CHAPTER 12

Industry and Services

Field Note Branding the Backboard

Figure 12.1
Skopje, Macedonia. The Nike "swoosh" is everywhere—even on the backboard of a basketball hoop in this relatively poor neighborhood of Skopje, Macedonia. © Alexander B. Murphy.

Walking through a relatively poor neighborhood in Skopje, Macedonia, with the midday Muslim call to prayer ringing in my ears, the last thing I expected to see was something from my home state of Oregon (Fig. 12.1). But there it was—the unmistakable Nike swosh on the backboard of a basketball hoop where the local kids play pick-up games!

As ubiquitous as the Nike brand of athletic shoes and its trademark swoosh are on the landscape, it is difficult to examine the cultural landscape and pinpoint where Nikes are produced. Nike was founded in Oregon in 1961 by a former competitive runner (its first year of sales was $8000), and it has grown to be one of the giants of the shoe and apparel business (with sales of $10.2 billion in 2005). With headquarters in Beaverton, Oregon, a suburb of Portland, the company is far more than a Beaverton concern. Despite an Oregon workforce of over 20,000 people, not a single individual in Oregon is directly involved in the process of putting a

shoe together. Nike began production in the 1960s by contracting with an Asian firm to manufacture its shoes. In 1974, Nike set up its first domestic shoe manufacturing facility in the small town of Exeter, New Hampshire. By the end of that year, Nike's workforce was still modest in number, but the Oregon contingent focused on running the company and expanding sales, whereas the New Hampshire and the Asian contingents focused primarily on the production of athletic shoes.

As Nike grew to become the world's leading manufacturer of athletic shoes (with almost a 40 percent share of the world's athletic shoe market), its employment numbers skyrocketed and many new manufacturing plants were established in Asia and beyond. This transformation did not translate into manufacturing jobs in Beaverton, Oregon, however. The employment opportunities now provided by Nike at its world headquarters are for the financial administrators, marketing and sales specialists, information technology directors, computer technicians, lawyers, and support personnel needed to run an international company with over $9 billion in annual revenues. The local social and economic geography of Beaverton bears little resemblance to what one might have expected in a town housing an important shoe company 75 years ago.

Seventy-five years ago, economic geographer J. Russel Smith reported that "three hundred shoe factories have sales offices located within a few blocks of each other in Boston." In a leather district close to the city, hides were imported from around the world, and tanneries prepared the hides. In a ring of suburbs around Boston, great shoe towns like Haverhill, Brockton, and Lynn had factories specializing in men's or women's shoes. Writing in 1925, Smith described the process of shoe production in the shoe factory town of Lynn:

> *Walking the streets of Lynn one realizes what concentration an industry can have; the signs upon the places of business read—heels, welts, insoles, uppers, eyelets, thread, etc., etc. It is an astonishing proof of the degree to which even a simple commodity like a shoe, so long made by one man, can be subdivided and become the work of scores of industries and thousands of people.*

Shoe salespeople flocked periodically to the shoe company headquarters in Boston to learn about the company's newest offerings and fill their sample suitcases with shoes to show their clients as they made the rounds of their sales territories.

Today, production and marketing of Nike shoes and apparel involves an elaborate global network of international manufacturing and sales. The global processes have local outcomes and realities, as each node of the Nike network is functionally specialized, dependent on other nodes, and influenced by the niche it occupies in the network.

In this chapter, we examine the origins of the Industrial Revolution in Great Britain and its diffusion into mainland Europe. In addition, we look at the first manufacturing belts in Europe, Asia, and North America. The conditions of industrialization have changed since its beginnings; thus, we also examine how industrialization has changed, focusing on the global labor force and the post-Fordist concepts of just-in-time manufacturing and global division of labor. Changes in the world-economy have spurred new manufacturing belts, considerably changing places in the semi-periphery. We also study how the expanding service economy is changing the nature of employment and the economic bases of many countries.

Key Questions For Chapter 12

1. Where did the Industrial Revolution begin, and how did it diffuse?
2. How do location theories explain industrial location?
3. How has industrial production changed?
4. Where are the major industrial belts in the world today and why?
5. What is the service economy, and where are services concentrated?

WHERE DID THE INDUSTRIAL REVOLUTION BEGIN, AND HOW DID IT DIFFUSE?

Industrial production began long before the Industrial Revolution. Cottage industries and community workshops were located throughout the world, and trade in these industrial products was widespread. For example, in the towns and villages of India, workshops produced goods made of iron, gold, silver, and brass. India's carpenters were artists as well as artisans, and their work was in demand wherever it could be bought. India's textiles, made on individual spinning wheels and hand looms, were considered the best in the world. These industries were sustained both by local aristocrats and by international trade. Textiles in Great Britain were produced in rural villages within individual homes where, during the winter months, rural residents would spin thread or weave fabric. The quality of production varied according to place. India's textiles were so finely produced that British textile makers rioted in 1721, demanding legislative protection against imports from India.

China and Japan possessed a substantial industrial base long before the Industrial Revolution. Even European industries, from the textile makers of Flanders and Britain to the iron smelters of Thüringen, had developed considerably, but in price and quality Europe's products could not match those of other parts of the world.

What Europe's products lacked in quality, its merchants more than made up for in aggressiveness. Commercial companies, such as the Dutch and British East India Companies, laid the groundwork for Europe's colonial expansion. They gained control over local industries in India, Indonesia, and elsewhere, profited from political chaos, and played off allies against enemies. British merchants could import about as many tons of raw fiber for the textile industries as they wanted, and all they needed to do was find ways to mass-produce these raw materials into finished products. Increasing production in the textile industries would enable the British merchants to bury the remaining local industries in Asia and Africa under growing volumes and declining prices.

The Industrial Revolution

During the eighteenth century, markets for European goods were growing, especially in the colonies. Better machines were urgently needed, especially improved spinning and weaving machines. The first steps in the **Industrial Revolution** did not use a revolutionary energy source: the new spinning wheels were still powered by foot pedals, and the new water looms were driven by water running downslope.

The eighteenth century was marked with a series of inventions that brought new uses to known energy sources (coal) and new machines to improve efficiencies (steam engines) and enable the other new inventions (water pumps and railroads). Funding the inventions and financially supporting inventors and inventions through several trials required money. The eighteenth century was marked with a flow of capital from the colonies and from global trade to Western Europe (Fig. 12.2). The flow of capital into Western Europe enabled investors to fund inventors and to perfect inventions. For example, James Watt is credited with improving the steam engine by creating a separate chamber to house the steam and by perfecting the pistons and getting them to preform correctly. The invention did not happen overnight: a series of attempts over a few decades finally worked when Watt partnered with toymaker and metal worker Matthew Boulton (who inherited great wealth from his wife). Boulton financed the final trials and errors that made Watt's steam engine functional and reliable.

During the Industrial Revolution, innovations in iron manufacturing enabled the production of the steam engine and other products made of iron. In Coalbrookdale, England, in 1709, iron worker Abraham Darby found a way to *smelt* iron. By burning coal in a vaccuum-like environment, the English already knew they could cook off the impurities leaving behind coke, the high-carbon portion of coal. Carbon is found in all life forms, and all fossil fuels are

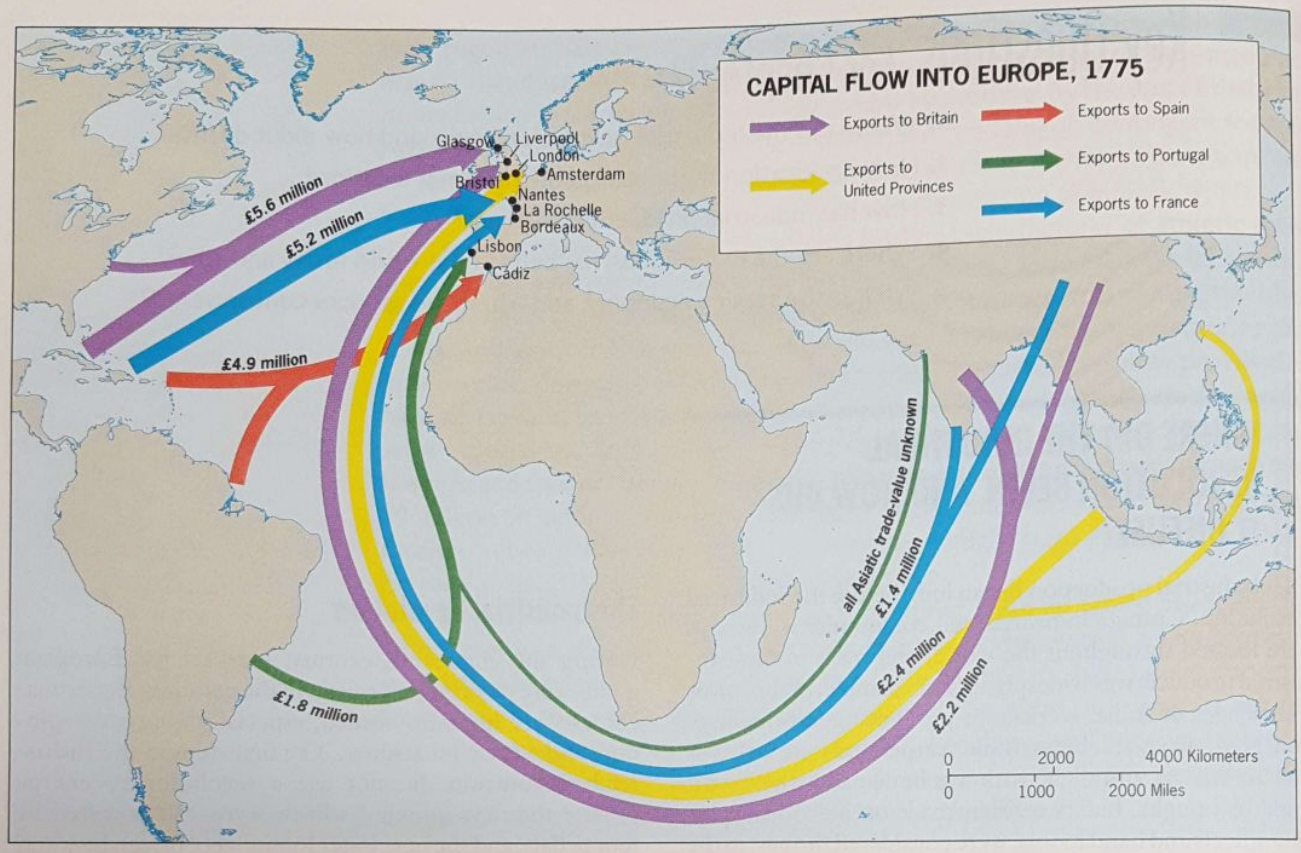
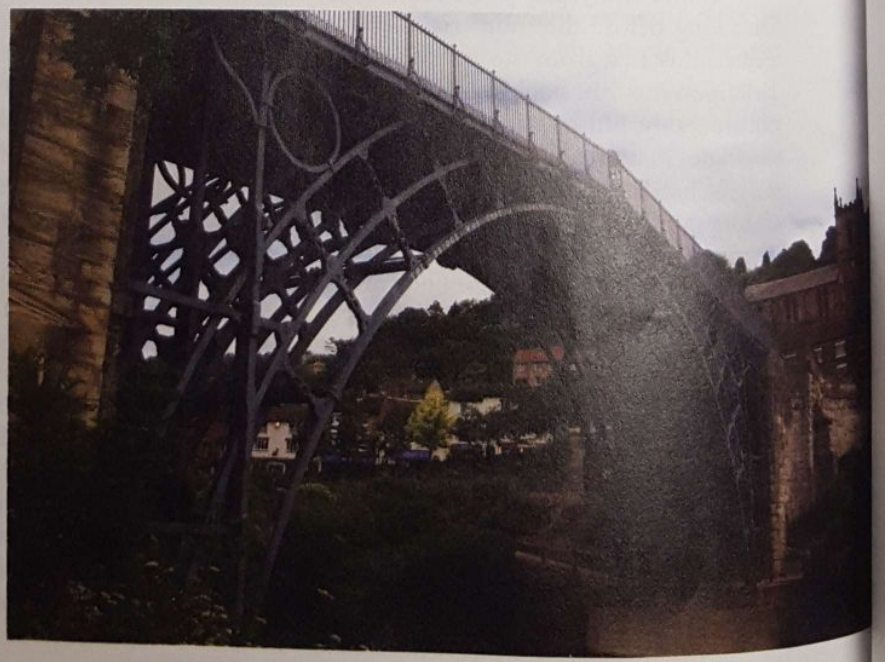


Figure 12.2

Capital Flows into Europe during Colonialism. This map shows the major flows of capital into Europe from Europe's colonies. The capital helped fuel Europe's Industrial Revolution at the end of the 1700s and into the 1800s. *Adapted with permission from*: Geoffrey Barraclough, ed. *The Times Concise Atlas of World History*, 5th edition, Hammond Incorporated, 1998.

Figure 12.3

Ironbridge, England. The world's first bridge made entirely of cast iron was constructed in the late eighteenth century near Coalbrookdale, England, reflecting the resources, technology, and available skills in this area at the time. © John Robertson/Alamy.



carbon based. In 1709, Darby put iron ore and coke in a blast furnace, and then pushed air into the furnace, a combination that allowed the furnace to burn at a much higher temperature than wood charcoal or coal allowed. Mixing the iron ore with limestone (to attract impurities) and water and smelting it with coke enabled iron workers to pour melted iron ore into molds (instead of shaping it with anvils) making *cast iron*. The use of molds allowed more consistency in iron parts and increased production of iron components. The residents of Ironbridge, a town neighboring Coalbrookdale, still take pride in their town's bridge, the first in the world made entirely from cast iron in 1779 (Fig. 12.3).

The steam engine alone had dramatic effects. It was used to pump water out of coal mines, enabling coal workers to reach deeper coal seams; to power spinning wheels that spun 100 plus spools of thread at a time; to power dozens of looms in a factory all at once; and to create a new mode of transportation, the railroad. The first railroad in England was opened in 1825. In 1830, Manchester (a center of textile manufacturing) was connected by rail to the nearby port of Liverpool (a westward-facing port that linked Britain with the colonies), and in the next several decades thousands of miles of iron and then steel track were laid. Ocean shipping also entered a new age when the first steam-powered vessel crossed the Atlantic in 1819.

With the advent of the railroad and steam ship, Britain enjoyed even greater advantages than it did at the beginning of the Industrial Revolution. Not only did it hold a monopoly over products that were in demand around the world, but it alone possessed the skills necessary to make the machines that manufactured them. Europe and America wanted railroads and locomotives; England had the know-how, the experience, and the capital to supply them. Soon British influence around the world was reaching its peak.

Meanwhile, modern Europe's spatial pattern began to take shape. In the early part of the Industrial Revolution, before the railroad connected places and reduced the transportation costs of coal, manufacturing needed to be located close to coal fields. Manufacturing plants also needed to be connected to ports where raw materials could arrive and finished products could depart. In the first decades of the Industrial Revolution, plants were usually connected to ports by broad canal or river system. In Britain, densely populated and heavily urbanized industrial regions developed near the coal fields (Fig. 12.4).

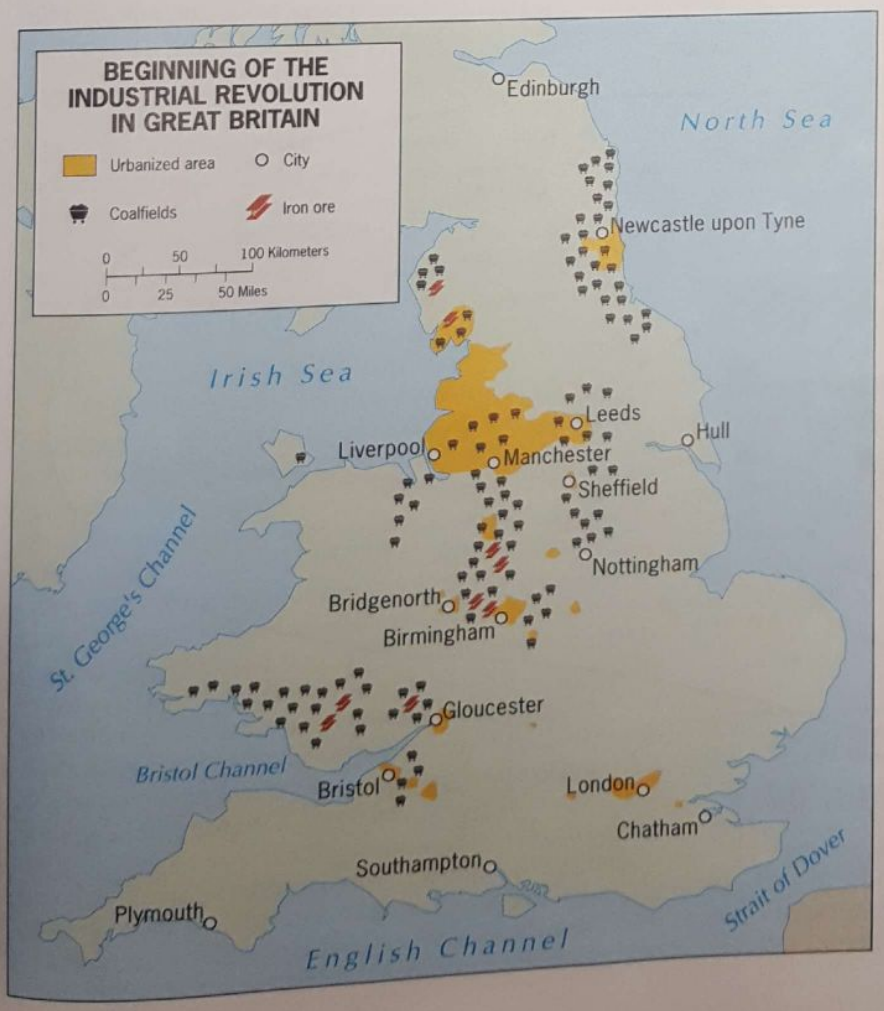


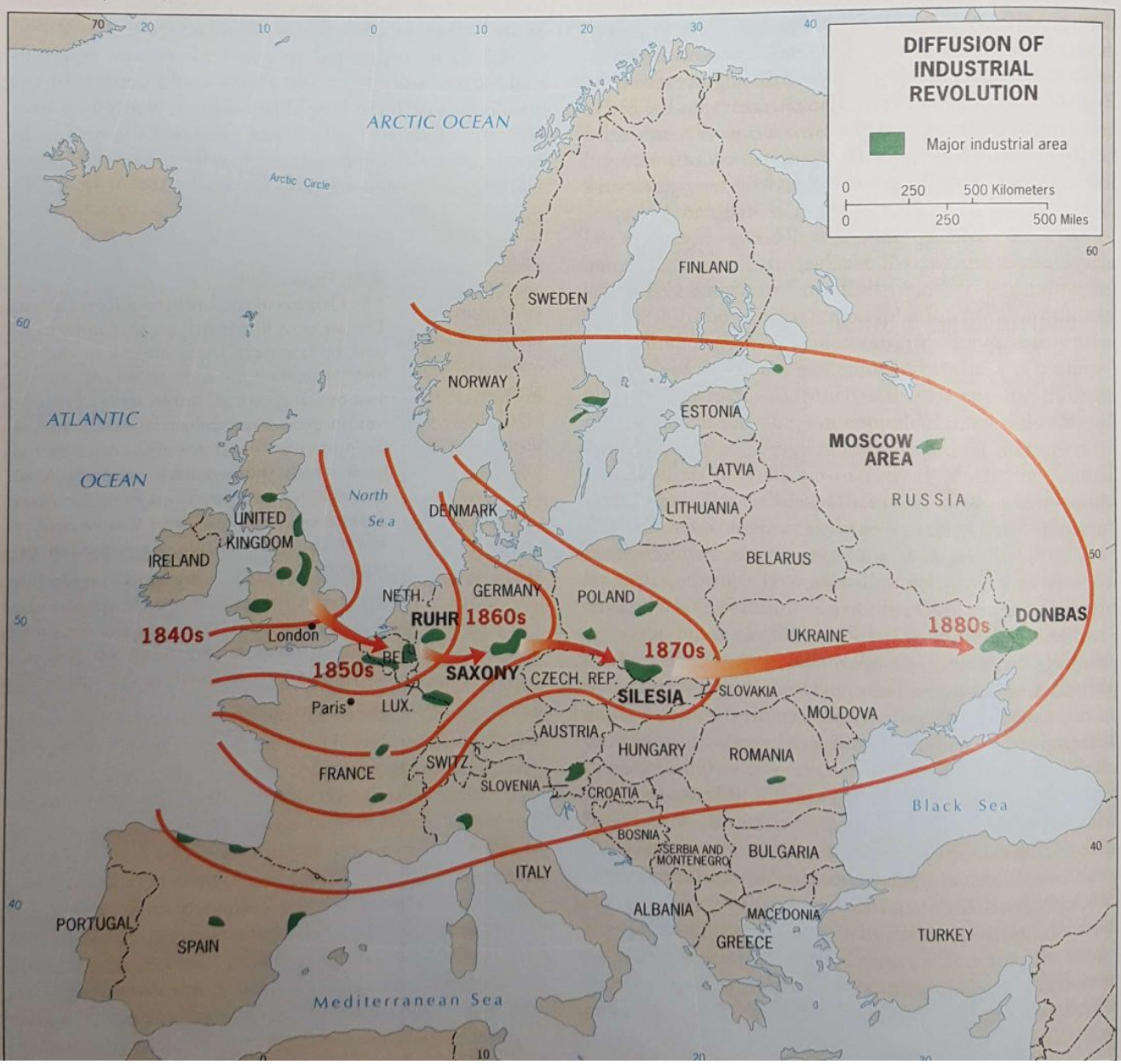
Figure 12.4
The Origins of the Industrial Revolution. The areas of Great Britain that industrialized earliest were those closest to the resources needed for industrialization: coal, iron ore, and capital. Large areas of urbanization grew near industrial zones and in the port cities where materials came in and from which industrialized products went out. *Adapted with permission from*: Geoffrey Barraclough, ed. *The Times Concise Atlas of World History*, 5th edition, Hammond Incorporated, 1998.

The largest such region was the Midlands of northcentral England.

Diffusion to Mainland Europe

In the early 1800s, as the innovations of Britain's Industrial Revolution diffused into mainland Europe, the same set of locational criteria for industrial zones applied: proximity to coal fields and connection via water to a port. A belt of major coal fields extends from west to east through mainland Europe, roughly along the southern margins of the North European Lowland—across northern France and southern Belgium, the Netherlands, the German Rühr, western Bohemia in the Czech Republic, and Silesia in Poland. Iron ore is dispersed along a similar belt, and the map showing the pattern of diffusion of the Industrial Revolution into Europe reflects the resulting concentrations of economic activity (Fig. 12.5). Industrial developments in one area, such as the Rühr area of present-day

Figure 12.5
Diffusion of the Industrial Revolution. The eastward diffusion of the Industrial Revolution occurred during the second half of the nineteenth century.



Field Note

"Paris and the Paris Basin form the industrial as well as agricultural heart of France. The city and region are served by the Seine River, along which lies a string of ports from Le Havre at the mouth to Rouen at the head of navigation for ocean-going ships. Rouen has become a vital center on France's industrial map. As we approached on the river, you could see the famous cathedral and the city's historic cultural landscape to the left (north), but on the right bank lay a major industrial complex including coal-fired power facilities (although France leads Europe in nuclear energy), petrochemical plants, and oil installations. It is all part of the industrial region centered on Paris."

Figure 12.6
Rouen, France. © H. J. de Blij.

Germany (Germany was not consolidated into a single country until the 1870s) changed the port cities to which they are linked—in this case Rotterdam in the Netherlands. The Rhine River flows through the Rühr area and enters the sea at Rotterdam. Over the last 200 years, the Dutch have radically altered the port of Rotterdam to ease transportation and make it the most important port in Europe and a hub of global commerce.

Once the railroad was well established, some manufacturing moved to or grew in existing urban areas with large markets, such as London and Paris. London was an attractive site for industry because of its port location on the Thames River and more importantly because of its major role in the flow of regional and global capital. By locating in London, an industry was at the pulse of Britain's global influence. Paris was already continental Europe's greatest city, but like London, it did not have coal or iron deposits in its immediate vicinity. When a railroad system was added to the existing network of road and waterway connections in Paris, it strengthened the city's position as the largest local market for manufactured products for hundreds of miles. Paris attracted major industries, and the city, long a center for the manufacture of luxury items (jewelry, perfumes, and fashions), experienced substantial growth in such industries as metallurgy and chemical manufacturing. With a ready labor force, an ideal regional position for the distribution of finished products, the presence of governmental agencies, a nearby ocean port (Le Havre), and France's largest domestic market, Paris's development as a major industrial center was no accident. These urban centers became, and remain, important industrial complexes not because of their coal fields but because of their commercial and political connectivity to the rest of the world (Fig. 12.6).

THINKING GEOGRAPHICALLY

Examine the map of diffusion of the Industrial Revolution into Europe and determine what other characteristics (aside from presence of coal) were necessary for industrialization to take hold in these regions.

HOW DO LOCATION THEORIES EXPLAIN INDUSTRIAL LOCATION?

Primary activities draw from the land and therefore are located where resources (forests, minerals, and good soils) are located. The improvements in transportation and communications that have created time-space compression

(see Chapter 4) in our globalized world make secondary industries much less dependent on resource location. Raw materials can be transported to distant locations to be converted into manufactured products—if the resulting profits outweigh the costs. A large body of work in economic geography focuses on **location theory**, predicting where business will or should be located.

Any attempt to establish a model for the location of secondary industry runs into complications much greater than those confronting von Thünen, who dealt only with primary industries. The location of secondary industries depends to an important extent on human behavior and decision making, on cultural, political, and economic factors, and even on intuition or whim. Since models must be based on assumptions, economic geographers have to assume that decision makers are trying to maximize their advantages over competitors, that they want to make as much profit as possible, and that they will take into account **variable costs** such as energy supply, transport expenses, labor costs, and other needs when choosing an industrial location.

In calculating efforts to maximize advantages, a key issue is the **friction of distance**, the increase in time and cost that usually comes with increasing distance. If a raw material has to be shipped hundreds of miles to a factory, rather than being manufactured right next door, the friction of distance increases. A corollary to the concept of the friction of distance is what geographers call distance decay (see Chapter 4), which assumes that the impact of a function or activity will decline as one moves away from its point of origin. Distance decay suggests that manufacturing plants will be more concerned with serving the markets of nearby places than more distant places. This basic principle is important in efforts to understand the locational dynamics of a variety of phenomena—including the manufacturing industry.

Weber's Model

The German economic geographer Alfred Weber (1868–1958) did for the secondary industries what von Thünen had done for agriculture: he developed a model for the location of manufacturing plants. Weber drew from the research of other economic geographers and began with a set of assumptions that enabled him to create his model. In *Theory of the Location of Industries* (1909), Weber eliminated labor mobility and varying wage rates and calculated the "pulls" exerted on each point of manufacturing in his hypothetical region of analysis.

Weber's **least cost theory** accounted for the location of a manufacturing plant in terms of the owner's desire to minimize three categories of costs. The first and most important of these categories was *transportation*: the site chosen must entail the lowest possible cost of moving raw materials to the factory and finished products to the market. Weber suggested that the site where transportation costs are lowest is the place where it would be least expensive to bring raw materials to the point of production and to distribute finished products to consumers. The second cost was that of *labor*. Higher labor costs reduce the margin of profit, so a factory might do better farther from raw materials and markets if cheap labor made up for the added transport costs.

The third factor in Weber's model was what he called **agglomeration**: when a substantial number of enterprises cluster in the same area, as happens in a large industrial city, they can provide assistance to each other through shared talents, services, and facilities. All manufacturers need office furniture and equipment; the presence of one or more producers in a large city satisfies this need for all. Thus, agglomeration makes a big-city location more attractive, perhaps overcoming some increase in transport and labor costs. Excessive agglomeration, however, leads to high rents, rising wages, circulation problems (resulting in increased transport costs and loss of efficiency), and other problems. These problems may eventually negate the advantages of agglomeration. Such factors have led many industries to leave the crowded urban centers of the U.S. eastern megalopolis and move to other locations—a process known as **deglomeration**.

Hotelling's Model

Similar to Weber through his theory of agglomeration, an economist by the name of Harold Hotelling (1895–1973) sought to understand the issue of **locational interdependence** by posing the question of where two ice cream vendors might stand on a beach occupied by people distributed evenly along its stretch. In choosing a simple, one-dimensional space, Hotelling was able to simplify the analysis. He concluded that the two vendors might start at locations somewhat distant from one another so that they could each be as close to as many customers as possible. As the two vendors sought to maximize sales, however, Hotelling argued that they would seek to constrain each other's sales territory as much as possible. This would lead them to move ever closer to the center of the beach, until they were standing back-to-back. And once they reached those positions, they were likely to stay there because a decision by one of them to move could only hurt profitability.

The point of Hotelling's analysis is to show that the location of an industry cannot be understood without reference to the location of other industries of like kind. But in the example of the ice cream vendors, only one variable is considered: the effort to maximize the number of sales. The costs for some of the consumers will be greater if the two sellers cluster at the center of the beach—for those at the edges will have to walk farther to buy ice cream than if

the two vendors were each located close to the center of each half of the beach. Moreover, more consumers may be aware of the ice cream vendors if they are spread out.

Lösch's Model

It was a concern with such complexities that led August Lösch to emphasize profit maximization in his locational analyses. Lösch (1967) worked to determine the locations manufacturing plants could choose to maximize profit. He added the spatial influence of consumer demand and production costs to his calculations. Determining the point of maximum profit is often difficult, but as Figure 12.7 suggests, firms will usually try to identify a zone in which some kind of profit can be expected. To the left and right of the zone, distance decay will make sales unprofitable. Firms will try to situate themselves away from the margins of that zone. However, other businesses can always come along and change the configuration of that zone—and this is one element that can easily cause a locational change in production in a capitalist system.

Major Industrial Regions of the World before 1950

Each of these models helps explain where industries are located, but before 1960, the main locational costs for industries were transportation of raw materials and shipping of finished products. Thus, the first manufacturing belts, regions of major manufacturing concentration, tended to be close to raw materials and accessible to transportation routes. Yet, at the global scale, several major areas of raw materials did not industrialize early. The world map of major regional-industrial development reveals that before 1950, only a small minority of countries were major industrial economies. Beyond raw materials, many factors help explain this pattern, including relative location, political circumstances, economic leadership, labor costs, and levels of education and training.

The four **primary industrial regions** that stand out on the world map are Western and Central Europe, Eastern North America, Russia and Ukraine, and Eastern Asia. Each of these regions consists of one or more core areas of industrial development with subsidiary clusters.

Western and Central Europe

The manufacturing regions of Western Europe are largely the regions that experienced industrialization between the late eighteenth and early twentieth centuries. From this region of Europe came the European Coal and Steel Community (ECSC), which served as the foundation of the European Union (see Chapter 8). Europe's principal coal deposits lie in a belt across northern France, Belgium, northcentral Germany, the northwestern Czech Republic, and southern Poland—and it was along this zone that industrialization expanded in mainland Europe. Colonial empires gave France, Britain, Belgium, and the Netherlands, and later Germany, access to the capital necessary to fuel industrialization and in some cases the raw materials necessary for production. Three manufacturing districts lay in Germany: the Rühr, based on the Westphalian coal field, the Saxony district, near the border of the former Czechoslovakia, and Silesia (now part of Poland). Germany still ranks among the world's leading producers of both coal and steel and remains Europe's leading industrial power (Table 12.1). By the early twentieth century, industry began to diffuse far from the original European hearth to such places as northern Italy (now one of Europe's major industrial regions), Catalonia (anchored by Barcelona) and northern Spain, southern Sweden, and southern Finland.

The Manufacturing Belts of Germany

The Rühr (in present-day Germany) became Europe's greatest industrial complex. Named after a small tributary of the Rhine River, the Rühr reveals the combined advantages of high-quality resources, good accessibility, and proximity to large markets. When local iron ore reserves became depleted, ores could be brought in from overseas. The Rühr was already undergoing industrialization in the closing decades of the nineteenth century, but by the 1930s the river basin had become one of the most important industrial regions in the world, pouring forth the products of heavy industry, including tanks and other weapons for Hitler's armies.

Saxony (also in present-day Germany), on the other hand, was always oriented toward specialized lighter manufactures. Anchored by Leipzig and Dresden, it became known for such products as optical equipment and cameras, refined textiles, and ceramics. Farther east, the

Figure 12.7
Economic Influences on Business Location. This diagram shows the connections among price, space, income and costs.

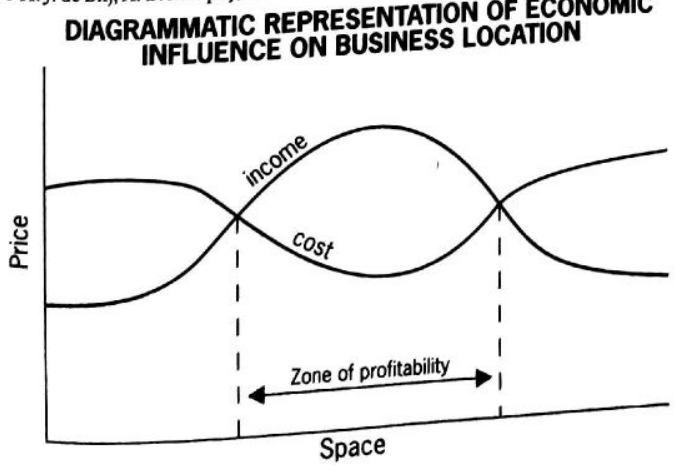


TABLE 12.1
Top Ten Crude Steel Producers.

TOP STEEL PRODUCING COUNTRIES OF THE WORLD, 2003

Country	Rank	Tonnage
China	1	220.1
Japan	2	110.5
United States	3	90.4
Russia	4	62.7
South Korea	5	46.3
Germany	6	44.8
Ukraine	7	36.9
India	8	31.8
Brazil	9	31.1
Italy	10	26.7
France	11	19.8
Taiwan	12	18.8
Turkey	13	18.3
Spain	14	16.5
Canada	15	15.9
Mexico	16	15.2
United Kingdom	17	13.3
Belgium	18	11.1
South Africa	19	9.5
Poland	20	9.1

Data from: International Iron and Steel Institute, "2004 Edition World Steel in Figures," *http://www.worldsteel.org/media/wsif/wsif2004.pdf*, last accessed October 2005.

industrial district of Silesia was originally part of Germany but now lies in Poland and extends into the Czech Republic (Fig. 12.8). The development of the Silesian district was based on high-quality coal resources and lesser iron ores that were later supplemented by imports from Ukraine.

The sophistication of European industry ensured that World War II would be the most destructive conflict ever fought, but the war ended up destroying much of the continent's industrial infrastructure in the process. This outcome created considerable challenges in the decade following the war, but from an industrial standpoint it was not altogether a minus. German industry had been reduced to rubble, but with American aid new factories sprang up that incorporated the latest technology. In time, such factories had a competitive edge over older industrial establishments in North America and less-hard-hit parts of Europe.

North America

By the beginning of the twentieth century, the only serious rival to Europe was a realm heavily settled by Europeans with particularly close links to Britain (and links to the capital and innovations that fueled industrialization there): North America. Manufacturing in North America began in New England as early as late colonial times, but the northeastern States are not especially rich in mineral resources.

North America benefited from the capacity of its companies to acquire needed raw materials from overseas sources. It did not need to go overseas for the raw materials to produce energy, however. Coal was the chief fuel for industries at the time, and there was never any threat of a coal shortage. U.S. coal reserves are among the world's largest and are widely distributed—from Appalachian Pennsylvania to the northwestern Great Plains (Fig. 12.9). The United States still vies with China as the world's largest coal producer.

The steel plants along the northeastern seaboard of the United States were built there largely because they used iron ore shipped from Venezuela, Labrador (Canada), Liberia, and other overseas sources. Instead of transferring the iron ore from oceangoing ships onto trains and transporting them inland, the plants used them right where they arrived—practically at the point of unloading at such huge steel-mill complexes as Sparrows Point, near Baltimore, and Fairless, near Philadelphia. So in this case distant ore deposits affected the location of industry in the United States.

In the decades after World War I, the United States emerged as the world's preeminent industrial power. Having escaped the destruction that World War I brought

Figure 12.8
Major Industrial Regions of Europe. This maps shows the major industrial districts of Europe. © H. J. de Blij, A. B. Murphy, E. H. Fouberg, and John Wiley & Sons, Inc.

to much of Western Europe, the United States capitalized on its newfound global political stature, its developed infrastructure, and its highly trained workforce to build an industrial economy that was second to none. The Great Depression that began in 1929 was an enormous setback, of course, but only in absolute terms. The effects of the depression were felt worldwide, and if anything, the United States came out of it with an expanded industrial dominance. That dominance grew even greater after World War II, when once again the United States avoided

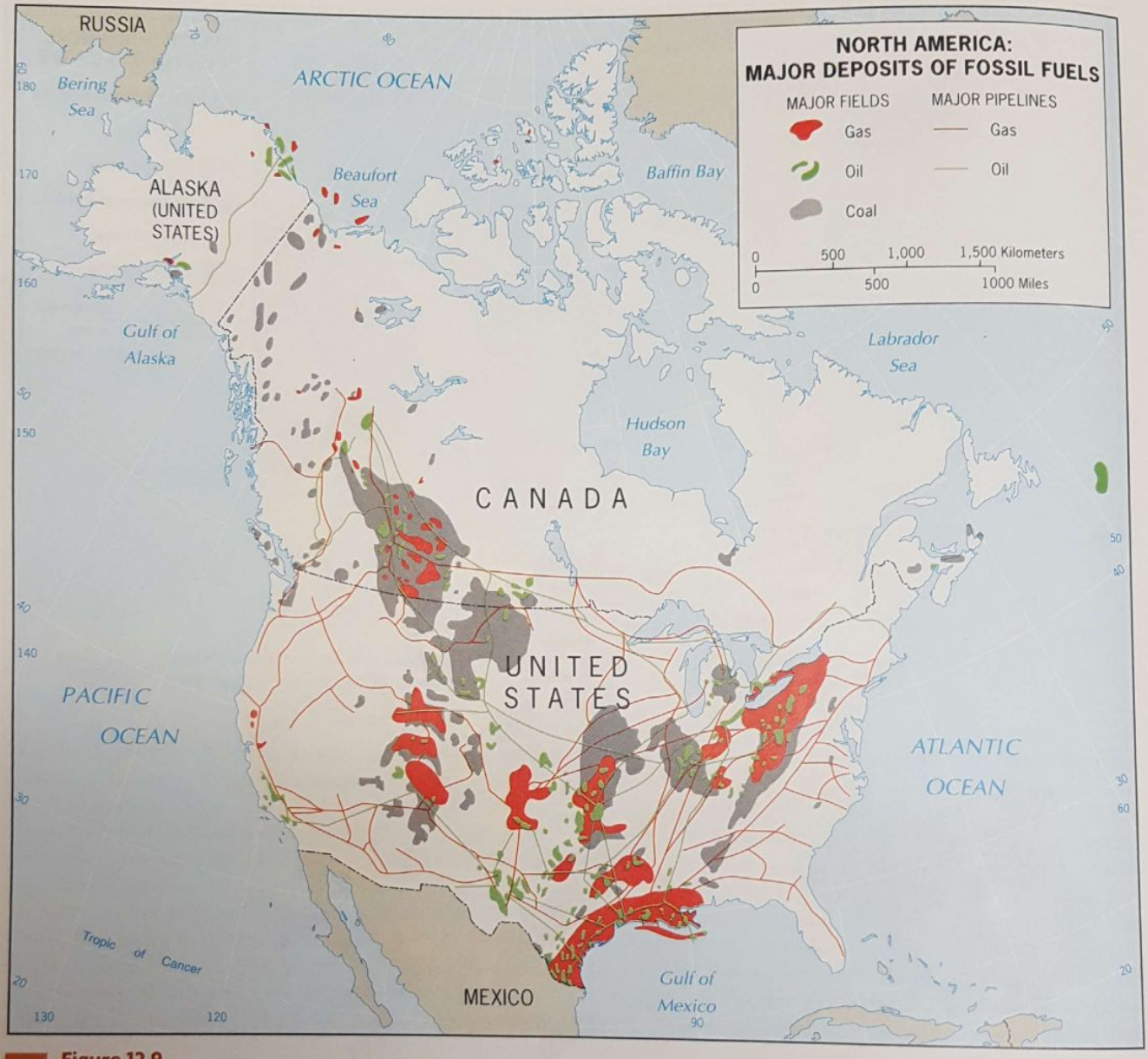


Figure 12.9

Major Deposits of Fossil Fuels in North America. North America is the world's largest energy consumer, and the realm is also endowed with substantial energy sources. © H. J. de Blij, A. B. Murphy, E. H. Fouberg, and John Wiley & Sons, Inc.

destruction within its own boundaries and yet received a major industrial boost from the wartime effort. Canada, too, was in a strong position, and a major American Manufacturing Belt emerged in the rectangular region shown in Figure 12.10.

The American Manufacturing Belt

The American Manufacturing Belt extends from the northeastern seaboard to Iowa and from the St. Lawrence Valley to the confluence of the Ohio and Mississippi rivers. At the belt's northeastern edge, the light industries of New England and New York give way to heavier manufacturing. Here lies the Southeast Pennsylvania district, centered on metropolitan Philadelphia and encompassing the Baltimore area. Throughout much of the twentieth century, iron ores were smelted right on the waterfront in tidewater steel mills. Major chemical industries (notably in northern Delaware), pharmaceutical industries, and lighter manufacturing plants were established there as well.

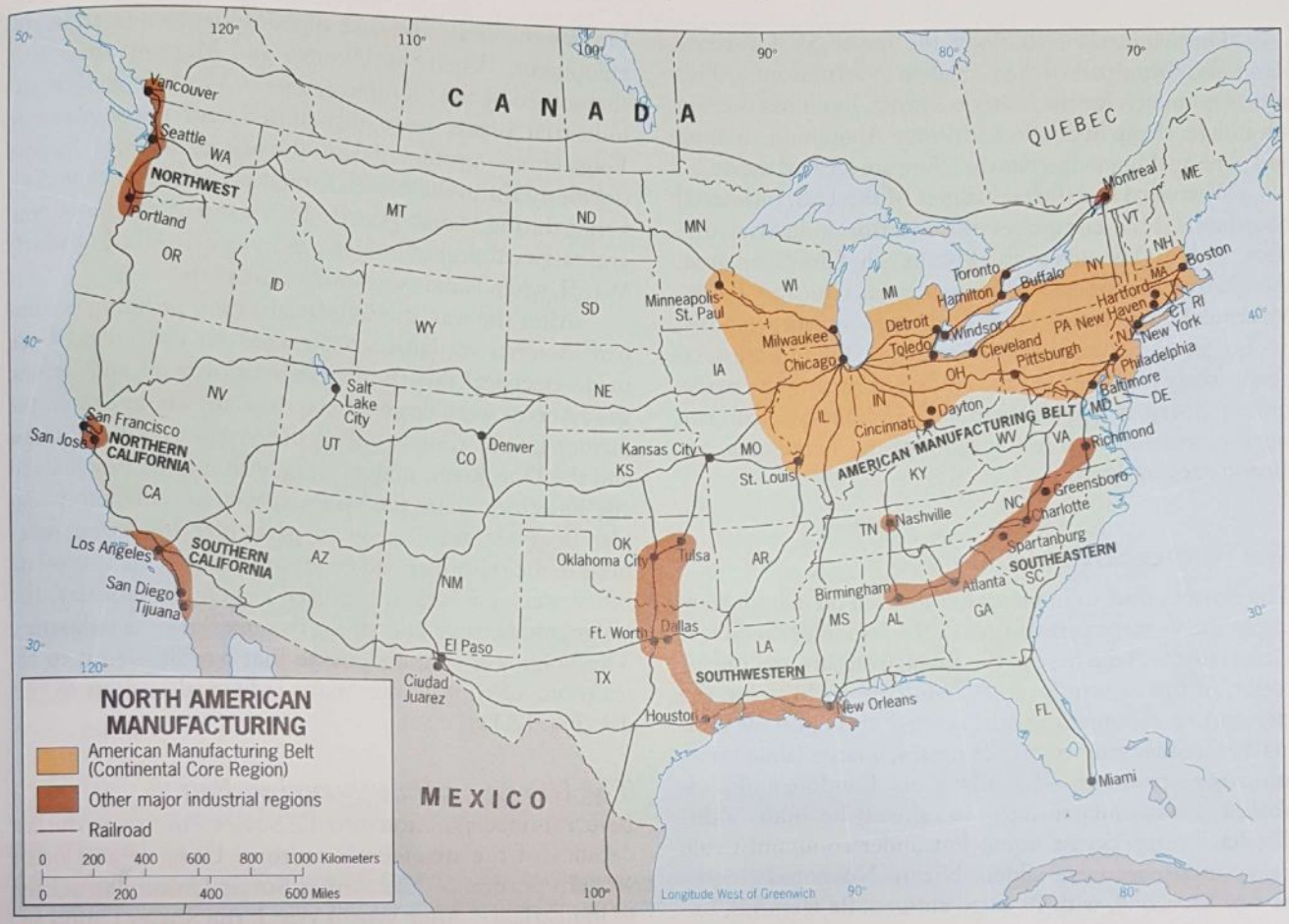


Figure 12.10

Major Manufacturing Regions of North America. North American manufacturing has dispersed westward and southward, but the eastern core area remains dominant.

Industrialization began early in New York, which today is at the heart of the American megalopolis and home to tens of thousands of industrial establishments. An early start, large urban growth and agglomeration played roles in this development. The New York area is not especially endowed with mineral resources but, like Paris and London, it is a large market. It also has a huge skilled and semiskilled labor force, is the focus of an intensive transport network, and has long been one of the world's great ports. The port serves as a major **break-of-bulk point**, where cargo is transported from one mode of transportation (for example, a ship) to another mode of transportation (truck or train). Such transfers generate employment, activity, and wealth.

Farther west lies the well-defined upstate New York district, extending from Albany, on the Hudson River, to Buffalo, on the shore of Lake Erie. Growth there was originally stimulated by the Erie Canal, which was dug in the early nineteenth century to connect the East Coast to the Great Lakes. During the mid-twentieth century, specialty manufactures developed in this region. Rochester came to be known for cameras and optical products, Schenectady for electrical appliances, and Buffalo for steel.

Canada's Southern Ontario district extends from the western end of Lake Ontario to the industrial zone at the western end of Lake Erie. As Figure 12.10 shows, this district links two parts of the U.S. Manufacturing Belt anchored by Buffalo and Detroit; the most direct route between these two industrial cities is through Ontario.

Canadian and U.S. manufacturing complexes meet in two great horseshoe-shaped zones around the western ends of Lakes Ontario and Erie. In the Northeast is a horseshoe-shaped cluster of industries, which curls from Oshawa through Toronto and Hamilton to Buffalo. Westward, around the western end of Lake Erie, is another horseshoe-shaped cluster of industries, which extends from Windsor in Ontario through Detroit and Toledo to Cleveland. The first of these zones is mainly Canadian, and the second is largely American.