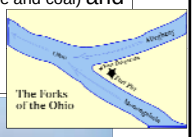
PITTSBURGH

- 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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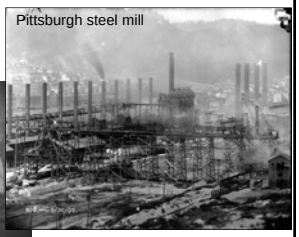
Vintage Photos of Pittsburgh



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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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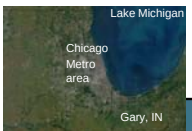

Chicago:
Satellite images

- 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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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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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 western end of Lake Ontario from Toronto to the Niagara River.

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St. Lawrence Seaway/ Great Lakes System

Nearly 2500 miles from Duluth, MN on Lake Superior to the Gulf of St. Lawrence and the Atlantic Ocean.

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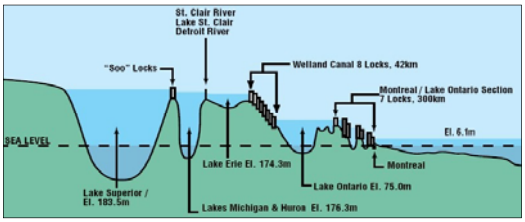
Great Lakes/St. Lawrence River Profile showing seaway locks



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