The heart of every economy is industrial production, and the heart of economic geography lies in the spatial patterns and physical landscapes industry creates. Industry location may seem a limited province, at first. One starts off comfortably enough with the localization of different factories and sectors, such as steel mills and automobile plants, but all too quickly the division of labor outruns traditional notions of what constitutes an “industry” and the spatial division of labor disperses into a thousand pieces cast hither and yon—tire factories here, engine plants there, electronic ignitions and engineering plants somewhere else. These all have to be knitted together into discrete units called factories, offices, or design houses, and into much looser connections called farms, sectors, or networks. To make matters worse, these webs of production overlap and interconnect in surprising ways that can never be entirely untangled, and they stretch far and wide across boundaries and to the farthest reaches of the global economy. The modestly ambitious industrial geographer may pull on seven-league boots as we try to mark off the immense tapestry of localization and globalization woven by contemporary production and trade.

This immense geography of production is in constant motion, rendering most all fixed ideas about industry location patterns. Industrialization drives sectors and places along divergent paths of growth, and disrupts all established geographical habits. That divergence and instability is essential to the uneven development of the industrialized world. But movement alone does not capture the creative (and destructive) powers of modern industry. Successive industrial revolutions have built up the great cities, transport systems, and landscapes of production that surround us; industry does not locate in a known world so much as it produces the places it inhabits. This jagged process of industrial development repeatedly outruns prediction and liquidates the geographies of the past, generating the endless novelty that makes economic geography such a lively and challenging area of inquiry.

What is Industrial Production?

Production is making something. That something may be as rock solid as a car, a passing as a meal, or as shadowy as a program flickering on a TV screen. As th
world moves toward more information-rich forms of production and products, like computer software and video games, there are more products that come in small packages, like CDs, and fewer bulky objects like steel girders. But production is, in its case, an act of human labor; it involves work, pain, and simple. In one case there is a definite product, something you can kick with your foot, a good like a television set. In the other, there is only a change of condition, a labor service such as a pierced ear, clean floor, or plane ride to Jamaica.

In traditional usage, "industrial location" referred to manufacture, or the making of goods. There has been a tendency to be so restrictive that when manufacturing has dwindled down to one-fifth of employment, on average, in advanced industrial economies. We have to come to grips with the larger impact of modern industrial activity and its spatial distribution. Nonetheless, we all inhabit an industrial economy with the production of goods at its core. There is good deal of confusion on this point because official censuses call almost every-

ting today a service.

A great many things called services are, in fact, work on goods. Some kinds of goods take unusual forms, like French fliers to go downstream, skyscrapers, or the oars cutting out the top. Some come in modern physical carriers with lots of critical information, like newspapers or software disks. Some very large goods are used by many people through lease and rental arrangements, as with hotels, airplanes, and planes. Long-lived goods require repeated maintenance and repair, which is why there are so many auto shops, janitors, and house-painters (Sayer and Walker, 1992). Nor should one forget the important areas of agriculture and resource extraction, on which no longer take up much of the workforce in the advanced industrial states but that most of the characteristics of modern economies (Hamilik, this volume). There are the crucial functions of distribution and sale of all goods that involve extensive distribution networks of warehouses and cons. Together, all such labor involved in the production, distribution, and reproduction of goods of every kind more than doubles the usual estimates of manufacturing, bringing the total employment in basic industry up to well over half the "core sector. Most of the remainder is taken up by three major labor-using industries: health care, education, and personal service. Their output unquestionably forms the core of services, not goods. Wherever city segments these segments of goods and services production fall under, are organized as regional centers, ask any Las Vegas ma-ter" in the "hotel industry" or Miami janitor if he works in the "cleaning industry." All such industries play a role in shaping the landscape of modern cities and regions, whether the factory district of Kansas City, the malls surrounding Indianapolis, the hotels of Cancun, or the sea of warehouses around O'Hare Air- port. They are all a part of modern economic geography, even if its heart remains manufacturing, from Manchester to Silicon Valley (Daniels, 1993).

In saying that production is an act of human labor, we mean that people are really involved in organizing, orchestrating, and carrying out the tasks of modern industry. This means that securing a labor force is a prime task of any industrial location, and critical to its locational calculus. First, most recruit labor either by advertising in the neighborhood or by attracting them from long distances. This matching of labor supply and demand is a basic process for geographic.
While management, research, and design used to be part of the internal division of labor within the large firms, these functions have spilled out into the open market. This has led to rapid growth in enterprises and employment in the "business services" sector. Corporations have long sought outside help, of course; advertising has traditionally been an independent sector centered on New York's Madison Avenue. But all this has vastly expanded. Today, managerial functions are commonly turned over to consultants such as McKinsey & Company, engineering firms such as Bechtel provide technical design input, telecommunication companies handle phone sales, billing companies take care of consumer accounts, leasing companies supply office furniture, and food service firms staff the lunchrooms (on "financial services," see Leyshon, this volume).

Headquarters, R&D, and business services each have their own geographical credentials, and these have become a staple of economic geography (Daniels, 1992). Corporate managers and their high-level advisors cluster in prestigious locales, traditionally in major urban centers like New York. More recently, many have decamped to suburban suburbs, especially when not too far from the airports or on the edge of big cities. But they are likely to consign their accessory workers to back offices in distant suburbs or cities, like the billing offices of Chevron in the outer reaches of the San Francisco Bay Area.

**Sites of Production: Factories and Other Workplaces**

In conjuring up an image of industrial production, most people think of the factory, which has been virtually synonymous with industrialization for most of the last two centuries. Factories are a highly visible and striking part of the landscape of industrialized countries, so shocking to early observers that they earned William Blake's epithet "dark satanic mills." But why do factories exist at all? We take them for granted, little considering that they are a way of coping with the division of labor and organizing industrial work.

Factories were a spectacularly successful innovation in business organization, crucial to the success of the industrial revolution and long predating the modern corporation. The factory is a way of organizing social labor by bringing together many workers and tasks in one place, rationalizing the allocation of work and materials over a limited space, allowing close oversight of workers by bosses, and laying machinery from a single power source (Nelson, 1993). Factories soon grew to embrace the whole factory site, and even the whole factory cluster, of several tens of thousands, and even of millions, of workers. Large factories include so much of the relevant social labor that they are more independent of linkages to other workplaces or smaller facilities. They have, however, tended to disperse toward the edges of cities or into rural sites where they dominate the landscape (Scott 1982). Pittsburgh's many steel mills spread out like stars in a spiral galaxy. Yet large factories often obscure the vital role of smaller workshops and plants in many industries, which have long clustered in industrial districts embedded in large and small cities (Schantz, 1997). Most such districts are ich combinations of large and small facilities, as in Silicon Valley today.

The most striking workplace of the twentieth century has been the office building, particularly the skyscraper. Offices are like factories in that they bring together large numbers of workers doing related tasks under direct supervision, with the provision of suitable equipment, from desks to photocopy machines. But the occupations are different, "white collar" versus "blue collar," because the work is different: management design, or marketing, not the hands-on labor of manufacturing. From humble beginnings off to the side of factories, they were set off on their own and driven ever skyward as they clustered together in the centers of big cities. The visual impact of the skyscraper at the turn of the twentieth century was as great as that of the satanic mills of a century before (Markus, 1993). But, like factories, many offices have shifted toward suburban office parks.

There are many kinds of workplaces besides factories and offices. Hotels, restaurant, airports, convention centers, and warehouses are common workplaces, and often as large as the biggest factories (Las Vegas hotels run to over 5,000 workers). Some workplaces are single open-air locales, like wheat fields, golf courses, and building sites. Others are extensive: cable networks, highway systems, or gas lines. Some workplaces are inside moving machines, such as ships and airplanes. Some workers move about from one designated site to another, as in theatre or musical performances. And some roam freely, as in the case of truck-drivers or mail deliverers. Many sales representatives, designers, engineers, and repairers, not to mention gardeners and janitors, work in someone else's workplace instead of their own employer.

The workplace is an essential building block in the organization of industrial production, and the invention of more effective workplaces is an important part of the evolution of business and management (Sayer and Walker, 1992). Workplace form has been neglected in contemporary industrial geography, which focuses on markets, firms, and networks. Yet it has been a key term under such names as "plante" or "establishment" in the lexicon of economic geographers going back to Weber. Part of the logic of workplaces is dictated by technical considerations that give rise to economies of scale and scope in the shared use of machinery, bring together a set of tasks under one roof, or drive power lines across hill and dale. But the social component in deciding workplace function, boundaries, scale, and location is sizeable. The early factory, with its high walls and clock tower, was a strict reminder of the new industrial order. Office towers and urban skyscrapers are equally bold statements about the power of business. But the kind of megalomania entailed in Henry Ford's River Rouge plant, which did everything from make steel to assemble Model A's, is rarer today. The importance of the large factory as a business strategy has been diminishing for the last half century, in favor of more dispersed, flexible, and externalized forms of organization (Noble, 1986; Nelson, 1993).

**The Location of Firms and Corporate Geography**

The other major "container" for production is the firm, and firms are key players in the geography of industry. We take the firm for granted, but the modern firm evolved in tandem with capitalism and the industrial revolution. The big advances in the nineteenth century were "limited liability" (which kept failed businessmen out of debtor's prison), pool stock holding (which made large investments by
(996) Through the 1990s, the number of green card (permanent) arrivals entering the country for work purposes increased considerably. This growth was driven by several factors, including economic expansion, changes in immigration policy, and increased demand for skilled labor.

The green card process involves several steps:

1. The individual applies for an employment-based visa through the U.S. Department of Labor (DOL) by filing a Labor Certificate (Labor Certification).
2. If the Labor Certificate is approved, the individual applies to U.S. Citizenship and Immigration Services (USCIS) to begin the adjustment of status process.
3. During the adjustment of status process, the individual demonstrates eligibility for permanent residence.
4. After approval, the individual becomes a permanent resident and eventually a U.S. citizen if they meet the required criteria.

The green card process is complex and requires significant documentation and preparation. Assistance from legal experts or immigration service providers may be beneficial to navigate the process effectively.
Often forgotten, however, is the power of production at the workplace or industrial district. If a locale is to have global reach, it must be able to serve an immense number of customers, which requires a high level of productivity (and acceptance of mass-produced goods), as in textile manufacture. Or, local producers must offer a specific but widely desired product (technically sophisticated or fashionably)--such as machines to each silicon wafer from Applied Materials in Silicon Valley. In addition, large multinational corporations have been major carriers of investment and industry across national boundaries, helping to expand the industrialized world by leaps and bounds. In so doing, they imprint their internal hierarchies of labor and management on the global arena.

Most big industries operate a variety of territorial scales, from the local to the global (Storper, 1997; Scott, 1998). This can make their worldwide locational patterns seem "all over the place," and it takes closer analysis to reveal a geography of large and small clusters, networks of linkages between nodes, and sub-specialization and hierarchy. Aircraft, for instance, have a global geography that includes not only focal points such as Boeing in Seattle, but complementary firms in Los Angeles, electronics in Orange County and Silicon Valley, assembly in Alabama and Missouri, jet engines in Connecticut, or in Europe (around Toulouse, in southwest England, Silicon Glen, southern Germany, and central Italy [cf. Dedrick and Krueger, 1994]).

A different geography prevails where products don't travel well. Manufactured goods are often contrasted with so-called services in this regard. Yet some services, like finance, consulting, and tourism, travel quite well. Conversely, some basic activities, such as retailing, electric power, and prepared foods, are relatively immobile. Such local-sensing industries tend not to have a strong spatial division of labor; rather, they are replicated from locale to locale. A way around this limit to size is to locate, either by regionalizing firms (as in paint manufacturing) or creating a chain of identical facilities from place to place (as in fast foods). A labor contrast is often set up between localized and globalized industries, when Taco Bell, for example, can be both.

There are, of course, boundaries that limit the flow of goods and services, not to mention labor and capital. Industrial production systems are not all internationalized, much less globalized. They still flourish within certain bounded areas. National borders are the most obvious of these bounded spaces. Modern economic development cannot be understood apart from the emergence of nation-states since the eighteenth century (O pushwaem, 1990). Consolidation of national markets and trade barriers has confined many industries within national boundaries, with distinctive patterns of production, business organization, labor relations, and consumer preferences (Chandler, 1990; Renssacks, 1994). For example, almost all large industrialized nations have their own automobiles, garment, and machine-tool industries. They also have their own favorite specialties and competitive advantages that continue even as trade barriers break down, from fashion shoes from Italy to modernist wood furniture from Scandinavia, based in long-nurtured national skills, well honed tastes, or government favoritism (Beza, 1990; Porter, 1990; Walton, 1992). The reported death of the nation-state has been greatly exaggerated.

One of the most striking shifts in global geography has been the independence of newly industrialized countries. This is particularly true of East Asia's amazing rise to near parity with North America and Europe over the last fifty years. First Japan, then the "Four Tigers" (Taiwan, Korea, Hong Kong, and Singapore), and now China and Southeast Asia have industrialized at a breakneck pace (Amsden, 1989; Wade, 1990; Tabb, 1995). Their expansion has depended less on foreign direct investment than on high rates of internal saving and investment, under hostile conditions forged by strong national states (Wade and Veneroso, 1998). They have often specialized in labor-intensive and technically sophisticated products, dramatically altering the global pattern of industries like toys and garments in the process. This pattern depends a little on corporate hierarchies, to some extent on technical change [see below], and mostly on international differences in skills and wages (Webb, this volume).

Rising productivity in these places creates new patterns of international trade and takes a competitive toll on many industries in the advanced capitalist nations (Walker, 1999). This has forced a reconsideration of the dynamics of international competitiveness. Students of comparative development, such as Michael Porter (1990) and Peter Evans (1995), have come to realize how much of the "competitive advantage" of one country over another is not due to pre-given conditions, but to the way that labor productivity, product quality, and business capability can be improved through innovation, education, state assistance, and industrial strategy (Sheppard, this volume).

Another limit to globalization is the embrace of the three great continental trading blocs of the developed world, which have been growing faster than the global economy. The European Union (EU) is the leading example, followed by the North American Free Trade Agreement (NAFTA) and the East Asian space. There has been a dramatic shift in Europe toward production for the EU and away from national markets, accompanied by increased competition and consolidation across national borders, whereas trade beyond the bloc has diminished (Urwin, 1995). The North American Free Trade Alliance consolidates American economic integration under US domination; here, too, Canada, the USA and Mexico are each other's largest trading partners (Urqu, 1996). The countries of the East Asian region lack an equivalent to the EU and NAFTA, but Japan's overseas investment has fueled explosive growth in Southeast Asia, while investment from Hong Kong and Taiwan has done the same for China (Hong, 1998; Brenner, 1998).

Industrialization: The Rising Tide of Production and Technology

The idea of a spatial division of labor is a powerful one, but remains static. Economic geographers must capture the restless dynamism of modern industry. The great flaw in classical location theory is the belief that one already knows beforehand what industry looks like, and that industrial location consists of finding the best location for a known product and technique of production. Location, in this view, is like arranging furniture. One is searching for the optimal (least cost, highest profit) assignment of chairs and sofas, given the shape of the rooms. Once that arrangement is found, the furnishings are said to be at equilibrium. Location theory becomes a sort of economic feng shui, putting things in harmony with the gods of commerce.
This mirrors the dynamism of industrialisation and industrial geography. As eco-
nomic geographers discovered in the 1980s, industrial restructuring repeatedly
breaks up the furniture in one corner of the house while adding new pieces in another.
Accepting this, we can move into a more detailed analysis of the economy along
with the landscape. One has to rethink fundamentals, reject equilibrium and optimization
analysis, and go back to classical political economy with its emphasis on the sources
of growth and development (Sturtevant, 1977; see also Pollard, 1968; Beniger, 1986). This view
of "technological innovation" seems to have taken the stage in recent years. A new term for
this "massive innovation" in the 1980s is the "high tech" phenomenon. This term is
sometimes coined for the leading edge of technology in our times, including such things as electronics,
genes, and aerodynamics. But the age of High Tech is not something new. These and
spinning mills were part of the early nineteenth century, slaughterhouses
and steel furnaces are wonders of the late nineteenth century, and electricity and
chemicals the breakthrough domains of the early twentieth century. The Industrial
Revolution is not a single event, but an upheaval that still goes on today (Landes,
1975; Mickey, 1990; Purcell, 1995).

Industrialisation is, first, a process of improving production methods, raising the
productivity of labor and other inputs. Such improvements include the use of better
tools, rationalization of tasks, application of machinery, automatic control of
machines, moving assembly lines, saving on materials, and so on. The rise of produc-
tivity means falling costs per unit of output, which translates on the consumer side into
decreasing prices. This in turn, brings more customers into the market and sharpens competition between best practice and lagging producers (Higgie, this volume).

Just as important are improvements to products and the creation of entirely new
goods and services. From early on in the Industrial Revolution factories have sent
forth a stream of commodities that never existed before, such as the locomotive, the
metal-cutting lathe, or airship dyn. That stream has become a veritable Mississippi
of invention, making product proliferation an essential strategy of every industry
from soft-drinks to software (now called "niche marketing"). Moreover, one of the
clearest lessons of the new global cooperation has been the importance of quality
control, design, and performance of an industrial territory (Warf, 1997; Bielecki,
1997).

Changes in technology alter the input mix of manufacturers, which changes their
locational calculus (in the terms of Weber). Improvements in meat-packing, for
example, shifted the production of beef from the East Coast bouchers to Chicago's industrial
packers at the turn of the last century. At the same time, shifts in competitive
advantage and market share of firms and workplaces due to production advances
will rearrange the geographic patterns of industry. The industrial chicken industry, for
example, made the poultry districts of the South into major agribusiness centers (Boyd and
Watts, 1997; Page, this volume). Finally, wholly original products give rise to new
sectors of industry. The invention of the movies camera made a motion picture
industry possible, leading to Hollywood, while a shift from mini- to micro-com-
puters in the 1980s favored Silicon Valley over Boston's Route 128 electronics
complex (Saxenian, 1994).
Uneven Development: Many Paths of Industrialization

Industrialization does not proceed evenly across the whole front of the division of labor or the whole world of industrial places, despite the rapid circulation and diffusion of new ideas. Different industrial sectors and segments have their peculiar conditions of production to cope with, including the nature of the product, type of demand, level of competition, and labor traditions. The result is that the same abstract forces compelling technical change are applied differently from one sphere to another (Stooper and Walker, 1989).

Thus, only some kinds of industries are fruitful areas of mass (quantity) production, while others work in batches, sometimes by special order. Cars can be made en masse, but work stations are made in large batches, and specialized machinery for steel mills must be crafted on a custom basis. Big mass production factories tend to locate in more traditional places than batch and custom workplaces, where unstandardized inputs, skilled labor, and continual interaction with customers and suppliers are the rule. The latter types of production generate strong agglomeration economies, as pointed out by observers of industrial districts (Scott, 1988a; Amin, this volume). Custom and batch production have also generated some of the most dramatic innovations of our time (Saunmian, 1994; Sczumon, 1997), while many producers have backed off from the flood of steel volume in favor of a more careful coordination of supply with demand along the whole chain of production.

Different industries follow their own peculiar paths of industrialization. Most elementally, every sector has a sort of "technological backbone" that aligns the body of work around certain characteristics. Agriculture, for example, has never been assimilated into theories of automation based on manufacture, and health care does not conform well to conventional theses about mechanization. Ideas derived from automotive assembly do not carry over well to pharmaceuticals or textiles, where products and methods of production are so different. This means that sectorial studies are essential to economic geography and that abstracting from many sectors, rather than generalizing from only a few, is the only way to grasp the essential tendencies of geographical industrialization (Stooper and Walker, 1989: Page, this volume).

Beyond the technical spine of industrialization lies the "soft body" of social development, which is anything but formless. One of most exciting ideas in contemporary economic geography is that industrial history is literally embodied in the present. That is, choices made in the past—technology embodied in machinery and product design, farm access gained by patents or specific competencies, or labor skills acquired through learning—influence subsequent choices of methods, designs, and practices. This is usually called "path dependence" or "industrial trajectories" (Scott, 1988a; 1984). It does not mean a rigid sequence determined by technology and the past, but a road map in which an established direction leads more easily one way than another—and wholesale reversals are difficult. This logic applies to industrial location, as well as a Silicon Valley, once established, takes a life of its own, driving the electronics industry and building on the accumulated advantages of the past (Saunmian, 1994).

Technical and institutional practices of industry vary across regions, countries, and continents, as well as sectors. Economic geographers no longer make simple assumptions about the homogenity of capitalism and industrialism, or a common trajectory for all industrialization. Japanese industry is not a replicant of American industry, which did not replicate British industry. When Japanese managers applied the lessons of American Fordism to their situation, they came up with a new hybrid, "Toyotaism," and when American car companies tried to learn from the Japanese, in turn, they came up with an altered system of "lean production" (Scherberger, 1982; Womack et al., 1990).

One can therefore speak of "national systems of innovation," "national patterns of business organization," and even "national capitalism" because habits and styles of industrialization diverge between countries (Freeman, 1993). There are also substantial regional variations in technologies and industrial practices within supposedly homogeneous countries such as Canada and the United States (Rugby, this volume), and continental scale differences, as in comparing North American labor markets (flexible base and high, high employment wages; low entry wages; while those in Europe (greater job security, high entry wages, low unemployment) (Freeman, 1994). The same may be said of the contrast between East Asian state development and American liberalization with its dread of state intervention (Wade, 1990).

The Production of Place and New Industrial Spaces

Recent upheavals in the world economy and its geography have forced geographers to come up with a more forceful way of imagining how the industrial map has been put together over time. In a dynamic world, production is not just the production of goods and services; industrialization is the production of industry itself and of the industrial world. Before the Industrial Revolution there were no corporations, no factories, no captains of industry, no high tech; there was nothing to locate. The whole apparatus of industrial production had to be created out of whole cloth, and with it the landscape of modern industry.

The act of industrial creation has not been once-and-for-all but a thing repeated over and over—industrialization itself. Before the invention of open-hearth furnaces, there was hardly a steel industry and no Ruhr Valley metals complex. Before the internal combustion engine, there was only a small oil industry, and no Houston petroleum equipment and refining district. Before the automobile, no Detroit or Coventry. Today's economic geographers may delve into the secrets of Silicon Valley, or product design, farm access gained as patents or specific competencies, or labor skills acquired through learning—influence subsequent choices of methods, designs, and practices. This is usually called "path dependence" or "industrial trajectories" (Scott, 1988a; 1984). It does not mean a rigid sequence determined by technology and the past, but a road map in which an established direction leads more easily one way than another—and wholesale reversals are difficult. This logic applies to industrial location, as well as a Silicon Valley, once established, takes a life of its own, driving the electronics industry and building on the accumulated advantages of the past (Saunmian, 1994).

Technical and institutional practices of industry vary across regions, countries, and continents, as well as sectors. Economic geographers no longer make simple assumptions about the homogenity of capitalism and industrialism, or a common trajectory for all industrialization. Japanese industry is not a replicant of American industry, which did not replicate British industry. When Japanese managers applied the lessons of American Fordism to their situation, they came up with a new hybrid, "Toyotaism," and when American car companies tried to learn from the Japanese, in turn, they came up with an altered system of "lean production" (Scherberger, 1982; Womack et al., 1990).

One can therefore speak of "national systems of innovation," "national patterns of business organization," and even "national capitalism" because habits and styles of industrialization diverge between countries (Freeman, 1993). There are also substantial regional variations in technologies and industrial practices within supposedly homogeneous countries such as Canada and the United States (Rugby, this volume), and continental scale differences, as in comparing North American labor markets (flexible base and high, high employment wages; low entry wages; while those in Europe (greater job security, high entry wages, low unemployment) (Freeman, 1994). The same may be said of the contrast between East Asian state development and American liberalization with its dread of state intervention (Wade, 1990).

Recent upheavals in the world economy and its geography have forced geographers to come up with a more forceful way of imagining how the industrial map has been put together over time. In a dynamic world, production is not just the production of goods and services; industrialization is the production of industry itself and of the industrial world. Before the Industrial Revolution there were no corporations, no factories, no captains of industry, no high tech; there was nothing to locate. The whole apparatus of industrial production had to be created out of whole cloth, and with it the landscape of modern industry.

The act of industrial creation has not been once-and-for-all but a thing repeated over and over—industrialization itself. Before the invention of open-hearth furnaces, there was hardly a steel industry and no Ruhr Valley metals complex. Before the internal combustion engine, there was only a small oil industry, and no Houston petroleum equipment and refining district. Before the automobile, no Detroit or Coventry. Today's economic geographers may delve into the secrets of Silicon Valley, or product design, farm access gained as patents or specific competencies, or labor skills acquired through learning—influence subsequent choices of methods, designs, and practices. This is usually called "path dependence" or "industrial trajectories" (Scott, 1988a; 1984). It does not mean a rigid sequence determined by technology and the past, but a road map in which an established direction leads more easily one way than another—and wholesale reversals are difficult. This logic applies to industrial location, as well as a Silicon Valley, once established, takes a life of its own, driving the electronics industry and building on the accumulated advantages of the past (Saunmian, 1994).

Technical and institutional practices of industry vary across regions, countries, and continents, as well as sectors. Economic geographers no longer make simple assumptions about the homogenity of capitalism and industrialism, or a common trajectory for all industrialization. Japanese industry is not a replicant of American industry, which did not replicate British industry. When Japanese managers applied the lessons of American Fordism to their situation, they came up with a new hybrid, "Toyotaism," and when American car companies tried to learn from the Japanese, in turn, they came up with an altered system of "lean production" (Scherberger, 1982; Womack et al., 1990).

One can therefore speak of "national systems of innovation," "national patterns of business organization," and even "national capitalism" because habits and styles of industrialization diverge between countries (Freeman, 1993). There are also substantial regional variations in technologies and industrial practices within supposedly homogeneous countries such as Canada and the United States (Rugby, this volume), and continental scale differences, as in comparing North American labor markets (flexible base and high, high employment wages; low entry wages; while those in Europe (greater job security, high entry wages, low unemployment) (Freeman, 1994). The same may be said of the contrast between East Asian state development and American liberalization with its dread of state intervention (Wade, 1990).

Recent upheavals in the world economy and its geography have forced geographers to come up with a more forceful way of imagining how the industrial map has been put together over time. In a dynamic world, production is not just the production of goods and services; industrialization is the production of industry itself and of the industrial world. Before the Industrial Revolution there were no corporations, no factories, no captains of industry, no high tech; there was nothing to locate. The whole apparatus of industrial production had to be created out of whole cloth, and with it the landscape of modern industry.

The act of industrial creation has not been once-and-for-all but a thing repeated over and over—industrialization itself. Before the invention of open-hearth furnaces, there was hardly a steel industry and no Ruhr Valley metals complex. Before the internal combustion engine, there was only a small oil industry, and no Houston petroleum equipment and refining district. Before the automobile, no Detroit or Coventry. Today's economic geographers may delve into the secrets of Silicon Valley, or product design, farm access gained as patents or specific competencies, or labor skills acquired through learning—influence subsequent choices of methods, designs, and practices. This is usually called "path dependence" or "industrial trajectories" (Scott, 1988a; 1984). It does not mean a rigid sequence determined by technology and the past, but a road map in which an established direction leads more easily one way than another—and wholesale reversals are difficult. This logic applies to industrial location, as well as a Silicon Valley, once established, takes a life of its own, driving the electronics industry and building on the accumulated advantages of the past (Saunmian, 1994).
economies give a new twist to the theory of industrialization, which has traditionally focused in rationalization and mechanization within the factory. But the power of the district lies in the way the place produces more of itself (Scott, 1988a).

This "production of place" contains something even more general and powerful than external economies and entrepreneurial start-ups. It means the creation of whole urban landscapes, from the factories to the houses of the workers, from the infrastructure to the commercial life of cities. It begins with capital investments, building workshops and installing machines. It grows as the workforce and capital expand and proliferate. It draws in new migrants, who in turn support a mass of secondary industries and ancillary activities. It pays taxes to governments which build supporting institutions, in dense bureaucracies. It generates profits to support further investment, in an upward spiral (Stoeper and Walker, 1949).

Large urban agglomerations like Tokyo mix a variety of industries that make metropolitan economies another more than a set of industrial districts, and send the scale of modern cities -- of the cities with each passing generation (the largest are now on the order of 25 million people) (Tabb, 1995a; Hall, 1998). Industrialization has, in time, built up the entire modern urban system of advanced capitalist countries and the great production heartlands of the English Midlands, the Midwest, the Rhine, or Lombardia. Very simply, it has created the industrial world as we know it.

Industrialization does not unravel in wonder like a red carpet to the future, however. It jams and junks and explodes from one epoch to another, one place to another. New factories open up, while others close down. New firms rise like the phoenix, while others go bankrupt. Entirely new industries, never before imagined, march across the face of the earth sowing up outposts like the Assyrians of old, beheaded in silicon and gold. Newly industrialized countries sprout on the margins of the world. One of the most important topics of investigation in economic geography is the development of "new industrial spaces" -- the impact craters of the interior showers of industrialization (Scott, 1988b).

These spaces open up in the course of every sector's evolution. Industries normally relocate and rebuild several times over the long term. Steel in the USA began as iron-making in the ferrous bogs of New Jersey in the seventeenth century, then shifted west in the eighteenth century to eastern Pennsylvania's iron deposits and woods where charcoal could be made. Which coal began to be produced with coal in the nineteenth century, the industry clustered around the anthracite regions. But with the shift to bituminous coal and Bessemer furnaces after the Civil War, Pitts- burgh became the transcontinental steel center. That pattern was altered as the iron deposits of Lake Superior came into use and the Midwest's agricultural demand for steel grew from the Heart of the Great Lakes in the twentieth century. The sharp decline of American steel in the 1980s left the playing field open to a wave of Japanese and Korean mills in new sites across the Midwest.

New industrial spaces are not confined to the expansion of single industries. Industrialization periodically hurks huge new landscapes onto the map, as can be seen in the expansion of industrial Europe outward from Britain in the nineteenth century (Pollard, 1981), or in today's "Edge City" developments of north D.C., the Frangellie arc of southern Paris, and Orange County, California (Scott, 1992b; Garreau, 1991). They can reconfigure the geography of nations with remarkable speed. Mexico, for example, has been turned upside down geographically twice in the last half century: the tornado of Mexican cities in millions of people during the national industrialization era of the 1940s to 1960s; then came border indus- trialization under US auspices that put the North back atop Mexican development (Coury, 1998). The way vigorous national economies enter the global scene is another case of new industrial spaces, as seen in places like Italy, Thailand, and Brazil. Indeed, the whole continental zone of East Asia swept onto the field of play of the industrialized world in our time, in the same way North America rose to challenge Europe a century before.

Nor should we forget the virtual deindustrialization of the former Soviet Union. One should never imagine that the unstable and uneven development of indus- trialization only moves in one direction, the upward curve of progress. Deindustrial- izaition, which since the northern cities of the USA, Britain, and France with such ferocity from the 1750s to the 1990s, is the drowning face of the geography of capitalism (Bluestone and Harrison, 1982). This has been a repeated threat since the dawn of industrial revolution, as can be seen in the ruins of the once-glorious iron district of Shropshire or the silk-weaving region of Lyon.

Conclusion

Our tour of the geography of production has no real conclusion. The restless hand of industry writes and then moves on, and the book of industrial revolutions has yet to be closed. Thus, economic geography is not a stale field of study, but partakes of the most startling developments of political economy. It forces history upon a reluctant social science and futurism upon recalculating historians. And it demands spatial imagination and a geographical turn of mind among every economist, technologist, or sociologist studying capitalism and the immense powers of production it has unleashed. As Marx and Engels (1844) put it eloquently in the year of the California Gold Rush, "All that is solid melts into air."

Bibliography


