and the Catholic Church as much as he did his American ex-wife, whom he had followed by a detective, jailed, and deported. In 1907, he sent troops to crush a determined strike by small property owners and vineyard laborers in the south.

In 1911, Radical Premier Joseph Caillaux (1863–1944), unlike Clemenceau, sought accommodation with Germany. The French Socialist Party launched a campaign against militarism and particularly against the extension of the term of military service from two to three years. Antimilitarism remained popular among workers because of the role of troops in the repression of strikes. But the Second Moroccan Crisis between Germany and France that same year (see Chapter 22) gave rise to another wave of nationalism. Besieged by the press for his pacific stand, Caillaux's government fell the following year. Raymond Poincaré (1860–1934), an outspoken nationalist, became premier in 1912 and then president a year later. He eagerly anticipated the chance to win back Alsace and Lorraine, and he firmed up French support of a Russian role in the Balkans. Poincaré's nationalism seemed in tune with the times.

Conclusion

The second half of the nineteenth century brought about significant political change to the three European powers that had been the strongest at mid-century. In Britain, the second Reform Bill of 1867 expanded the electoral franchise, and another law in 1884 followed suit. After the collapse of the Second Empire in 1870 and the Paris Commune the following year, France emerged as a republic. In Russia, Tsar Alexander II's emancipation of the serfs in 1861 did not change the fundamental institutions of autocracy. Yet some reforms did follow, even as critics of the tsarist state grew more vocal, and the Revolution of 1905 challenged the foundations of autocracy. In the meantime, Britain's economic strength and great navy left it in a position to dominate international affairs. Having defeated Austria and then France, Prussia emerged as the leader of a unified and powerful Germany, dominant in Central Europe. At the same time, the Second Industrial Revolution brought remarkable technological advances, increased mass production, and ever larger cities now bathed in electric light.

CHAPTER 19

RAPID INDUSTRIALIZATION AND ITS CHALLENGES, 1870–1914

Jeanne Bouvier was a peasant girl born in 1865 in southeastern France. Her father earned his living by tilling the fields and as a barrel maker, an occupation closely tied to wine production. But in 1876, disease began to destroy the vineyards of the Rhône River Valley. Jeanne's family was forced to sell its land and possessions and travel to find work, pushed along by poverty and unemployment. From age eleven to fourteen, Jeanne worked thirteen hours a day in a silk mill. Four other jobs in various towns and villages in her region followed until Jeanne's mother took her to Paris, where the first job she found lasted only a week. Like so many other single, female migrants to city life, she then worked as a domestic servant. A cousin showed her how to do hat-trimming work. When that trade collapsed because of changes in style and the economic depression, she became a skilled dressmaker in a Parisian workshop and then developed her own clientele. Jeanne Bouvier became a Parisian. When she returned home to her native village, Jeanne spoke French, and not the patois in which her old friends conversed. She had become an urban woman.

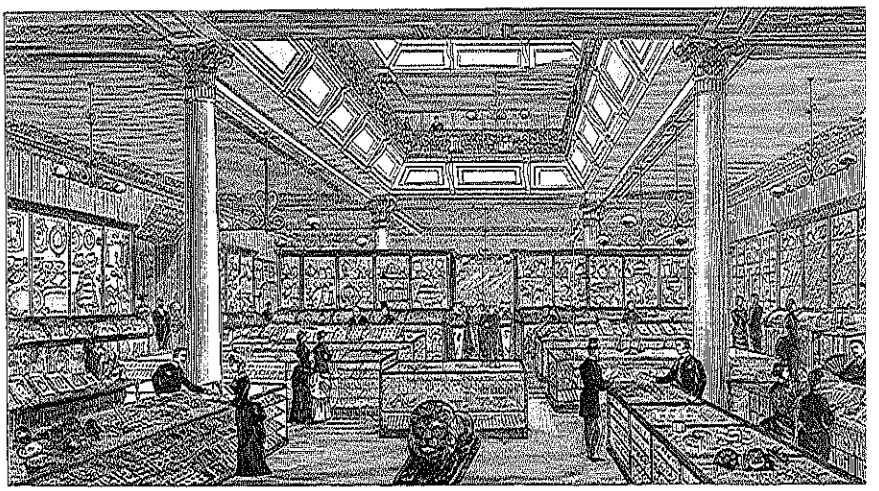
In 1900, the French Catholic writer Charles Péguy expressed the opinion that Europe had changed more in the previous thirty years than it had since the time of Jesus Christ. The period 1870–1914 was indeed one of rapid economic and social change in much of Europe. Rail networks extended their reach into the countryside, carrying manufactured goods and returning with meat, vegetables, fresh milk, and fruit for burgeoning cities. The speed and capacity of steamships brought American cereal grains, cattle, and meat to Western European ports, reducing their prices.

Technological advances helped propel the Second Industrial Revolution, which beginning in the 1850s and 1860s swept across much of northern, western, and central Europe, as well as the United States, and some of southern and eastern Europe. New manufacturing processes spurred the emergence of the chemical, electrical, and the steel industries. "Big business" took shape as larger companies controlled a greater share of markets.

Technological advances and mechanized factory production transformed the way millions of people worked and lived. Electric lights turned night into day in cities and towns. A permanent working class that had broken its ties with the countryside developed. However, rural areas were also changing as agricultural productivity increased. Large, productive farms whose lands were enriched by chemical fertilizers and cultivated with mechanized equipment encouraged more efficient regional agricultural specialization. Improvements in agriculture were less apparent in the Russian Empire, Eastern Europe, and the Balkans, although in Hungary, where the great magnates and other nobles still owned much of the land, the use of agricultural machinery, the rotation of crops, and product specialization also brought greater yields.

Declining mortality rates led to an increase in Europe's population. Longer life expectancy followed better nutrition—a more varied diet with greater caloric consumption—as well as improved sanitation and purer water supplies. Living conditions gradually improved for most people. Wages continued to rise. Mass education elevated rates of literacy. The middle class expanded in size and complexity. An expansion in white-collar jobs—including positions as clerks, tram ticket collectors, and schoolteachers, among many others—offered peasants and workers chances for social mobility, particularly in Western Europe.

An elegant London department store, late nineteenth century.



Many workers now had a little money and time left over for leisure activities. Bicycles, sports, and, early in the new century, movies became part of the lives of millions. Nonetheless, in many regions—including much of southern Italy, Spain, Portugal, Russia, and the Balkans—wrenching poverty remained common, and mobility into the middle class remained exceptional at the turn of the century.

Emigration to other countries emerged as one of the most significant social phenomena of the age, particularly during the depression that lasted from 1873 into the mid-1890s. Peasants and laborers, in particular, left Europe in hope of economic opportunity in the United States, Canada, and Latin America. Great Britain, Germany, and Ireland had provided most of the earlier waves of emigrants—for example, during the "hungry forties" marked by the Irish potato famine. Now Italians, in particular, headed overseas in great numbers, along with Scandinavians.

The last years of the nineteenth century—the fin de siècle—would be remembered after World War I as the "Belle Époque"—the "good old days"—a period of material progress and cultural innovation. New inventions like the telephone and automobile promised an even better life ahead.

The Second Industrial Revolution

Steel led the Second Industrial Revolution. Then electricity accelerated European economic growth, providing, in the century's last two decades, power for industry. The Second Industrial Revolution brought a stunning variety of technological innovations that ultimately improved the everyday lives of most Europeans. In large cities, subways and, increasingly, automobiles made people more mobile. At the same time, new discoveries in the physical sciences—particularly chemistry—and the development of germ theory and bacteriology led to advances that improved agriculture, as well as public health, making possible longer lives.

The Second Industrial Revolution seemed impervious to an economic depression that began in 1873 and lasted until the mid-1890s. It was marked by falling prices and punctuated by financial panics, although not by prolonged unemployment or economic stagnation. Following a fever of speculation, particularly in Germany, banks failed in Vienna. The speed with which the crisis spread to other financial capitals reflected the extent to which improvements in transportation and communication had extended the links of an increasingly global economy. British foreign investment doubled between 1900 and 1914, and within Europe the volume of trade increased by twenty-five times between 1820 and 1913. Increasingly, the price of grain and other essential commodities became more constant with the development of a global market for foodstuffs. Agricultural prices fell virtually everywhere in Europe, in part because imported grain from the

United States and Canada flooded markets. In industrialized countries, tariffs became the focus of impassioned political debate, even in Britain, where economic liberalism remained the prevailing credo. Governments responded to the depression by imposing protective tariffs, in the interest of native industries and agriculture, in Austria (1874), Russia (1875), France (1892), Italy (1887), and Germany (1902).

New Technology and Scientific Discoveries

In 1856, the English inventor Henry Bessemer (1813–1898) developed a new method for forging steel from pig iron by forcing air through the molten metal to reduce its carbon content. The result was steel that was less expensive to produce than it had been by the old method and that could be turned out in greater quantities (see Table 19.1). Other related discoveries over the next twenty years permitted the production of steel of a more consistent quality, lowering its price by two-thirds.

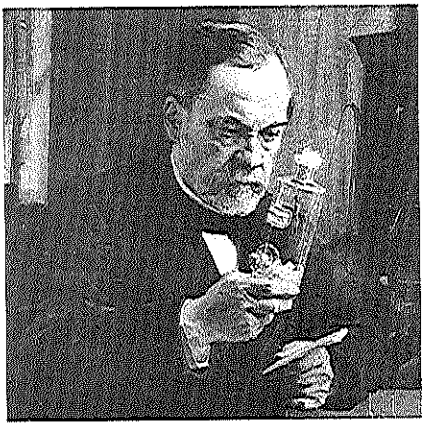
Steel's strength, durability, and flexibility gave it a marked advantage over iron. Steel improved the size, quality, standardization, and precision of machinery. Just three years after Bessemer's discovery, the first British ship constructed of steel slid into the sea. Larger, sturdier, and faster than their predecessors, steel ships transformed naval warfare.

Medical advances enhanced the already soaring prestige of science and the professional stature of its practitioners. In much of Europe, a trip to the doctor was no longer seen as the first stop on the way to the undertaker. Anesthesia, which had already been discovered in the United States in the 1840s, made surgery less painful. The French scientist Louis Pasteur (1822–1895) discovered that just as various types of fermentation were caused by different kinds of germs, so were many diseases. His development of germ theory in the 1860s brought a virtual revolution in health

TABLE 19.1. ANNUAL OUTPUT OF STEEL (IN MILLIONS OF METRIC TONS)

Year	Britain	Germany	France	Russia
1875–1879	0.90	—	0.26	0.08
1880–1884	1.82	0.99	0.46	0.25
1885–1889	2.86	1.65	0.54	0.23
1890–1894	3.19	2.89	0.77	0.54
1895–1899	4.33	5.08	1.26	1.32
1900–1904	5.04	7.71	1.70	2.35
1905–1909	6.09	11.30	2.65	2.63
1910–1913	6.93	16.24	4.09	4.20

Source: Carlo Cipolla, ed., *The Fontana Economic History of Europe*, vol. 3(2) (London: Collins/Fontana Books, 1976), p. 775.



Louis Pasteur in his laboratory.

care. Pasteur's experiments demonstrated that the spoilage of food could be avoided by destroying microbes that were already present and preventing the arrival of others (thus, the "pasteurization" of milk). Pasteur's studies of specific bacteria and viruses led to the immunization of animals and helped end a silkworm blight. Wilhelm Röntgen (1845–1923), a German scientist, discovered the X-ray in 1895. Then another German, Robert Koch (1843–1910), discovered and isolated the tuberculosis bacillus.

The development of bacteriology, which infused the hygienic movement with the certitude of science and helped create preventative medicine, reduced mortality by encouraging, for example, sewage works. Sewer systems ensured a cleaner water supply, reducing some contagious diseases. People became less tolerant of foul smells. Rat poison killed off disease-carrying rodents.

The Electric and Chemical Revolutions

Electricity made possible the invention of the electromagnetic telegraph, the undersea cable, and the telephone. Yet electricity remained little more than a scientific curiosity until relatively late in the century. The bottleneck remained the generation of electricity. Werner von Siemens (1816–1892), a German, invented the first self-excited electromagnetic generator in 1867, which made possible the production of electrical energy, and three years later the first generator of direct current (a ring dynamo) followed. Germany took the lead in the production of power generators. Thomas Edison (1847–1931), an American scientist, invented the incandescent lamp in 1879. Two years later, the first electric power stations began operation in England, and during the following decades electricity gradually entered European homes. Electric alternators and transformers and improvements in cable and insulation provided means by which electric power could be generated and diffused. Yet, well into the twentieth century, in many parts of Europe electricity still remained a luxury.

For all their efficiency, water power, coal, and gas had placed limits on the location of factories. Electric power, however, could be transported with relative ease, which ultimately enabled countries not well endowed with natural resources to industrialize partially. The steel, textile, shoemaking, and construction industries, among others, came to depend upon

electric power. In Europe, as in the United States, the first results of the electric age were particularly striking in heavy industry—for example in electrochemistry (aluminum) and metallurgy (electric furnaces). The burgeoning German electrical manufacturing industry helped Germany to challenge Britain for European manufacturing primacy.

The sewing machine, developed by the American Isaac Singer (1811–1875), began to be found in industry and homes in the 1850s, well before the use of electricity became common. The mechanization of the production of ready-made garments rapidly extended consumer markets, setting styles and reducing the price of clothing. But the impact of the sewing machine also demonstrated continuities in industrial work. For the garment industry—attracting Jewish immigrants to Paris and, above all, New York—remained largely tied to home work, as well as to sweatshops. Women, and some men, too, turned out ready-made cloaks and dresses. Machines that could do band stitching, make buttonholes, or embroider led to a further specialization of labor. Singer marketed his machine as a device that would liberate women from tedious work. But the sewing machine also bound many women to the hectic pace of piecework, and to payments for the machine itself, usually purchased on time-payment plans.

By 1900, other electrically powered household appliances—refrigerators, fans, and vacuum cleaners—were generally available to those families that could afford to have their houses wired for electricity and could pay for the appliances.

The development of chemistry also brought lasting advances. In Germany, university chemical research and teaching developed precociously. German companies benefited from synthetic organic chemistry, manufacturing dyes, soaps, and pharmaceuticals, further improving sanitation and public health. Fritz Haber (1868–1934) discovered the nitrogen-fixing process, by which atmospheric nitrogen could be converted into compounds. By 1913, he and his colleagues were able to transform ammonia into nitric acid by oxidation, which made possible the industrial production of fertilizers and explosives. Advances in chemistry helped transform agriculture, the textile industry, and engineering.

In Western Europe, powerful industrial giants began to emerge. The development of economic cartels dealt a blow to the liberal era of free trade. Cartels are formal agreements by which competitors within the same industry protect profits by sharing markets, regulating output, fixing prices, and taking other measures to limit competition. Cartels permitted a few large companies to dominate production and distribution, enabling heavy industries to protect themselves during periods of falling prices and high unemployment by controlling production and setting prices. In Germany, mining cartels set production goals and kept prices artificially high. In France and Great Britain, informal agreements among industrialists achieved virtually the same results as formalized cartels. The return to protective tariffs aided

Women working on a sewing machine and sewing by hand.

cartels, protecting them from competition from abroad. Even where there were no cartels, the concentration of business in larger companies continued, in part because in industries such as metallurgy and chemicals, expensive machinery made "start-up" costs prohibitive for smaller firms.

Regional Variations

The industrial boom of the Second Industrial Revolution was perhaps most dramatic in Germany. By 1890, both Germany and the United States had surged ahead of Britain in metallurgical production. By the turn of the century, German factories turned out more steel than Britain and France combined, and Germany's chemical industry was the most modern in the world. In 1900, Britain produced twice as much sulphuric acid as Germany; in 1913, the proportion had been reversed. Germany's national product more than tripled between unification in 1871 and 1914.

Germany enjoyed the advantage of starting to industrialize after its rivals, thereby being able to employ the most modern equipment in factories specially built to accommodate technological advances. By contrast, some British factories, most of which had been built early in the century (and some even before), seemed to be crumbling.

German banks played a more direct role in German industrialization than did their counterparts in other countries. While providing investment capital, large investment banks acquired large blocks of industrial shares, particularly in heavy industries like coal mining, electricity, and railways. Having entered industry to assure proper business management of companies to which they loaned money, the banks earned big profits and paid high dividends to those who had invested in them. German banks themselves became industrial entrepreneurs. This also favored the trend of German industry toward cartels, which controlled production and prices.

German universities were more numerous and of better quality than any others in Europe at the same time, despite their authoritarian structure and their acquiescence in discrimination against Jews, Catholics, and socialists. They emerged as centers of scientific research, particularly in chemistry. By contrast, English employers tended to look down their noses at academic training as a poor substitute for work experience, just as universities in Britain were relatively slow to adopt a more practical curriculum.

Great Britain remained the world's greatest economic power, but British manufactured goods stacked up at the docks as demand declined abroad and prices fell. By the mid-1880s, some of the countries that had purchased British goods were able to meet consumer demand at home with their own production. In the century's last decades, shiploads of foreign-made goods began to undercut British production, which was unprotected by tariff walls. Instead of depending upon British shipping, German, Italian, and French merchants now took advantage of the Suez Canal, opened in 1869, to send their own ships to Asia to make purchases and sell goods directly.

In the Russian Empire, the economy remained overwhelmingly agricultural. Despite the development of Ukraine as a major producer of wheat, the famine of 1890–1891, to which the novelist Leo Tolstoy helped focus international concern, killed millions of peasants. Absentee ownership of large estates, peasant plots that continued to be farmed at subsistence level as they had been for centuries, and village communal lands hindered agricultural development. Farmers in some places lacked even enough horses to pull plows. Yet Russian agriculture gradually increased its productivity, doing so without the capital-intensive farming that characterized much of Western Europe. Russian increases in harvest yields were comparable to those of France and Germany by 1900, making possible the increased export of grain and other foodstuffs. The Peasant Land Bank, created in the 1880s, helped thousands of peasants purchase land, and a thriving cooperative movement beginning at the turn of the century brought some prosperity.

Russian industries still confronted the serious physical impediment of sheer distance between resources, manufacturers, and markets. Coal deposits lay far from centers of manufacturing. Weak banking structures limited the accumulation of investment capital, and the Orthodox Church viewed investment as usurious and therefore dishonest.

MAP 19.1 RUSSIAN INDUSTRIALIZATION, 1870–1914 Areas of industrial concentration, including kinds of industry and resources.

Yet Russian industry also developed rapidly beginning in the mid-1890s, benefiting from advanced technology imported from Western Europe (see Map 19.1). Foreign investment in Russia, above all from France, more than doubled during the 1890s. Although textiles still represented the largest branch of Russian industry, heavy industries, particularly metallurgy, boomed. The state helped develop heavy metals and fuel production,

TABLE 19.2. PRODUCTION OF COAL AND STEEL IN RUSSIA (IN THOUSANDS OF TONS)

Year	Coal	Steel
1860	695	257
1880	3,276	289
1890	6,015	857
1900	16,155	2,711
1910	25,000	3,017
1913	36,038	4,918

Source: Arcadius Kahan, *Russian Economic History: The Nineteenth Century* (Chicago: University of Chicago Press, 1989), p. 21.

including oil. The output of steel increased fourfold during the last decades of the century (see Table 19.2). By 1914, Saint Petersburg had become one of the largest concentrations of industry in Europe, with more than 900 factories. The growth of light industry and the expansion of the market contributed considerably to the country's economic growth, permitting exports to Asian neighbors. Russian foreign trade tripled between 1885 and 1913. The length of Russia's rail lines increased by three times between 1881 and 1905, and its banks developed in size and scale. By the turn of the century, railroads at last linked Russia's major cities and facilitated the shipping of grain to the empire's northern ports.

The Russian working class grew from about 2 million industrial workers in 1900 to about 3 million by 1914 (compared to over a 100 million peasants). Yet many Russian industrial workers still labored part-time in agriculture. In 1900, peasants made up two-thirds of the population of Saint Petersburg, a city of more than 1.4 million people. They retained strong ties to their villages, which remained their legal residences. The rural commune still carried out functions of local authority, including many fiscal obligations (assuring the payment of taxes and redemption payments on land gained at the time of the emancipation of the serfs in 1861), policing (including overseeing the division of communal lands), and rudimentary welfare functions.

In most of Europe's industrializing countries, the growing manufacturing sector coexisted with small-scale production (see Map 19.2). In France, the production of high-quality handicrafts, centered in Paris, continued to dominate industry. Traditional small-scale manufacturing also persisted alongside regionally specific heavy industries in Spain (Catalonia and the Basque region), Austria-Hungary, and Italy, where little large-scale industry could be found south of the triangle formed by Milan, Turin, and the port of Genoa. As in Russia, most of the investment in Spanish industry came from abroad because agriculture generated inadequate surpluses for significant industrial investment. In the Austro-Hungarian monarchy, the dynamism of

MAP 19.2 AREAS OF INDUSTRIAL CONCENTRATION, 1870–1914 Various regions industrialized more quickly than others, with industrial concentration likely to be found where there were coal fields and rivers.

Bohemia and Moravia contrasted sharply with the small-market ways of Austria and the Hungarian plain. In the Balkans, where major rail lines were not in place until the late 1880s, poor roads and the daunting mountains limited the emergence of vibrant regional market economies. In many places, mules remained the best way to transport goods. Yet even in overwhelmingly rural Bulgaria, the value of industrial production multiplied by three times just between 1904 and 1911, and the railway network increased rapidly after 1880.

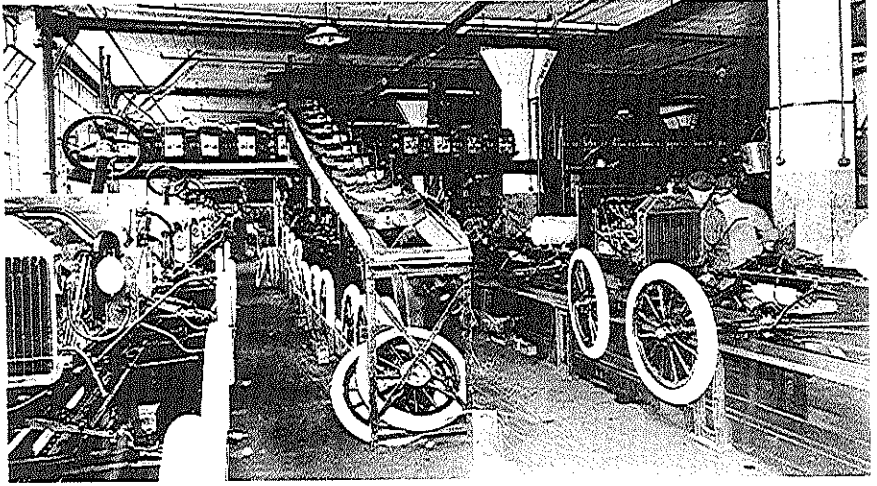
Travel and Communications

Electric power led to the construction of modern public transportation systems, first trams and then subways. Mass transportation transformed residential patterns in large cities. The London underground railway had already opened without electricity in 1863, making it possible for employees and workers to live much farther from their jobs. In 1900, the first Paris subway—the *métro*—began operation on the right bank of the Seine River, and other lines soon followed. Four years later, the first sections of New York City's subway began operation.

In 1885, Carl Benz (1844–1929), a German engineer, built upon the invention of the internal combustion engine. He added a primitive carburetor and constructed a small automobile. The first automobiles were very expensive, the tires alone costing more than an average worker's annual wages. In 1897, Rudolf Diesel (1858–1913), a German, produced the first successful engine fueled by kerosene, which could power larger vehicles. By the turn of the century, four-cylinder engines powered automobiles.

Automobile manufacturing quickly became a major catalyst for industrial growth and the implementation of new production methods, stimulating the production of steel, aluminum, rubber, and tools. The petroleum industry slowly developed, although at the time only the oil reserves in Romania were known and exploited (the first oil refinery in Europe had been built there in 1857). Little by little some industrialists and statesmen began to grasp the economic and strategic significance of oil, particularly after the discovery in 1908 of rich oil fields in Persia (Iran).

Automobile manufacturers shifted from the limited production of elite cars, above all, the British Rolls Royce, to less expensive models. Henry Ford (1863–1947), who began his company in Detroit in 1903, produced more than 15 million "Model T" Fords, which even some of his own workers could afford to purchase. Worried by American competition, the French car manufacturer Louis Renault (1877–1944) looked for ways to cut production costs. Assembly-line production made it possible to construct cars in segments. Workers mounted components on stationary chassis frames lined up along the factory floor. They used hand files to shape engine parts for expensive cars since interchangeable parts were not yet available. The assembly



An early automobile assembly line.

line reduced the time it took to produce each car from twelve hours to one and a half hours.

The automobile transformed travel. Elegant horses and fancy carriages owned by people of means no longer monopolized travel. However, until it was repealed in 1896, the British "Red Flag Act" restricted the speed of motor vehicles to two miles per hour and required three people carrying red warning flags to accompany each vehicle, a decided inconvenience. In 1896, the speed limit was raised to fourteen miles per hour.

Car travel necessitated better roads. Early drivers required not only thick goggles to protect themselves against dust but also whips to keep away startled dogs. Gradually, government authorities ordered the paving of roads, and gas stations began to dot the landscape. In 1900, the Michelin Company in France, one of the first to shift from producing bicycle to automobile tires, published its first guide for travelers, listing garages, hotels, and restaurants. Michelin successfully lobbied for signs along roads indicating distances. The number of cars in Paris tripled between 1906 and 1912. Traffic jams became a way of urban life. Motorized taxis and then motorized fire engines raced by their horse-drawn predecessors.

The cult of speed next took to the air, after centuries of dreams had brought only balloon ascents and short glider flights. In 1900, a retired German general, Count Ferdinand von Zeppelin (1838–1917), built the lumbering dirigible airship that still bears his name. After years of experimentation with propellers and small engines, Orville and Wilbur Wright, two American bicycle manufacturers, launched the first successful flight in 1903. They then took their air show to England, France, and Germany, where the crown prince of Prussia began to consider the military uses of the airplane.

More Europeans could now travel for leisure than ever before. Middle-class vacations became more common. The travel business boomed. Health spas and resorts, which had developed since the mid-1800s, became even more popular in Western Europe. Spas claimed that their thermal waters offered healing and sustaining properties that facilitated the circulation of blood, attacked gout—the encumbering malady of people who were too well fed—or in some other way restored to equilibrium the human body victimized by modern life.

Mediterranean, North Sea, and English Channel resorts offered casinos and beachfront promenades. English coastal towns like Brighton and Blackpool attracted visitors oblivious to the rain. The tourist pier and arcade took shape. English nobles, who could afford to flee the British winter, "discovered" Nice. Upper-class Italians began to frequent their own Riviera, Belgians the port of Ostend, and Germans the Baltic resorts. Vacationers from many countries discovered the Alps and sent the first postcards back to envious friends. Partially spurred on by tourism, photography emerged as a major visual art. The relatively light Kodak camera appeared in 1888. Bretons began to refer to French-speaking tourists as "Kodakers."

A revolution in communications also slowly transformed life. The telegraph had already increased the availability of news from around the world, with the help of press agencies like Havas, the Associated Press, and Reuters. The telephone, invented by Alexander Graham Bell (1847–1922) in 1876, reached private homes. Germans made 8 million telephone calls in 1883, 700 million in 1900. Fifteen years after Thomas Edison invented the gramophone in 1876, a number of virtuosos had made their first scratchy recordings. The Italian Guglielmo Marconi (1874–1937) pioneered the first wireless voice communication in the 1890s; by 1913, weekly concerts could be heard on the radio in Brussels. Silent motion pictures, first shown in 1895, became an immediate hit, sometimes accompanied by a piano. Early viewers watched brief scenes of modern life, such as a train beginning to move. Longer films with plots and action followed. The Austro-Hungarian army began to experiment with motion pictures, using cameras to study the flight of artillery shells.

Women at work at a telephone switchboard.

Further Scientific Discoveries: "A Boundless Future" and Its Uncertainties

The astonishing advances of late nineteenth-century science led one researcher to exude that "science strides on victoriously towards a boundless future." The creation in 1883 of a worldwide system for patenting reflected a veritable torrent of new inventions. Scientists had already concluded that cells form the basis for life. This knowledge led scientists to understand more about the principles of heredity. At the same time, new discoveries revealing nature's complexity began to temper the infectious optimism of the age. Fin-de-siècle scientists realized that the more they understood about the world, the more there was left to know about such basic principles as matter, light, and energy. Mathematicians and especially physicists began to rethink fundamental assumptions about the universe.

Radioactivity was discovered in Paris in 1896. Marie Curie (1867–1934), a Polish-born chemist carrying out research with her husband, Pierre Curie (1859–1906), isolated radium, a radioactive element, in 1910. Marie Curie, who was refused entry to the French Academy of Science because of her gender, won two Nobel Prizes. Her rival, Ernest Rutherford (1871–1937), a New Zealander, discovered two kinds of radiation, which he called the alpha and beta rays. He posited the disintegration of radioactive atoms, which is the phenomenon of radioactivity. Rutherford used this discovery to

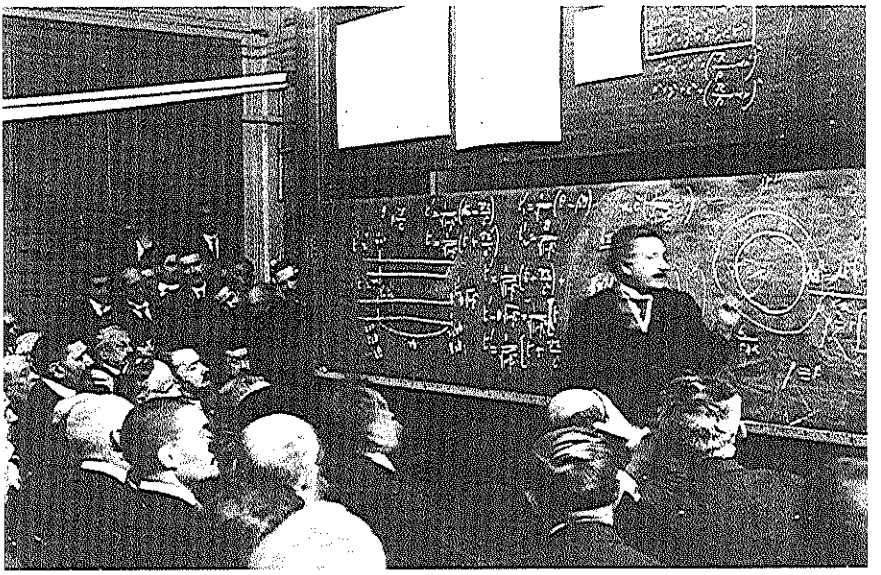
(*Left*) Pierre and Marie Curie. (*Right*) Ernest Rutherford, who is holding the apparatus that he used to break up the nucleus of the nitrogen atom.

postulate the structure of the atom, with a positively charged nucleus and negatively charged electrons circling around it.

"Particle theories" in physics cast doubt on contemporary assumptions about the universe. They demonstrated the complexity of motion, light, and matter, which appeared to consist of electrically charged particles. Since the time of Sir Isaac Newton in the seventeenth century, scientists had believed that any two objects, whether the sun and the earth, or a coffee cup and a bowl of sugar, acted on each other through gravitational force. There seemed no mechanism for transmitting action but rather only empty space between the two. James Maxwell (1831–1879), a British scientist, solved the "action at a distance" problem for the case of electromagnetic forces. His theory of electromagnetic fields postulated that one object creates an electrical field around particles, which in turn exerts forces on electrically charged objects, and that light itself consists of electromagnetic waves. The German scientist Max Planck (1858–1947) discovered that radiant energy is emitted discontinuously in discrete units, or quanta. Planck's quantum theory, not finalized until 1925, challenged the fundamental scientific understanding of energy that had survived almost intact since Newton's day. More than this, it seemed to add an element of chance to the story of the universe, suggesting that its operations were not absolutely predictable. Here, too, scientists now realized that they knew considerably less about the nature of matter and about the universe than they had long assumed.

These discoveries were only a beginning. The much more difficult problem of gravity remained. In Switzerland, German-born Albert Einstein

Albert Einstein explaining his theories to a stunned audience.



(1879–1955), whose modest position as a patent examiner of other people's discoveries belied his genius, sought to carry physics beyond Newton's theory that space and time were absolute quantities. In 1905, Einstein postulated a special theory of relativity, arguing that the velocity of light was both constant and independent of the velocities of the source and observer of light.

Einstein also postulated the relationship between mass and energy in his equation: $E = mc^2$ (energy equals mass multiplied by the square of the speed of light). In the mid-twentieth century, this formula would provide the key for the controlled release of energy from the atom. Einstein's search for an exact description of the laws of gravitation led him in 1915 from his relatively simple special theory of relativity to his general principle of relativity, which postulated that the laws of nature operated in exactly the same way for all observers. His theory supplanted traditional theories of gravitation, which saw gravity as a property of objects interacting with each other. Rather, Einstein believed that they interacted with space. Yet Einstein and other scientists remained ill at ease with the element of chance suggested by Planck's quantum theory. Trying to explain his conclusion that the universe could not operate in a random way, Einstein later insisted: "God does not play dice." Both Planck's theory, by suggesting a role for chance, and Einstein's staggering achievements themselves left open as many questions for the future as they resolved, not the least of which would later be terrifying new applications of the German scientist's famous formula to the hydrogen and atom bombs.

Social Change

Between 1870 and 1914, the population of Europe increased by half, rising from 290 to 435 million (see Table 19.3). By the end of the nineteenth century, one of every four people in the world was a European. The urban population of most countries grew rapidly. More "white-collar" positions,

Table 19.3. Population Growth in Major States between 1871 and 1911 (population in millions)

	c. 1871	c. 1911	% increase
German Empire	41.1	64.9	57.8
France	36.1	39.6	9.7
Austria-Hungary*	35.8	49.5	38.3
Great Britain	31.8	45.4	42.8
Italy	26.8	34.7	29.5
Spain	16.0	19.2	20.0

*Not including Bosnia-Herzegovina.
Source: Colin Dyer, *Population and Society in Twentieth Century France* (New York: Holmes and Meier, 1978), p. 5.

such as clerks and salespeople, became available, and service employment drew migrants to cities. Increased factory production altered the physical structure of industrial cities, which were characterized by greater social segregation within their limits. Working-class suburbs grew rapidly on the outskirts of towns. Overseas emigration, particularly to the Americas, rose rapidly and did not slow down even with the end of the economic depression in the mid-1890s.

Demographic Boom

Europe's population grew rapidly because the continent passed from the traditional pattern of high birthrates and high death rates to low rates of both births and deaths. Mortality rates fell during the second half of the nineteenth century, particularly among children. Births outnumbered deaths, despite the fact that fertility rates fell beginning in the 1860s, or even before. Infant mortality declined, particularly in Western and Central Europe, because of greater medical understanding of chest and stomach infections, as well as a general improvement in the standard of living. Many poor people now lived in warmer, drier accommodations, although improvements still lagged behind in large, dirty, industrial cities.

With infant mortality greatly reduced, more couples sought to control the number of children they had (see Table 19.4). Although Britain's Queen Victoria had nine children, poor families often had more children than upper-class couples, who limited themselves to two or three offspring because they wanted to devote more resources to the education and inheritance of each child. In France, officials and nationalists worried about their country's unique plunging birthrate. The French population grew by only about 15 percent from mid-century until 1914. The division of farmland into small plots may be a partial explanation—another child ultimately meant a further subdivision of land because France no longer had primogeniture (inheritance by the eldest son).

Contraception became more widespread, although the methods were very traditional ones. Coitus interruptus was the most common method, although

TABLE 19.4. THE DECLINE IN FAMILY SIZE (NUMBER OF CHILDREN) IN ENGLAND AND WALES

Year	Family Size
1861–1869	6.16
1871	5.94
1876	5.62
1890–1899	4.13
1900–1909	3.30
1910–1914	2.82

Source: E. A. Wrigley, *Population and History* (New York: McGraw-Hill, 1969), p. 197.

it was hardly flawless. Rudimentary condoms made of animal intestines were superseded in the 1880s by rubber condoms, although these still were relatively expensive, and were used primarily for protection against disease rather than for birth control. As families sought to limit the number of children and single women encountered unplanned pregnancies, abortion became more common, in part because contraception methods remained very hit or miss. A quarter of pregnancies probably ended in abortion, even though abortions were both illegal and extremely dangerous. Women seeking to terminate a pregnancy took all sorts of concoctions rumored to be effective, or put themselves at the mercy of quacks.

In some places, however, births to unmarried couples or to single mothers increased rapidly. Young female migrants to the city were vulnerable to the advances of men promising marriage or promising nothing at all. Unplanned pregnancies followed. A sizable percentage of the population of most countries—about 10 to 15 percent—never married or entered into permanent or long-term relationships. Unmarried women were especially common in Scotland, Ireland, and in Brittany in France, from which more males than females migrated to urban, industrial regions.

Improving Standards of Living

Living standards improved for ordinary people in every industrialized country. Standards of living were far higher in northern Europe than in southern and eastern Europe, greater in Britain than in France, with Germany closing the gap with both of its rivals. In Britain, real wages (taking inflation into account), which had increased by a third between 1850 and 1875, again rose by almost half during the last three decades of the century. Workers enjoyed higher levels of consumption because the price of food fell as agricultural production increased and transportation improved. Working-class families still spent half of their budget on food, but this was less than during previous centuries. This left more money to spend on clothes, with something occasionally left over. Small-town shops were better supplied than ever before, and ready-made clothes sold on market day alongside manufactured household utensils.

More grain and meat, arriving in refrigerated ships, reached Europe from Australia, Canada, the United States, and Argentina. Meat ceased to be a luxury. The average German had consumed almost 60 pounds of meat in 1873, 105 pounds in 1912. Germans consumed on average three times more sugar at the end of the century than thirty years earlier. People who lived a good distance inland—and who were of some means—found that fish reached them before the ice keeping the fish fresh had melted. The poor, too, now enjoyed a more varied diet, consisting of more vegetables, fruit, and cheese. As the diet of ordinary people improved, and thus their nutrition, people gradually became taller. Still, workers almost everywhere remained chronically undernourished and vulnerable to childhood diseases.

The average European laborer was still shorter than the average middle-class person.

Migration and Emigration

European migration was part of a worldwide movement of men and women in what was becoming a global labor force. Migration—both permanent and seasonal—within Europe continued to be significant. In France, in particular, many rural regions of marginal agriculture lost population to cities and towns. Seasonal work took hundreds of thousands of laborers across borders for part of the year as construction and harvest workers. Some Italian laborers known as "swallows" spent four weeks a year traveling to and from Argentina to work the harvests.

Permanent migration to the city did not end the contact between the migrants and their rural origins. Many industrial workers still went back to their villages to help with the harvest, and many miners were also part-time farmers. Thus, migration was a two-way street, at least when patterns of movement involved relatively short distances. When migrants returned home for visits, they brought with them not only stories about what they had experienced in the cities and towns where they now lived, but different ways of speaking, knowledge of birth control, the habit of reading, a taste for sports, and greater political awareness and interest.

Immigrants from Europe await a ferry for New York City, having passed through the entry point at Ellis Island.

Overseas emigration increased dramatically during the nineteenth century's last decades, the result of economic stagnation, marginal and overcrowded agricultural regions, religious persecution, and the hope of finding a better life. Between 1850 and 1880, about 8 million Europeans emigrated, most to the United States. Russia and Eastern Europe sent an increasing number of impoverished people abroad. Between 1890 and 1914, about 350,000 Greeks—one-seventh of the population of Greece—left their country, most for good. Emigration from Europe was itself facilitated by the transportation revolution, as steamships carried millions of people to a new life across the oceans.

With improving economic times in the late 1890s, emigration slowed down from Germany, while remaining high from Ireland and increasing dramatically from Italy. During the first decade of the twentieth century, emigration from Europe rose to between 1 and 1.4 million people each year. Most of those packing themselves onto overcrowded steamers went to the United States: Italians and Irish to New York, Boston, and Philadelphia; Portuguese to Providence and New Bedford; Germans and Bohemians to Chicago, Milwaukee, and Philadelphia (see Table 19.5); Poles to Chicago and Detroit. In 1907, due to their sheer number, Italian emigrants sent back enough money to cover half the commercial deficit of their native country. Pushed by crop failures and pulled by the U.S. Homestead Act of 1862 (which virtually guaranteed land in the American West), waves of Swedes, along with Norwegians and Finns, began to emigrate to the northern United States. By the 1930s, 3 million Swedes had changed countries, leaving a population of about 6 million at home. Hundreds of thousands of Portuguese left for Brazil in search of jobs as laborers, following the abolition of slavery in that country in 1888.

Between 1871 and 1914, more than 1.5 million Jews left Russia and Polish Russia for the United States, fleeing poverty and periodic anti-Semitic violence. Many left their homes with little more than a few cherished items and great hopes. One Jewish emigrant from a village in Belarus remembered that his family carried empty suitcases as they left home—they did not want the

TABLE 19.5. EMIGRATION TO THE UNITED STATES, 1871–1910

	1871–1880	1881–1890	1891–1900	1901–1910
Germany	718,000	1,500,000	505,000	341,000
Ireland	437,000	656,000	388,000	339,000
England/Scotland/Wales	548,000	807,000	272,000	526,000
Scandinavia	243,000	655,000	372,000	505,000
Italy	56,000	307,000	652,000	2,000,000
Austria-Hungary	73,000	363,000	574,000	2,145,000
Russia/Baltic states	39,000	213,000	505,000	1,597,000

Source: Leonard Dinnerstein and David M. Reimers, *Ethnic Americans: A History of Immigration and Assimilation* (New York: Harper and Row, 1977), p. 11.

other people they met along the way to know that they owned virtually nothing to carry. Tens of thousands of Jews moved westward to European capitals, such as London, where they lived in the East End. Most Jews retained their cultural traditions and religion and spoke Yiddish as their first language. They were considered outsiders by many people in Vienna, Berlin, Budapest, Paris, and other cities (even in some cases by assimilated Jews). The Zionist movement for the establishment of the Jewish homeland in Palestine emerged partially in response to the rising tide of anti-Semitism in Europe. The movement's founder was Theodor Herzl (1860–1904), a gifted journalist and German-speaking Jew from Budapest who had moved to Vienna.

Although many families left together for overseas destinations, many married men went alone, hoping either to send for their families when they could afford to do so, or to return after saving some money. In new homes, migrants forged new collective identities, a process shaped not only by their own ethnic backgrounds and solidarities but also by conditions in their new homelands. Many never saw their families again. Migrants to the United States from southern Italy were the most likely to return permanently, with almost two-thirds eventually going back.

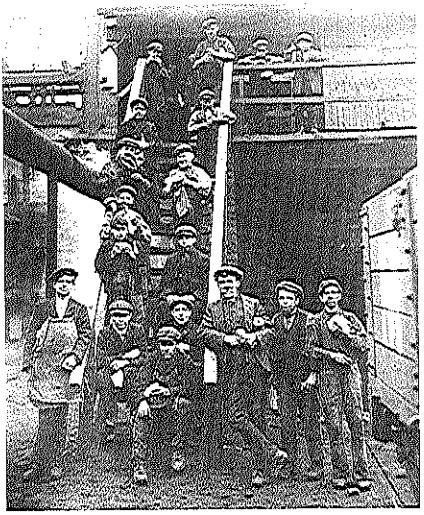
The Changing World of Work

By 1900, more than half of all industrial workers in Britain, Germany, and Belgium were employed in firms with more than twenty workers. Artisans, skilled workers, and unskilled workers often found themselves in the same factory. Most industrial workers came from proletarian families and grew up with few or no illusions about finding a more secure way of earning a living. But "proletarian" was also a state of mind. Many workers took pride in their work and in their social class. "I was born in the slums of London of working-class parents," a contemporary recalled, "and although I have attained a higher standard of living, I still maintain I am working class." Yet enormous differences in skill, remuneration, and quality of life continued to exist among workers.

Mechanization eliminated or reduced demand for some trades. Skilled glassworkers were no longer needed when the Siemens furnace, which permitted continuous production, was adapted to the production of bottles in the 1880s. Porcelain painters lost their jobs to unskilled female laborers when factory owners started using decals that could be applied to plates and then baked on. Steam laundries left many washerwomen without clients.

New professions brought some workers higher status. Engineers, capable of designing, overseeing, and repairing machinery, became fixtures in factories. In the 1880s, some engineers still had received training as apprentices, but by the first decades of the twentieth century, many had received university training in their chosen profession.

Women's work remained closely tied to their stage of life. Many young, unmarried women became servants upon arrival in the urban world, trying to



Derbyshire pit boys outside the mines in Britain.

save enough money for a modest dowry, in the hope of marrying someone of a slightly higher social class. By the end of the century, servants accounted for more than half of female workers in Britain.

Most female industrial workers were still employed in small workshops or at home, but more women became factory workers. Even in the Habsburg Empire, which was much less industrialized than Germany or Britain, about 900,000 women worked in factories, largely in unskilled jobs. Most earned only about half the wages of their male counterparts for, in some cases, the same jobs. Women workers were usually the last hired and the first fired. Despite harsh working conditions and relatively low wages, some women saw factory work as bringing an improvement in wages and conditions over agricultural labor, cottage industry, or domestic service. A Belfast woman in 1898 remembered her time in a linen mill: "Wonderful times then in the mill. You got a wee drink, got a join [pooled money with others to buy food], done your work and you had your company."

Industrialization and the Working-Class Family

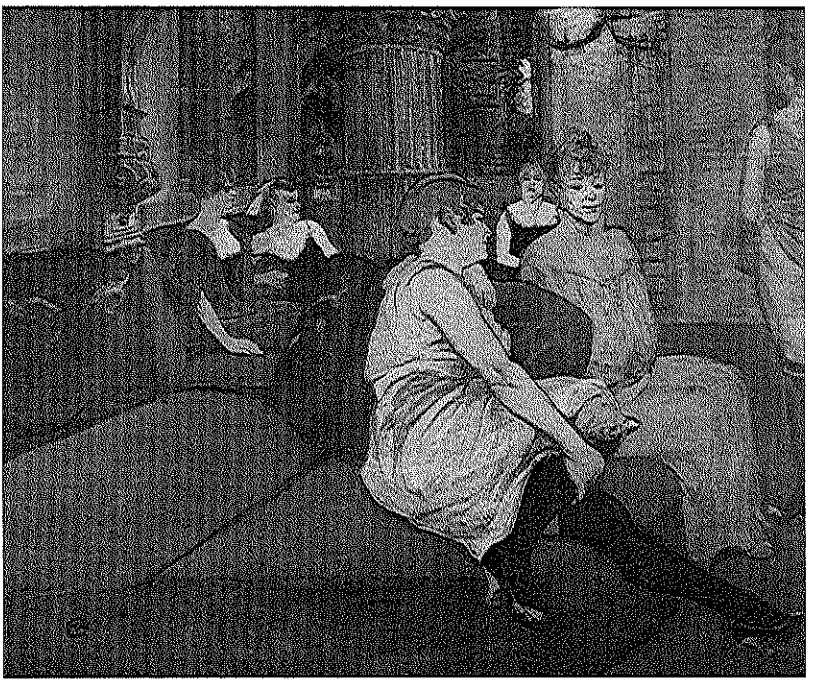
Moralists bemoaned the effects of industrial work, arguing that the uprooting of families from villages put them at risk in cities and factories characterized by vice and immorality. Despite laws controlling child labor (see Chapter 14), at the turn of the century many thousands of children, including those between the ages of eight and fourteen, were still working in factories (the young above age fourteen worked as adults). Moralists believed that only education, marriage, the habit of saving money, and a return to the old ways could save family life. Women, they claimed, were being taken away from their reproductive function, and from family life itself. Working-class families in cities were indeed much less likely to live with their extended families—that is, with parents and sometimes grandparents and in-laws—than were country people. More families tended to be broken up early when children sixteen years or younger left villages in search of work in the cities, leaving aging parents to fend for themselves as best they could. Furthermore, long hours in the factory for parents and children

alike seemed to erode parental authority. Moralists blamed increasingly homogeneous working-class neighborhoods, where drinking and domestic violence seemed rampant.

Many women of child-bearing age who could afford to do so, or who had no other choice, tended children full time. But once their offspring were old enough to care for themselves, many working-class mothers returned to factory work. Others worked at home, doing piecework and caring for their children at the same time. Many women thus alternated between industrial wage labor and child rearing.

As ever in the European experience, many women still were forced by economic circumstances into prostitution, in large cities, towns of modest size, and even villages. Some of the tens of thousands of prostitutes in Paris, London, Berlin, and Vienna worked in elegant brothels, under the direction of a "madam," who allowed them only a couple days off per year. Others worked on their own, waiting for customers in bars, doorways, windows, and parks. Most prostitutes were working-class women—some of whom were married—unable to find industrial work. Many were young, having had to leave school early to support younger siblings.

Henri de Toulouse-Lautrec's *In the Salon at the Rue des Moulins* (1894) depicts French prostitutes.



Prostitutes began to be perceived more than ever before as a chronic danger to public health. Complaints from the middle class increased (which was ironic, since middle-class men constituted a significant portion of the clientele for prostitutes). Socialist parties, however, expressed little interest in prostitution as an issue of reform, although they blamed capitalism for the low wages or unemployment that forced many women into prostitution.

In 1864, the British Parliament had passed the Contagious Diseases Act, which required medical examination of prostitutes. The goal was to stop the spread of venereal disease, particularly syphilis, by hospitalizing prostitutes found to be infected. If a woman refused medical examination, she could be prosecuted. The Contagious Diseases Act had the ironic effect of transforming prostitution from a temporary profession for many struggling working-class women to a dead-end, permanent job because the law publicly branded them as prostitutes.

Josephine Butler (1828–1906), the devoutly religious wife of a clergyman and president of an association encouraging higher education for women, led a well-organized, determined campaign in Britain and then on the continent against the Contagious Diseases Act. Some opponents of the act objected that the law called only for the inspection of prostitutes, not their clients; others opposed extensive police regulatory authority. Butler espoused the right of women to regulate their own sexuality. Parliament repealed the Contagious Diseases Act in 1886, and passed a law that banned brothels, forcing prostitutes to operate in tolerated "red-light" districts, where they were often subject to violence. Almost all of the victims of the still unidentified London killer "Jack the Ripper" were prostitutes.

In France, too, laws placed prostitutes under greater regulatory control. Gradually, the belief that morality could be legislated ebbed in Europe. Charitable institutions more willingly provided assistance to unwed mothers and their offspring, increasingly considering their sad situations as a social, not a moral, problem.

Teeming Cities

In 1899, an American statistician—the profession itself was another sign of the times—noted that "the concentration of population in cities [is] the most remarkable social phenomenon of the present century." Britain and Germany led the way, but France, Austria, Switzerland, Italy, Sweden, and even Spain and Serbia also had high rates of urban growth. Classic "factory towns" such as Manchester, Saint-Étienne, and Essen grew rapidly in size, but so did the population of other towns, swollen by service workers and state and commercial employees.

Rural industry, which had provided spinning, weaving, and finishing work for hundreds of thousands of people—above all, women—on a full- or part-time basis, gradually disappeared during the last half of the century. Manufacturing, including home production in the garment industry, now became

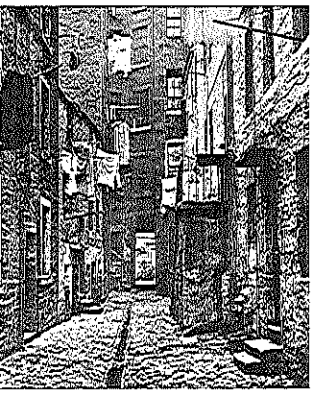
overwhelmingly concentrated in urban centers. Mechanized agriculture and falling agricultural prices reduced demand for farm laborers, encouraging migration to towns in search of work in the booming service sector or in industry. The population of Istanbul doubled in forty years, reaching 850,000 by 1886, swollen by the influx of Muslim refugees from Russia and the Balkans. Warsaw's population grew by more than four times from about 160,000 in 1850 to almost 800,000 people in 1911; two-thirds of the Polish city's buildings had been built in the nineteenth century. In Central and Eastern European cities like Prague and Tallinn, Czechs and Estonians, respectively, arrived in greater numbers from the countryside, changing the ethnic composition of these places.

Although some working-class families now lived in marginally more spacious lodgings, many densely packed urban neighborhoods became ghastly slums. London had its infamous "back to back" row houses, with little or no space between the houses and room for little more between the rows than outdoor toilets, if that, and garbage heaps. For most British workers, a parlor (a family room), a sign of "respectability," remained only a dream. In Glasgow, Scotland, a third of the city's families lived in one room, as more and more highlanders crowded into tall tenement dwellings.

As Paris became ever more crowded, Emperor Napoleon III had undertaken a massive rebuilding project in Paris during the 1850s and 1860s. He entrusted the planning to Baron Georges Haussmann (1809–1891). Together they planned the most extensive project of urban renewal since the rebuilding of London following the great fire in the seventeenth century and that of Edo (Tokyo) in Japan at about the same time following the great conflagration of 1657.

Napoleon III and Haussmann wanted to facilitate the expansion of commerce and industry through the creation of long, wide boulevards, which would be lined by symmetrical apartment buildings. It was not a coincidence

(*Left*) Tenement housing in Glasgow. (*Right*) Company housing near mines in northern France.



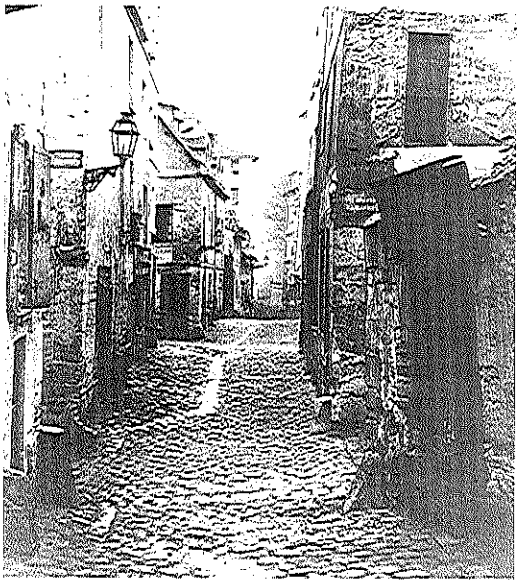
that some of the new arteries cut through some of the most traditionally revolutionary neighborhoods, providing troops quick access into the narrow streets in eastern Paris where ordinary people had risen up during the June Days in 1848, as well as during the French Revolution. This made it more difficult to erect barricades. The impressionist painter Auguste Renoir (1841–1919) would lament the transformation of these old Parisian neighborhoods and the new symmetrical buildings that lined the boulevards, "cold and lined up like soldiers at review." It seemed an appropriate image to accompany the further consolidation of state power. Glittering department stores and fancy cafés stood along the elegant boulevards, showcases to imperial monumentalism but also to modern life. Large iron structures provided space for Les Halles, the refurbished market of central Paris.

Napoleon III also wanted to make Paris a healthier place. Some of the broad boulevards replaced narrow, winding streets, cutting through unhealthy neighborhoods. Aqueducts were built to provide cleaner water for residents. Four hundred miles of underground sewers (which emptied into the Seine River northwest of Paris) improved health conditions in a city that had been recently ravaged by cholera.

Although the massive rebuilding provided jobs for many workers, it also forced many thousands of workers and their families to leave the central city for the cheaper rents of the inner suburbs, particularly those to the north and northeast—which were annexed to Paris in 1860—or to increasingly industrialized suburbs farther out, themselves emerging symbols of the Sec-

Emperor Napoleon III (*left*) and Baron Georges Haussmann, viewed as either the rebuilder of Paris or the "Alsatian Attila" (*right*).

ond Industrial Revolution. The cost of all these projects was enormous and far exceeded original estimates. Speculators made a fortune, tipped off as to where the next demolitions would take place.



Paris before Haussmann: Charles Marville's photograph of the Rue Traversine. Notice the drainage ditch in the center of the cobblestone street.

Paris had already reached well over a million inhabitants. By 1900, nine European cities had populations that large. London dwarfed them all, growing from 1.9 million in 1841 to 4.2 million in 1891. Between one-fifth and one-sixth of the population of Britain lived in London, which was larger than the next seven largest English cities and Edinburgh combined. The sprawling imperial city seemed almost ungovernable, an imposing labyrinth of different jurisdictions with 10,000 people exercising varying degrees of authority. Unlike Paris, which was for the most part administered by the centralized French state, London only had an effective local government after the establishment of the London City Council in 1889.

The largest port in the world, London also remained a center of international banking, finance, and commerce, and the administrative nerve center of the British Empire. The influence of "the City"—London's banking and finance district—extended around the world, channeling investment capital to innumerable countries within and beyond the empire. Half the capital that left Europe passed through London. The largest merchant marine fleet in the world carried woolens and other textiles to China, machine parts and hardware to Russia, toys to New York, settlers to Canada, and soldiers and sailors to India, and it imported Australian wool, Chicago beef, Bordeaux wines, Portuguese port, and Cuban cigars.

London was also a center of small-scale production and finishing in shops usually employing only a few skilled and semiskilled workers each, such as in the clothing industry, furniture making, engineering, and printing. The bustling East End docks employed a vast force of "casual labor"—that is, semiskilled and unskilled laborers who worked when work could be found. Two million people lived in the East End. There, and elsewhere, the homeless slept where they could, in empty or half-collapsed buildings, under bridges and railroad viaducts. To upper-class Londoners, the East

End, about which they knew nothing except "from hearsay and report," was a morass of tangled slums "as unexplored as Timbuktu." Residents of these districts spoke a cockney dialect that was difficult for outsiders to understand, or with a thick Irish brogue, or in Yiddish.

The Hungarian capital of Budapest revealed not only the social and ethnic complexity of the Austro-Hungarian Empire but also the increased social segregation characteristic of the modern city. This city on the Danube River grew from a population of about 120,000 in 1848 to 280,000 inhabitants in 1867 and almost 900,000 people in 1914. By then, Hungarian, which had been spoken by a minority of the population of the capital at mid-century, had become the language spoken by the vast majority of people. Many Germans and Jews had emigrated or been assimilated. The complexity of social differences was such that five forms of salutation were current, depending upon whom one was addressing. These ranged from the ultimate deference of "Gracious Sir," through the only slightly less groveling "Dignified Sir" or "Great Sir," all the way down to the considerably more common "Hey, you!"

Many social theorists were convinced that the rapid growth of cities bred crime (see Chapter 20). But, in fact, urban growth in some places seems to have significantly increased only crimes against property. Crime rates in Glasgow fell during the last half of the century, despite the petty extortion carried out by youth gangs like the Penny Mob, the Redskins, and the Kelly Boys. Many contemporary observers inveighed against cities as promoting an anonymous, alienated mass of people. Yet relatives and friends who had the same dialect or accent or religion encouraged others to move to the city and served as conduits for information about jobs and lodgings. The resulting "chain" migration created "urban villages" that mitigated against uprooting and lawlessness. Neighborhoods of Irish in Liverpool and London, and Italians and Irish in Boston and New York, provided solidarities that made the city seem less anonymous to newcomers.

Social segregation within European cities became more pronounced. Elevators carried wealthy occupants of apartment buildings to refurbished dwellings in the upper stories, where poorer people had once lived. Families of means lived along Vienna's Ringstrasse and near the parks of west London. As more suburbs developed around the edge of Europe's larger cities, some, particularly outside London, catered to middle-class people who could commute into the city, happy to live in small houses that offered more room and fresh air. These suburbs, unlike most center cities, reflected some degree of planning and improved water and gas supply, among other municipal services.

But European suburbs became even more mostly a plebeian phenomenon. Factories were constructed on the edge of cities so that manufacturers could take advantage of more space, proximity to railways and canals, somewhat lower cost of land and raw materials (avoiding the taxes that were still levied on goods brought into some cities), and the availability of cheap labor (see Chapter 14). Railway lines and factories on the edge of town

were surrounded by poor-quality, low-rent housing, usually owned by absentee landlords. More and more workers commuted daily into town to work—some still on foot, others by tram, subway, train, and later bus. Modest suburbs even developed around the small Estonian capital of Tallinn in the Russian Baltic provinces, where peasant workers settled on the edge of town.

With urban growth in cities came civic pride. Municipal governments built celebratory historical monuments, constructed new hospitals and town halls, sponsored bands, and created beautiful parks complete with ornate bandstands. They prided themselves on an increasingly diverse municipal cultural life, including occasional music festivals and perhaps even a museum. The proliferation of voluntary associations, such as clubs and choral societies, also came to be taken as symbols of urbanity as cities and towns continued to grow, transforming the lives of millions of Europeans.

At the same time, homosexual subcultures developed in most large cities, and in some smaller places (a German writer first used the term "homosexuality" in 1868). Same-sex acts had first been decriminalized in France in 1791, but gays and lesbians largely remained in the shadows, although readily identifiable hotels, restaurants, bars, parks, and gardens provided places for them to meet. If the prostitution of women was very much out in the open, that of men was always less obvious. Public attitudes toward homosexuality remained generally intolerant. This was reflected by the fact that the English philosopher Jeremy Bentham (1748–1832) penned many pages defending same-sex relations, but never dared publish them, and by occasional high-profile trials. The Scientific-Humanitarian Committee, established in Berlin in 1897, was the first organization founded to support homosexual rights.

Social Mobility

The middle classes swelled during the Second Industrial Revolution, taking their places in Europe's burgeoning cities. Lower-middle-class occupations, in particular, expanded rapidly. (That the lower middle class had some degree of self-awareness was revealed by the fact that in 1899 the first—and last—World Congress of the Petty Bourgeoisie took place in Brussels.) Architects required draftsmen; companies needed accountants and bookkeepers; and the London underground and Paris subway had to have agents. Furthermore, the expansion of governmental functions generated thousands of jobs: tax collectors, postal workers, food and drug inspectors, and recorders of official documents. The number of schoolteachers increased dramatically between the 1870s and 1914—five times more in Italy, thirteen times more in England. (Table 19.6 represents the rapid growth in the number of state employees.) In Britain, the proportion of the population classified as lower middle class grew from about 7 percent in 1850 to 20 percent in 1900. Clerks working for banks, railroads, utility companies, and

TABLE 19.6. NUMBER OF PUBLIC SERVANTS (NON-MILITARY)

	1881	1901	1911
Great Britain	81,000	153,000	644,000
France	379,000	451,000	699,000
Germany	452,000	907,000	1,159,000

Source: Norman Stone, *Europe Transformed 1878–1919* (Cambridge, Mass: Harvard University Press, 1984), p. 130.

insurance companies considered themselves above the working class and therefore "respectable." With the optimism of the age, they viewed such employment as a first step to one day owning their own store. They did not wear work clothes and did not do manual labor and they made a little more money than workers.

In European cities, women found jobs as department store clerks, stenographers, and secretaries. There were twelve times as many secretaries in 1901 as there had been two decades earlier; women, who held only 8 percent of post office and government clerical positions in 1861, accounted for more than half in 1911. They now used metal pens that replaced the age-old quill, and then the typewriter, invented in the 1880s. Nursing became a respected profession. Cafés and restaurants employed hundreds of thousands of women.

Gains made by workers seemed paltry when compared to the fortunes being made by industrialists, and even the salaries earned by management personnel. These gnawing disparities aided unions and socialist parties in their quest for the allegiance of workers, many of whom walked to and from work while horse-drawn cabs raced by, carrying well-heeled occupants. Indeed, during the mid-1890s, real wages, which had risen for several decades, entered a period of decline.

Dizzying "rags to riches" tales (especially popular in the United States and Russia) suggested that hard work could lead to better conditions of life. Emigrants to the United States arrived with fantastically high expectations of what life would be like. Inflated expectations often brought disappointment, as social mobility was extremely limited, particularly for first-generation immigrants. During the last decades of the century, 95 percent of American industrialists came from upper- or middle-class families, and not more than 3 percent were the sons of poor immigrants or farmers. Among immigrants and native-born workers in the United States, the most common form of social advancement was within the working class, not into a higher social group.

Despite movement in Western European countries into clerical and other lower-middle-class jobs, however, there were fewer possibilities of movement by workers into the middle class during the hard years of the 1880s than there had been during the middle decades of the century. Low wages and periodic unemployment for industrial workers made saving and the ownership of apartments or houses, both essential components of

Clerical work toward the end of the nineteenth century.

mobility, extremely difficult to achieve. Craftsmen and skilled workers had a far better chance for social ascension than did unskilled workers. As in the United States, those who did move up to middle-class employment were the exceptions. The vast majority of marriages in Europe took place between partners considered social equals. Working-class women were more likely than their brothers to achieve some social mobility—for example, by marrying a clerk or railroad station employee.

Cultural Changes: Education and Religion

In every country, states took enormous strides to bring education to more people. More children went on to secondary school, now including some girls. The state's increased role in education in Western Europe contributed to a growing secularization of public life. At the same time, the established churches lost the allegiance of many ordinary Europeans.

Education

Literacy rose rapidly during the last decades of the century in Europe as more governments enacted educational reforms. Literacy rates were higher in western—above all, northwestern Europe—than in southern and eastern Europe, although progress was notable in Russia around the turn of the century.

In Britain, Parliament passed, over Anglican opposition, the Education Act of 1870, which placed education in the hands of the state by permitting local education boards to create schools in districts where neither the Established Church nor its Dissenting Protestant rivals had established a

school. (With the help of state grants, the Anglicans had far outdistanced their competitors in building new schools; only ten years earlier they had controlled 90 percent of the elementary schools in England and Wales.) In 1880, Parliament passed a law requiring that all children between five and ten years of age attend primary school, up to age twelve beginning in 1899, and in 1891 primary education became free. Truancy officers in working-class neighborhoods encountered resistance from parents who preferred the supplementary income from their children's work to their schooling. State inspectors maintained educational standards, requiring villages to provide better facilities for their schools and accommodations for teachers. Besides familiarizing young people with "the letters," primary schools in late Victorian Britain sought to teach them how to be "good Englishmen" and "good English wives," idealizing social harmony in Britain while espousing British "superiority" over the indigenous peoples of the empire (see Chapter 21).

In France, the Ferry Laws (passed 1879–1881, named after Minister of Education and then Premier Jules Ferry) made primary schools free, obligatory, and secular for all children from age three to thirteen. Each region was required to operate a teacher-training school. Bretons, Provençaux, Gascons, Basques, Catalans, and people speaking regional patois learned French, which became spoken by most people, although bilingualism remained common. In Italy, Italian ceased to be a language spoken only by the upper class.

The percentage of people able to read and write still varied considerably from country to country. More men could read and write than women, more urban residents than rural people. In France, where 40 percent of military conscripts had not been able to read or write at mid-century, the percentage had fallen at the turn of the century to only 6 percent. In contrast, in Dalmatia, on the Adriatic coast, only 1 of every 100 conscripts could read and write in 1870, and in Spain 70 percent of electors were illiterate in 1890. In 1860, 75 percent of Italian men and almost 90 percent of women could neither read nor write and depended on public letter writers to pen what correspondence they required. By 1914, 75 percent of all Italians were literate. Yet in southern Italy and Sicily, more than half of the children in many places still did not attend school regularly or at all. In Germany, by the turn of the century less than 1 percent of the population remained illiterate. In Russia, illiteracy fell from about 90 percent of the population in the 1860s to about 75 percent by 1910. Whereas the older, illiterate generation of Russians mistrusted education ("You can't eat books"), fearing that literacy would erode village religious culture (and perhaps also deference to elders), younger peasants ridiculed their superstitious parents and welcomed self-improvement through education.

During the 1870s and 1880s, the issue of female education surged to the forefront in Western Europe. Only women whose families were able and willing to pay the required fees received secondary education. In France, women were allowed to teach boys, but men were not permitted to

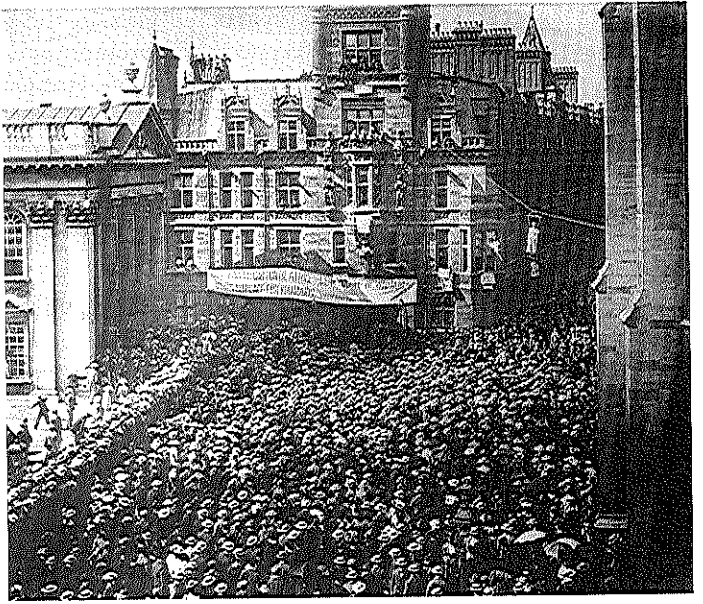
teach girls. Both lay teachers and nuns instructed girls in the domestic mission of women, stressing gender differences and promoting deference to their future husbands, as in other countries. A female German Social Democrat later recalled that the education she had received had been so "that I might one day be able to provide my husband with a proper domestic atmosphere." Schooling for boys and girls alike emphasized patriotic, secular, and politically conservative themes. Female teachers of girls were to be considered morally irreproachable and thoroughly secular mother figures within their communities.

In Western Europe, more young people attended secondary schools, the number tripling in Germany and quadrupling in France between 1875 and 1912. Many families viewed education as a way of improving the employment and marriage possibilities for their daughters.

Yet secondary education in general remained possible only for families of some means. Moreover, existing educational systems reinforced social distinctions of class, counseling "patient resignation" to one's economic and social condition. Secondary schools taught skills that led to good jobs, but they drew very few children from the lower classes. In England, boarding schools founded in the 1860s and 1870s catered to middle-class students, while the sons of "gentlemen" attended the nine old elite "public"—that is, private—schools.

Although the number of university students tripled in Europe during this period, university education remained limited to a tiny proportion of the population drawn from the upper classes. At the University of Cambridge at mid-century, 60 percent of the students were sons of landowners or clergy. In all of Britain, there were only 13,000 university students in 1913 in a total population of 36 million people, although the percentage of university students drawn from the middle classes had greatly increased and technical colleges began to attract more students. In Prussia, for example, only 1 in 1,000 university students had parents who were workers. The Russian tsars reversed the European trend during the course of the century, making it more difficult for non-nobles to attend secondary school and university. Yet, overall, the number of universities increased—for example, in Hungary, where three new ones opened their doors.

Despite this, only very slowly were women admitted to universities. In the 1860s, a few women were medical students in Paris, and the first female students appeared at the University of Zurich in 1867. In the 1870s, there were already women's colleges in England and women began university study in Denmark and Sweden. In Germany, where professors constituted the "intellectual bodyguard" of the Hohenzollern dynasty, women did not attend university until the late 1890s. Upon seeing a woman in his lecture course, the historian Heinrich von Treitschke stopped speaking. He escorted her out the door. Only in 1909 did women obtain the right to study in any German university. At the University of Cambridge, the Senate in 1897 voted overwhelmingly to deny women the right to take a Cambridge



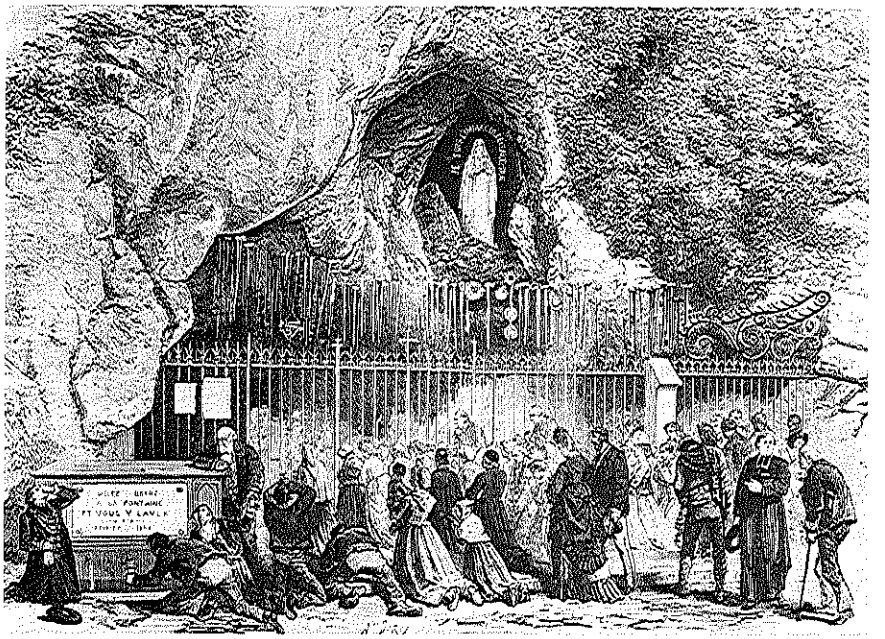
A protest opposing the admission of women to the University of Cambridge in 1881 demonstrates the unwillingness of many to erase gender distinctions in education.

degree. Women could not receive degrees or have full privileges as students at Oxford until 1920 and at Cambridge until 1948.

The Decline of Religious Practice

In a century of vigorous state secularization, particularly in Western Europe, many clergy viewed the period of rapid social change at the turn of the century with anxiety. The institutional influence of churches on states had declined dramatically in most of Europe. More than this, in some places, the influence of organized religion on society continued to wane. Secular education, espousing the cult of the nation, accelerated this trend, even though many people in Catholic countries still attended Church schools. However, fewer people went to church than earlier in the century. In London a survey at the turn of the century revealed that less than 20 percent of the population regularly attended services, a marked decline. In Spain, Galicia, the Basque provinces, and much of Castile remained devout, while much of southern Spain did not.

The first Catholic sociologists of religion found a sharp rise in "de-christianized" regions, as demonstrated by rates of couples not having church marriages or being slow to have their children baptized, or the decline in religious vocations. By the 1890s, the Church considered some



Catholic faithful at the Grotto of Lourdes.

regions in France, and most working-class districts of large European cities, to be "missionary" areas, in this way defined like China or the Congo. The loss of the Church's hold on ordinary people was reflected in the decline in the birthrate, explicable in part by increased use of birth control. Furthermore, an increasing number of French people called upon the clergy only at the time of baptism, marriage, and death (and thus were sometimes referred to as "four-wheeled Catholics," in reference to the wagons that carried an individual to each important occasion).

Yet the decline of religious practice in Europe was neither linear, nor did it occur everywhere. A revival of popular religious enthusiasm occurred in some places between 1830 and 1880, particularly among the upper classes. In Sweden the "Great Awakening" brought the revival of popular religion. In Catholic countries, lithography and printing presses helped rekindle devotion, spreading the news of religious shrines. Women were more apt to attend church than men (although in part this resulted from the fact that women live longer than men). The cult of the Virgin Mary also contributed to the feminization of religion in Catholic countries, perhaps encouraging more young women to enter convents.

The growing cult of miracles was part of a revival of popular religion, particularly in France, Italy, and Spain. Near the French town of Lourdes in the central Pyrenees, Bernadette, a peasant girl later canonized by the Church, announced in 1858 that the Virgin Mary had appeared to her.

Churchmen and their followers believed that the apparition explained the miraculous cures that seemed to occur at Lourdes, despite the skepticism of scientists. Religious pilgrimages by train to sites of miracles became big business. In the first decade of the new century, more than a million people came to Lourdes each year, many hoping to be cured of illness and disease. The popularity of pilgrimages reflected the resiliency of the Catholic Church, even in a time of growing doubt.

The Consumer Explosion

During the last decades of the nineteenth century, consumerism developed in the countries of Europe, again with considerable country-to-country variation. The new leisure activities of the Belle Époque themselves reflected the Second Industrial Revolution. Sports—principally soccer and rugby, bicycle and automobile races, and track and field—attracted participants and spectators and encouraged the formation of clubs.

Department stores reflected and helped shape the burgeoning consumer culture. First in London, Paris, and Berlin, department stores transformed the way many families shopped. They attracted prosperous clients in search of quality ready-made clothes that were less expensive than those stitched by tailors. The stores were monuments to the dynamism of bourgeois culture, displaying in their windows products that reflected material progress. Seeking to increase the volume of sales, department stores also stocked more inexpensive clothing, while adding umbrellas, toothbrushes, stationery, and much more. All of this required the organization into departments overseen by trained managers, which typified the Second Industrial Revolution. The expanding clientele of department stores included the families of shopkeepers, civil servants, and clerks of more modest means, and gradually workers as well. On an average day in the 1890s, 15,000 to 18,000 people entered the "Bon Marché"—still a Parisian landmark. Glossy catalogues in color, advancing advertising techniques, permitted shoppers to make purchases in the comfort of their homes. Advertisers began to direct their appeals at the "new woman," the housewife of taste, who had the time to create the model home and had some money to spend.

The owners of department stores wanted shopping to become an experience in itself, like a visit to a world's fair—except that one could now buy some of the displayed wonders of human innovation. Architects aimed at monumental and theatrical effects. The great department stores were enormous, stately structures topped with cupolas, with iron columns and an expanse of glass giving shoppers a sense of space and light. Shoppers could walk up grand staircases to observe the crowds below. Department stores became tourist sights, with dazzled visitors themselves becoming part of the spectacle. To Émile Zola, department stores had become the "cathedrals of modernity." For women of means, the commercialization

represented by the department stores of the West End of London became a liberating experience, a veritable zone of pleasurable consumerism.

The actress Sarah Bernhardt dramatically laid out in the Art Nouveau style in a coffin.

Leisure in the Belle Époque

During the Belle Époque, there was more to do than ever before for those with time for leisure and money to spend. The French capital set the tone for style in Europe, if not the world. Dance halls, cafés, and café-concerts, the latter offering the performances of musicians, singers, poets, comedians, jugglers, acrobats, female wrestlers, and snake charmers, lined the *grands boulevards*, attracting throngs of Parisians and tourists alike. Hundreds of thousands of Londoners and Parisians attended the theater at least once a week. The tango and the turkey trot, imported from the Americas, were banned in some establishments. German Emperor William II forbade officers from dancing these steps while in uniform.

The talented and beautiful actress Sarah Bernhardt (1844–1923) embodied images of fin-de-siècle Europe. The daughter of a Dutch immigrant, she became famous for her dramatic expressiveness and ability to communicate tears to an audience through her supremely evocative voice. Bernhardt learned her trade from the traditions of the popular boulevard theater. Renowned for her dramatic gestures (as a young woman she asked a photographer to take a picture of her in a coffin) and for a variety of sexual liaisons, Sarah Bernhardt's worldwide fame was such that the American circus entrepreneur P. T. Barnum, upon hearing that she risked the amputation of a leg, offered her a fortune if she would allow him to take it on the road and exhibit it with his famous circus.

Sports in Mass Society

Sports emerged as a prominent feature of mass society during the last decades of the century, a phenomenon linked to modern transportation and to a general increase in leisure time. The first automobile race was held in 1894 in France. Some of the cars were powered by electricity, others by

gasoline or even steam. Cycling competitions also generated enormous public interest. Sporting newspapers catered to fans. Competition between two cycling clubs led to the first Tour de France race in 1903, in which riders covered almost 1,500 miles in nineteen days.

Not only did people watch bicycle races, many rode bicycles themselves, both for leisure and as a source of transportation. A simple mechanism, the bicycle nonetheless reflected the technological innovation and mass production of the Second Industrial Revolution. By the late 1880s, bicycles were lighter, more affordable, and more easily repaired or replaced. Their manufacture became a major industry, with 375,000 produced in France by 1898 and 3.5 million in 1914.

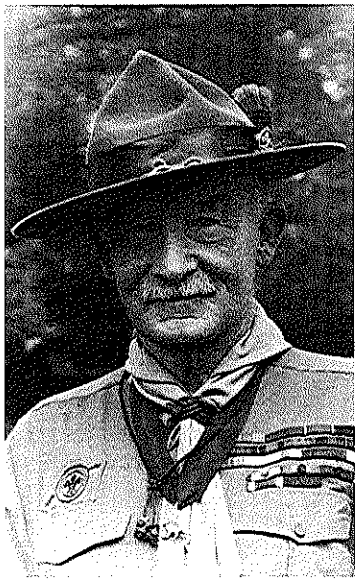
Both men and women rode bicycles. But some men complained that the clothes women wore while riding bicycles were unfeminine. Some worried that female cyclists might compromise the middle-class domestic ideal of the "angel of the house." Moralists were concerned that the jolts of rough paths and roads might interfere with childbearing, or even lead to debauchery by generating physical pleasure. The president of a feminist congress in 1896, however, toasted the "egalitarian and leveling bicycle." It helped free women from the corset, "a new Bastille to be demolished." The bicycle may have also changed what some people considered the feminine ideal from plumpness to a more svelte line.

Team sports also quickly developed as a leisure activity during the second half of the nineteenth century. The two most popular team sports in Europe, football (soccer in the United States) and rugby, both began in England. Rugby, which developed at Cambridge and Oxford Universities in the 1860s, was an upper-class sport. Football had much earlier origins, perhaps going back to when Vikings and Russians used to "kick the Dane's head around"—literally. But football, which also had university origins, evolved into a plebeian sport, like boxing, which was to English workers what rowing, cricket, and golf became to the upper classes. Professional football began in England in 1863; eight years later, there were fifteen clubs playing for the championship. The new century brought the first major brawl between supporters of rival teams: a match between the Catholic Celtics and the Protestant Rangers of Glasgow ended with the stadium burned to the ground. In 1901, 111,000 spectators watched the English Cup Final.

Baron Pierre de Coubertin (1863–1937), a French noble who feared that the young men of his country were becoming soft, organized the first modern Olympic Games, held in Athens in 1896 in homage to the Greek creators of the Olympiad. An Anglophile, he revered the contemporary image of hard-riding, athletic upper-class Englishmen playing sports at Eton and Cambridge and then going on to expand the British Empire.

There was more to the rise of sports and the cult of physical vigor than simply games and fun. The development of sports culture also reflected the mood of aggressive nationalism. The popularity of Darwin's theory of the evolution of species led to a growing preoccupation with the comparative

characteristics of specific races, or peoples. "Social Darwinists" misapplied the theory of "survival of the fittest" to society, including international sports competition. Games became hotly competitive. Moreover, the development of feminism in Western Europe may have contributed to what has been called a "crisis of masculinity," by which many men saw the strengthening of the "weaker sex" as the weakening of men. By this view, growing interest in sports competition was an affirmation of masculinity. Furthermore, the emerging interest in the times it took to run distances may have reflected fascination with scientific management.



Robert Baden-Powell, founder of the Boy Scouts.

The burgeoning interest in sports touched, above all, the young. In Germany, "wandering youth" clubs (*Wandervogel*) became popular, sending young boys out to camp under the stars. In Great Britain, Robert Baden-Powell (1857–1941) founded the Boy Scouts. After being rejected for admission to the University of Oxford and finding his vocation among young men in the army, Baden-Powell in 1908 organized the Boy Scouts in the hope of developing "among boys . . . a spirit of self-sacrifice and patriotism, and generally to prepare them to become good citizens." The uniform Baden-Powell had worn in South Africa—a Stetson hat, neckerchief, and khaki shorts—became that of the Boy Scouts, and their motto, "Be prepared."

Interest in sports touched all classes and reflected class differences. The poet Rudyard Kipling (1865–1936), who disliked sports in general, called cricket players (who tended to be from a loftier social class than his own) "fools." Football players, most of whom were from the working class, he dismissed as "oafs." People of great means were no longer the only people able to enjoy sports. While the upper classes had their own sporting associations, which retained a preference for horse racing—"the sport of kings"—working-class cycling and gymnastic clubs also began to spring up in the 1880s in Western Europe, particularly as workers won a shorter workweek and workday.

Conclusion

The Second Industrial Revolution transformed the way many Europeans lived. Electricity brought light to growing cities and towns, along whose

boulevards, tramways and automobiles now carried passengers. Most Europeans could now read and write, but they were—at least in Western Europe—less likely to go to church regularly than earlier generations. Most people lived longer and better than ever before. At the same time, economic and social inequalities generated union organization, the growth of mass political parties—notably a variety of socialist movements—and waves of social protest. Nationalism became a political force in many countries during the last three decades of the nineteenth century and the beginning of the twentieth century, engulfing not only the industrialized constitutional monarchies and republics of western and southern Europe but also the empires of central and eastern Europe.

The rapid pace of material progress and scientific and technological advances generated innovative, complex cultural responses during the remarkable years that brought the nineteenth century to a close and saw the dawning of the modern world in the first years of the twentieth century.