

Chronology

So that the events in this volume may be placed in a larger historical context, the following is a general chronology of important historical, scientific, and social events along with specific events related to the subject of this volume.

1750–1799

- 1787:** The Constitutional Convention in Philadelphia adopts the U.S. Constitution.
- 1789:** The Declaration of the Rights of Man is issued in France.
- 1790:** The first U.S. census is taken.
- 1791:** The states ratify the Bill of Rights, the first ten amendments to the U.S. Constitution.

1800–1849

- 1800:** World population reaches 1 billion.
- 1801:** Great Britain and Ireland unite.
- 1803:** Napoleonic Wars begin. Napoleon's army conquers much of Europe before Napoleon is defeated at Waterloo in 1815.
- 1803:** The United States pays France \$15 million for the Louisiana Territory extending from the Mississippi River to the Rocky Mountains.
- 1808:** The importation of slaves is outlawed in the United States, but the institution of African slavery continues until 1864.
- 1812:** The North American War of 1812 between the United States and the United Kingdom of Great Britain and Ireland begins. The war lasts until the beginning of 1815.
- 1814:** The Congress of Vienna redraws the map of Europe after the defeat of Napoleon.
- 1819:** South American colonial revolutions begin when Columbia declares its independence from Spain in 1819.

1820: The temperance movement begins in the United States.

1821: Mexico declares independence from Spain.

1821: Jean-Louis Prévost (1790–1850), Swiss physician, jointly publishes a paper with French chemist Jean-Baptiste-Andre Dumas (1800–1884) that demonstrates for the first time that spermatozoa originate in tissues of the male sex glands. In 1824 they also give the first detailed account of the segmentation of a frog's egg.

1822: American Colonization Society advocates the repatriation of freed African slaves to the Colony of Liberia.

1822: Jean-François Champollion (1790–1832), French historian and linguist, deciphers Egyptian hieroglyphics using the Rosetta Stone. He is the first to realize that some of the signs are alphabetic, some syllabic, and some determinative (standing for a whole idea or object previously expressed).

1822: William Church (c.1778–1863), American-English inventor, patents a machine that sets type. Patented in Boston, his machine consists of a keyboard on which each key releases a piece of letter type that is stored in channels in a magazine.

1829: Lambert-Adolphe-Jacques Quetelet (1796–1874), Belgian statistician and astronomer, gives the first statistical breakdown of a national census. He correlates death with age, sex, occupation, and economic status in the Belgian census.

1830: The Indian Removal Act forces the removal of Native Americans living in the eastern part of the United States.

- 1831:** Charles Robert Darwin began his historic voyage on the H.M.S. *Beagle* (1831–1836). His observations during the voyage lead to his theory of evolution by means of natural selection.
- 1832:** The advent of the telegraph.
- 1833:** A washboard is patented in the United States. This simple wooden-framed device has a corrugated rectangular surface that is used for scrubbing clothes clean.
- 1835:** Rubber nipples are introduced for infant nursing bottles.
- 1836:** Johann Nikolaus von Dreyse (1787–1867), German inventor, patents the “needle” rifle with a bolt breech-loading mechanism. This gun is loaded through the rear of the barrel.
- 1838:** More than 15,000 Cherokee Indians are forced to march from Georgia to present-day Oklahoma on the “Trail of Tears.”
- 1838:** Samuel Finley Breese Morse (1791–1872) and Alfred Vail (1807–1859) unveil their telegraph system.
- 1839:** Theodore Schwann (1810–1882), German physiologist, extends the theory of cells from plants to animals. He states in his book, *Mikroskopische Untersuchungen*, that all living things are made up of cells, each of which contains certain essential components. He also coins the term “metabolism” to describe the overall chemical changes that take place in living tissue.
- 1840:** John William Draper (1811–1882), American chemist, takes a daguerreotype portrait of his sister, Dorothy. This is the oldest surviving photograph of a person.
- 1840:** Pierre-Charles-Alexandre Louis (1787–1872), French physician, pioneers medical statistics, being the first to compile systematically records of diseases and treatments.
- 1841:** Horace Greeley (1811–1872), American editor and publisher, founds the *New York Tribune* which eventually becomes the *Herald Tribune* after a merger in 1924.
- 1842:** John Benne Lawes (1814–1900), English agriculturalist, patents a process for treating phosphate rock with sulfuric acid to produce superphosphate. He also opens the first fertilizer factory this year, thus beginning the artificial fertilizer industry.
- 1842:** Samuel Finley Breese Morse (1791–1872), American artist and inventor, lays the first underwater telegraph cable in New York Harbor. It fails due to a lack of proper insulation materials.
- 1842:** The first shipment of milk by rail in the United States is successfully accomplished.
- 1844:** Robert Chambers (1802–1871), Scottish publisher, publishes anonymously his *Vestiges of the Natural History of Creation*. This best-selling book offers a sweeping view of evolution and although incorrect in many specifics, it does pave the way for Darwin’s theory by familiarizing the public with evolutionary concepts.
- 1845:** The potato famine begins in Ireland. Crop failures and high rents on tenant farms cause a three-year famine. Millions of Irish immigrate to flee starvation.
- 1846:** The Mexican War begins as the United States attempts to expand its territory in the Southwest.
- 1846:** Oliver Wendall Holmes (1809–1894), American author and physician, first suggests the use of the terms “anaesthesia” and “anaesthetic” in a letter to William Thomas Green Morton (1819–1868), American dentist.
- 1847:** Claude-Felix-Abel-Niepce de Saint-Victor (1805–1870) of France first uses light sensitive materials on glass for photographs. He coats a glass plate with albumen containing iodide of potassium which, after drying, is coated with aceto-silver nitrate, washed in distilled water, and exposed.
- 1847:** John Collins Warren (1778–1856), American surgeon, introduces ether anesthesia for general surgery. It is soon taken up worldwide as an essential part of surgery.
- 1847:** Richard March Hoe (1812–1886), American inventor and manufacturer, patents what proves to be the first successful rotary printing press. He discards the old flatbed press and places the type on a revolving cylinder. This revolutionary system is first used by the *Philadelphia Public Ledger* this same year, and it produces 8,000 sheets per hour printed on one side.
- 1848:** Karl Marx publishes *The Communist Manifesto*.
- 1848:** Delegates at the Seneca Falls Convention on Woman Rights advocate equal property and voting rights for women.
- 1848:** A series of political conflicts and violent revolts erupt in several European nations. The conflicts are collectively known as the Revolution of 1848.
- 1848:** A group of six New York newspapers form an association or news agency to share telegraph costs. It is later called the Associated Press.
- 1848:** The first large-scale department store opens in the United States. The Marble Dry Goods Palace in New York occupies an entire city block.

- 1849:** Elizabeth Blackwell becomes the first woman in the United States to receive a medical degree. She graduates this year from Geneva College (now a part of Syracuse University) in New York.
- 1849:** John Snow (1813–1858), English physician, first states the theory that cholera is a water-borne disease and that it is usually contracted by drinking. During a cholera epidemic in London in 1854, Snow breaks the handle of the Broad Street Pump, thereby shutting down what he considered to be the main public source of the epidemic.
- 1850–1899**
- 1851:** James Harrison, Scottish-Australian inventor, builds the first vapor-compression refrigerating machinery to be used in a brewery.
- 1851:** James T. King of the United States invents a washing machine that uses a rotating cylinder. It is hand-powered and made for home use.
- 1852:** Harriet Beecher Stowe's novel *Uncle Tom's Cabin* is published. It becomes one of the most influential works to stir anti-slavery sentiments.
- 1854:** Crimean War begins between Russia and allied forces of Great Britain, Sardinia, France, and the Ottoman Empire.
- 1854:** Violent conflicts erupt between pro-and anti-slavery settlers in Kansas Territory. The "Bleeding Kansas" violence lasts five years.
- 1854:** Florence Nightingale (1823–1910), English nurse, takes charge of a barracks hospital when the Crimean War breaks out. Through dedication and hard work, she goes on to create a female nursing service and a nursing school at St. Thomas' Hospital (1860). Her compassion and common sense approach to nursing set new standards and create a new era in the history of the sick and wounded.
- 1854:** Cyrus West Field (1819–1892), American financier, forms the New York, Newfoundland and London telegraph Company and proposes to lay a transatlantic telegraph cable.
- 1855:** Alfred Russel Wallace (1823–1913), English naturalist, publishes his paper "On The Law Which Has Regulated the Introduction of New Species." Although this is written before Wallace conceives of the notion of natural selection, it shows him in the process of anticipating Darwin.
- 1856:** *Illustrated London News* becomes the first periodical to include regular color plates.
- 1857:** Supreme Court of the United States decision in *Dred Scott v. Sanford* holds that slaves are not citizens and that Congress cannot prohibit slavery in the individual states.
- 1857:** The Indian Mutiny revolt against British colonial rule in India begins.
- 1858:** The transatlantic cable is first opened with an exchange of greetings between English Queen Victoria (1819–1901) and U. S. President James Buchanan (1791–1868). Several weeks later, a telegraph operator applies too much voltage and ruins the cable connection.
- 1858:** Mary Anna Elson (1833–1884), German-American physician, is the first Jewish woman to graduate from the Women's Medical College of Philadelphia. She practices in Philadelphia and later in Indiana.
- 1859:** Charles Robert Darwin (1809–1882), English naturalist, publishes his landmark work *On the Origin of Species by Means of Natural Selection*. This classic of science establishes the mechanism of natural selection of favorable, inherited traits or variations as the mechanism of his theory of evolution.
- 1859:** Ferdinand Carre (1824–1900), French inventor, introduces a refrigeration machine that uses ammonia as a refrigerant and water as the absorbent. This method becomes widely adopted.
- 1860:** The U. S. Congress institutes the U. S. Government Printing Office in Washington, D. C.
- 1861:** The Civil War begins in the United States.
- 1861:** The popular press begins in England with the publication of the *Daily Telegraph*.
- 1864:** U.S. President Abraham Lincoln issues the Emancipation Proclamation, freeing the slaves in Union-occupied lands.
- 1865:** The Civil War ends with the surrender of the secession states. The United States is reunified.
- 1865:** President Lincoln is assassinated by John Wilkes Booth.
- 1865:** The Thirteenth and Fourteenth Amendments to the U.S. Constitution are ratified. The Thirteenth Amendment outlaws slavery; the Fourteenth Amendment makes all persons born or naturalized in the United States to be U.S. citizens and extends equal protection under the law.
- 1867:** Britain grants Canada home rule.
- 1869:** The first transcontinental railroad across the United States is completed.
- 1870:** The Franco-Prussian War (1870–1871) begins.

- 1871:** The era of New Imperialism, or “empire for empire’s sake,” starts a multinational competition for colonies in Africa, Asia, and the Middle East.
- 1871:** Charles Robert Darwin (1809–1882), English naturalist, publishes his *The Descent of Man, and Selection in Relation to Sex*. This work extends his theory of evolution by applying it to humans.
- 1874:** Thomas Alva Edison (1847–1931), American inventor, perfects his quadruplex telegraph. It is able to transmit two messages over one telegraph line or four messages in each direction over two wires.
- 1875:** Robert Augustus Chesebrough (1837–1933), American manufacturer, first introduces petrolatum, which becomes known by its product name of Vaseline. This smooth, semisolid blend of mineral oil with waxes crystallized from petroleum becomes useful as a lubricant, carrier, and waterproofing agent in many products.
- 1876:** Alexander Bell files for a patent for the telephone.
- 1876:** Robert Koch (1843–1910), German bacteriologist, is able to cultivate the anthrax bacteria in culture outside the body. He then studies its life cycle and learns how to defeat it. During the next six years, Koch isolates the tubercle bacillus and discovers the cause of cholera.
- 1876:** The American Library Association is founded in Philadelphia, Pennsylvania by American librarian, Melvil Dewey (1851–1931), the founder of the decimal system of library classification.
- 1877:** Reconstruction, the period of rebuilding and reunification following the U.S. Civil War, ends.
- 1879:** Albert Ludwig Siegmund Neisser (1855–1916), German dermatologist, discovers gonococcus, the pus-producing bacterium that causes gonorrhea.
- 1879:** John Shaw Billings (1838–1913), American surgeon, and Robert Fletcher (1823–1912) of England issue the first volume of *Index Medicus*. This massive medical bibliography is initially arranged by author and subject and continues today.
- 1880:** Louis Pasteur (1822–1895), French chemist, first isolates and describes both streptococcus and staphylococcus (both in puerperal septicemia).
- 1883:** *Journal of the American Medical Association* is first published.
- 1884:** International conference is held in Washington, D. C., at which Greenwich, England, is chosen as the common prime meridian for the entire world.
- 1885:** Karl Benz invents in automobile in Germany.
- 1885:** Edouard van Beneden (1846–1910), Belgian cytologist, proves that chromosomes persist between cell divisions. He makes the first chromosome count and discovers that each species has a fixed number of chromosomes. He also discovers that in the formation of sex cells, the division of chromosomes during one of the cell divisions was not preceded by a doubling because each egg and sperm cell has only half the usual count of chromosomes.
- 1885:** James Leonard Corning (1855–1923), American surgeon, is the first to use cocaine as a spinal anesthetic.
- 1885:** Louis Pasteur (1822–1895), French chemist, inoculates a boy, Joseph Meister, against rabies. He had been bitten by a mad dog and the treatment saves his life. This is the first case of Pasteur’s use of an attenuated germ on a human being.
- 1886:** Richard von Krafft-Ebing (1840–1902), German neurologist, publishes his landmark case history study of sexual abnormalities, *Psychopathia Sexualis*, and helps found the scientific consideration of human sexuality.
- 1887:** Theodor Boveri observes the reduction division during meiosis in *Ascaris* and confirms August Weismann’s predictions of chromosome reduction during the formation of the sex cells.
- 1888:** First incubator for infants in the United States is built by William C. Deming.
- 1888:** Heinrich Wilhelm Gottfried Waldeyer-Hartz (1836–1921), German anatomist, first introduces the word “chromosomes.”
- 1889:** Francis Galton (1822–1911), English anthropologist, culminates his work on inheritance and variation with his book *Natural Inheritance*. It influences Karl Pearson and begins the science of biometrics or the statistical analysis of biological observations and phenomena.
- 1889:** Pasteur Institute first opens in Paris.
- 1889:** Richard Altmann (1852–1900), German histologist, isolates and names nucleic acid.
- 1890:** The U.S. Census Bureau announces that the American frontier is closed.
- 1890:** Herman Hollerith (1860–1929), American inventor, puts his electric sorting and tabulating machines to work on the U. S. Census. He wins this contract after a trial “run-off” with two other rival systems and his system performs in one year what would have taken eight years of hand tabu-

lating. This marks the beginning of modern data processing.

- 1891:** Maximilian Franz Joseph Wolf (1863–1932), German astronomer, adapts photography to the study of asteroids and demonstrates that stars appear as points in photographs while asteroids show up as short streaks. He makes the first discovery of an asteroid from photographs, and during his lifetime discovers over 500 asteroids in this manner.
- 1891:** Hermann Henking (1858–1942), German zoologist, describes sex chromosomes and autosomes.
- 1892:** Ellis Island becomes the chief immigration station of the eastern United States.
- 1893:** Panic of 1893 triggers a three-year economic depression in the United States.
- 1893:** Sigmund Freud (1856–1939), Austrian psychiatrist, describes paralysis originating from purely mental conditions and distinguishes it from that of organic origin.
- 1894:** Thomas Alva Edison (1847–1931), American inventor, first displays his peep-show Kinetoscopes in New York. These demonstrations serve to stimulate research on the screen projection of motion pictures as well as to entertain.
- 1895:** John Cox is the first U. S. physician to use x-rays as an adjunct to surgery.
- 1896:** Landmark Supreme Court of the United States decision, *Plessy v. Ferguson*, upholds racial segregation.
- 1896:** Edmund Beecher Wilson (1856–1939), American zoologist, publishes his major work *The Cell in Development and Heredity* in which he connects chromosomes and sex determination. He also correctly states that chromosomes affect and determine other inherited characteristics as well.
- 1897:** Guglielmo Marconi (1874–1937), Italian electrical engineer, exchanges wireless messages across 3.5 miles of water in England.
- 1897:** Havelock Ellis (1859–1939), English physician, publishes the first of his seven-volume work *Studies in the Psychology of Sex*. This contributes to the more open discussion of human sexuality and supports sex education.
- 1898:** USS Maine sinks in harbor in Havana, Cuba; Spanish-American War begins.

1900–1949

- 1901:** Guglielmo Marconi (1874–1937), Italian electrical engineer, successfully sends a radio signal from England to Newfoundland. This is the first transatlantic telegraphic radio transmission and, as such, is considered by most as the day radio is invented.
- 1902:** Clarence Erwin McClung (1870–1946), American zoologist, isolates the “X” or sex chromosome which is combined with a “Y” chromosome in the male, as compared to two “X” chromosomes in the female.
- 1902:** Ernest H. Starling (1866–1927) and William M. Bayliss (1860–1924), both English physiologists, isolate and discover the first hormone (secretin, found in the duodenum). Starling also first suggests a name for all substances discharged into the blood by a particular organ, and it is “hormones” from the Greek word meaning to “rouse to activity.”
- 1902:** The Horn & Hardart Baking Company of Philadelphia, Pennsylvania creates an early automat that offers food for a “nickel in a slot.”
- 1903:** Wright brothers make first successful flight of a controlled, powered airplane that is heavier than air.
- 1903:** *The Great Train Robbery*, the first modern movie, debuts.
- 1903:** Walter S. Sutton (1876–1916) of the United States writes a short paper in which he states the chromosome theory of inheritance. This important idea that the hereditary factors are located in the chromosomes is also offered independently by Theodor Boveri (1862–1915) of Germany.
- 1904:** Russo-Japanese War (1904–1905): Japan gains territory on the Asian mainland and becomes a world power.
- 1904:** First radical operation for prostate cancer is performed by the American urologist Hugh Hampton Young (1870–1945).
- 1904:** Ivan Petrovich Pavlov (1849–1936), Russian physiologist, is awarded the Nobel Prize for Physiology or Medicine for his work establishing that the nervous system plays a part in controlling digestion and by helping to found gastroenterology.
- 1905:** Albert Einstein (1879–1955), German-Swiss-American physicist, uses Planck’s theory to develop a quantum theory of light that explains

- the photoelectric effect. He suggests that light has a dual, wave-particle quality.
- 1905:** Fritz Richard Schaudinn (1871–1906), German zoologist, discovers *Spirocheta pallida*, the organism or parasite causing syphilis. His discovery of this almost invisible parasite is due to his consummate technique and staining methods.
- 1905:** Albert Einstein (1879–1955), German-Swiss-American physicist, submits his first paper on the special theory of relativity titled “Zur Elektrodynamik bewegter Korpen.” It states that the speed of light is constant for all conditions and that time is relative or passes at different rates for objects in constant relative motion. This is a fundamentally new and revolutionary way to look at the universe and it soon replaces the old Newtonian system.
- 1905:** Albert Einstein (1879–1955), German-Swiss-American physicist, publishes his second paper on relativity in which he includes his famous equation stating the relationship between mass and energy is $E = mc^2$. In this equation, E is energy, m is mass, and c is the velocity of light. This contains the revolutionary concept that mass and energy are only different aspects of the same phenomenon.
- 1905:** Hermann Walter Nernst (1864–1941), German physical chemist, announces his discovery of the third law of thermodynamics. He finds that entropy change approaches zero at a temperature of absolute zero and deduces from this the impossibility of attaining absolute zero.
- 1905:** Alfred Binet (1857–1911), French psychologist, devises the first of a series of tests (1905–1911) that make him the “father of intelligence testing.”
- 1905:** Edmund Beecher Wilson (1856–1939), American zoologist, and Nettie M. Stevens independently discover the connection between chromosomes and sex determination.
- 1905:** Robert Koch (1843–1910), German bacteriologist, is awarded the Nobel Prize for Physiology or Medicine for his investigations and discoveries in relation to tuberculosis. He is one of the founders of the science of bacteriology.
- 1906:** Marie Skłodowska Curie (1867–1934), Polish-French chemist, assumes her husband Pierre’s professorship at the Sorbonne after he is killed in a traffic accident. She becomes the first woman ever to teach there.
- 1907:** Alva T. Fisher of the United States designs the first electric washing machine. Manufactured by the Hurley Machine Corporation, it is the first washing machine that does not require an operator to crank a handle to perform the washing action.
- 1907:** Boris Rosing, a lecturer at the Technological Institute, St. Petersburg, Russia, first introduces the idea of using a cathode ray tube as a means of reproducing a television picture. Known as “Rosing’s Apparatus,” he names it the “electric eye.” Although this system uses an electronic receiver, it still has a mechanical camera.
- 1907:** Clemens Peter Pirquet von Cesenatico (1874–1929), Austrian physician, and Bela Schick, Austrian pediatrician, introduce the notion and term “allergy.”
- 1907:** The first powdered soap for home use is called “Persil” and is sold by Henkel & Co. in Germany.
- 1908:** A. A. Campbell-Swinton of England first suggests the use of a cathode ray tube as both the transmitter (camera) and receiver. This is the first description of the modern, all-electronic television system.
- 1909:** Phoebus Aaron Theodore Levene (1869–1940), Russian-American chemist, discovers the chemical distinction between DNA (deoxyribonucleic acid) and RNA (ribonucleic acid).
- 1910:** Charles-Jules-Henri Nicolle (1866–1936), French bacteriologist, discovers the viral origin of influenza.
- 1910:** Harvey Cushing (1869–1939), American surgeon, and his team present the first experimental evidence of the link between the anterior pituitary and the reproductive organs.
- 1912:** The value of wireless at sea is demonstrated during the *S.S. Titanic* disaster as those who get to lifeboats are saved by rescuing vessels.
- 1913:** Alfred Henry Sturtevant (1891–1970), American geneticist, produces the first chromosome map, showing five sex-linked genes.
- 1914:** Archduke Franz Ferdinand of Austria-Hungary and his wife Sophie are assassinated; World War I begins.
- 1914:** Panama Canal is completed.
- 1914:** The massacre of 1.5 million Armenians by the Turkish government begins; it is later known as the Armenian Genocide.
- 1914:** John Broadus Watson (1878–1958), American psychologist, launches his theory of behaviorism. This approach, which says that brain activity comprises responses to external stimuli, restricts psychology to the objective, experimental study of human behavior or human responses to stimuli.

- 1915:** German U-boats sink the British passenger steamer RMS Lusitania.
- 1916:** Easter Rising in Ireland begins the fight for Irish independence.
- 1917:** The United States enters World War I, declaring war on Germany.
- 1917:** The Russian Revolution begins as Bolsheviks overthrow the Russian monarchy.
- 1918:** World War I ends.
- 1918:** The Great Flu hits; nearly twenty million perish during the two-year pandemic.
- 1918:** Thousands of political dissidents are tried and imprisoned during the Red Terror in Russia; five million die of famine as Communists collectivize agriculture and transform the Soviet economy.
- 1919:** The ratification of the Nineteenth Amendment to the U.S. constitution gives women the right to vote.
- 1919:** Mahatma Gandhi initiates satyagraha (truth force) campaigns, beginning his nonviolent resistance movement against British rule in India.
- 1920:** The Red Scare (1920–1922) in the United States leads to the arrest, trial, and imprisonment of suspected communist, socialist, and anarchist “radicals.”
- 1920:** KDKA, a Pittsburgh Westinghouse station, transmits the first commercial radio broadcast.
- 1922:** Twenty-six of Ireland’s counties gain independence, while the remaining six become Northern Ireland and remain under British rule.
- 1922:** Mussolini forms Fascist government in Italy.
- 1922:** The British Broadcasting Company (BBC) is formed.
- 1922:** The first canned baby food is manufactured in the United States by Harold H. Clapp of New York.
- 1923:** Max Wertheimer (1880–1943), German psychologist, publishes *Untersuchungen zur Lehre der Gestalt*, which first originates the concept of Gestalt psychology. This school of psychological thought attempts to examine the total, structured forms of mental experience.
- 1925:** Geneva Protocol, signed by sixteen nations, outlaws the use of poisonous gas as an agent of warfare.
- 1925:** The Scopes Monkey Trial (July 10–25) in Tennessee debates the state’s ban on the teaching of evolution.
- 1927:** Charles Lindbergh makes the first solo nonstop transatlantic flight.
- 1927:** Lemuel Clyde McGee, American biochemist, first obtains an active extract of the male sex hormone from bull testicles.
- 1927:** Selmar Aschheim and Bernhardt Zondek, both German physicians, devise a pregnancy test in which the subject’s urine is injected subcutaneously in immature female mice. A positive reaction is marked by congestion and hemorrhages of the ovaries in the mice.
- 1928:** Alexander Fleming discovers penicillin.
- 1929:** Black Thursday. The U.S. stock market crashes, beginning the Great Depression.
- 1929:** Edward Adelbert Doisy (1893–1986), American biochemist, first isolates estrone from the urine of pregnant women.
- 1929:** Adolf Friedrich Johann Butenandt (1903–1994), German chemist, isolates the first of the sex hormones, estrone. He obtains this female sex hormone from the urine of pregnant women.
- 1929:** Casimir Funk, Polish biochemist, obtains active male hormone from male urine.
- 1930:** Ronald Aylmer Fisher (1890–1962), English biologist, publishes *The Genetical Theory of Natural Selection* which, together with Sewall Wright’s *Mendelian Populations* (1931), lays the mathematical foundations of population genetics.
- 1930:** Rubber condoms made of a thin latex are introduced.
- 1932:** Hattie Wyatt Caraway of Arkansas is the first woman elected to the U.S. Senate.
- 1932:** Nazis capture 230 seats in the German Reichstag during national elections.
- 1932:** Werner Karl Heisenberg (1901–1976), German physicist, wins the Nobel Prize for Physics for the creation of quantum mechanics, the application of which has led to the discovery of the allotropic forms of hydrogen.
- 1932:** RCA (Radio Corporation of America) makes experimental television broadcasts from the Empire State Building in New York.
- 1933:** Adolf Hitler named German chancellor.
- 1933:** President Franklin D. Roosevelt announces the New Deal, a plan to revitalize the U.S. economy and provide relief during the Great Depression. The U.S. unemployment rate reaches twenty-five percent.
- 1933:** U.S. President Franklin Delano Roosevelt (1882–1945) makes the first of his “fireside chats” to the American people. He is the first national leader to use the radio medium comfortably and

regularly to explain his programs and to garner popular support.

- 1933:** Christopher Howard Andrewes, English pathologist, Wilson Smith (1897–1965), English bacteriologist and virologist, and Patrick Playfair Laidlaw (1881–1940), English physician, demonstrate the viral nature of the human influenza agent by transmitting it to a ferret and then transferring the virus onto a suitable culture medium.
- 1934:** George W. Beadle, working with Boris Ephrussi, in collaboration with A. Kuhn and A. Butenandt, worked out the biochemical genetics of eye-pigment synthesis in *Drosophila* and *Ephestia*, respectively.
- 1934:** John Marrack begins a series of studies that leads to the formation of the hypothesis governing the association between an antigen and the corresponding antibody.
- 1935:** Germany's Nuremberg Laws codify discrimination and denaturalization of the nation's Jews.
- 1935:** Antonio Caetano de Abreu Freire Egas Moniz (1874–1955), Portuguese surgeon, performs the first lobotomy. This operation, which severs the patient's prefrontal lobes of the brain, opens a new field called psychosurgery. It is usually employed as a last resort and eventually is done away with once tranquilizers and other mind-affecting drugs are discovered.
- 1935:** K. David and associates first isolate a pure crystalline hormone from testicular material and name it testosterone.
- 1936:** Herbert McLean Evans (1882–1971), American anatomist and embryologist, and his group first isolate the interstitial cell stimulating hormone (ICSH). Also called luteinizing hormone, it is concerned with the regulation of the activity of the gonads or sex glands and is produced by the pituitary gland.
- 1938:** Anti-Jewish riots begin across Germany. The destruction and looting of Jewish-owned businesses is known as *Kristallnacht*, "Night of the Broken Glass."
- 1938:** Hitler marches into Austria; political and geographical union of Germany and Austria proclaimed. Munich Pact—Britain, France, and Italy agree to let Germany partition Czechoslovakia.
- 1938:** Mass hysteria among American radio listeners is caused by a dramatic reenactment of H. G. Wells' (1866–1946) novel *War of the Worlds*. American actor, writer, and director George Orson Welles (1915–1985) leads many to believe that a "gas raid from Mars" is actually happening.
- 1939:** The United States declares its neutrality in World War II.
- 1939:** Germany invades Poland. Britain, France, and Russia go to war against Germany.
- 1939:** The Holocaust (Shoah) begins in German-occupied Europe. Jews are removed from their homes and relocated to ghettos or concentration camps. The *Einsatzgruppen*, or mobile killing squads, begin the execution of one million Jews, Poles, Russians, Gypsies, and others.
- 1939:** Television debuts at the World's Fair.
- 1940:** George Wells Beadle, American geneticist, and Edward Lawrie Tatum (1909–1975), American biochemist, establish the formula "One gene = one enzyme." This discovery that each gene supervises the production of only one enzyme lays the foundation for the DNA discoveries to come.
- 1940:** Ernest Chain and E.P. Abraham detail the inactivation of penicillin by a substance produced by *Escherichia coli*. This is the first bacterial compound known to produce resistance to an antibacterial agent.
- 1941:** The U.S. Naval base at Pearl Harbor, Hawaii is bombed by the Japanese Air Force. Soon after, the United States enters World War II, declaring war on Germany and Japan.
- 1941:** The first Nazi death camp, Chelmno, opens. Victims, mainly Jews, are executed by carbon monoxide poisoning in specially designed killing vans.
- 1942:** Executive Order 9066 orders the internment of Japanese immigrants and Japanese-American citizens for the duration of World War II.
- 1942:** Enrico Fermi (1901–1954), Italian-American physicist, heads a Manhattan Project team at the University of Chicago that produces the first controlled chain reaction in an atomic pile of uranium and graphite. With this first self-sustaining chain reaction, the atomic age begins.
- 1943:** Penicillin is first used on a large scale by the U. S. Army in the North African campaigns. Data obtained from these studies show that early expectations for the new drug are correct, and the groundwork is laid for the massive introduction of penicillin into civilian medical practice after the war.
- 1945:** Auschwitz death camp is liberated by allied forces.
- 1945:** World War II and the Holocaust end in Europe.

- 1945:** Trials of Nazi War criminals begin in Nuremberg, Germany.
- 1945:** United Nations is established.
- 1945:** Displaced Persons (DP) camps are established throughout Europe to aid Holocaust survivors. In the three years following the end of World War II, many DPs immigrate to Israel and the United States.
- 1945:** First atomic bomb is detonated by the United States near Alamogordo, New Mexico. The experimental bomb generates an explosive power equivalent to between 15 and 20 thousand tons of TNT.
- 1945:** RCA Victor first offers vinyl plastic records to the public.
- 1945:** The United States destroys the Japanese city of Hiroshima with a nuclear fission bomb based on uranium-235. Three days later a plutonium-based bomb destroys the city of Nagasaki. Japan surrenders on August 14 and World War II ends. This is the first use of nuclear power as a weapon.
- 1946:** John von Neumann (1903–1957), Hungarian-American mathematician, begins work at the Institute for Advanced Study at Princeton, New Jersey to establish a digital computer project. He is soon joined by Julian Bigelow, American engineer, and American mathematician, Herman Heine Goldstein.
- 1948:** Mahatma Gandhi is assassinated in New Delhi.
- 1948:** The Soviets blockade Berlin. The United States and Great Britain begin airlift of fuel, food and necessities to West Berlin. The event, the first conflict of the Cold War, became known as the Berlin Airlift (June 26–Sept 30, 1949).
- 1948:** The United Nations issues the Universal Declaration of Human Rights.
- 1948:** Israel is established as an independent nation.
- 1948:** American zoologist and student of sexual behavior, Alfred C. Kinsey (1894–1956) first publishes his *Sexual Behavior in the Human Male*.
- 1949:** South Africa codifies apartheid.
- 1949:** Soviets test their first atomic device.
- 1951:** First successful oral contraceptive drug is introduced. Gregory Pincus (1903–1967), American biologist, discovers a synthetic hormone that renders a woman infertile without altering her capacity for sexual pleasure. It soon is marketed in pill form and effects a social revolution with its ability to divorce the sex act from the consequences of impregnation.
- 1952:** First hydrogen bomb is detonated by the United States on an atoll in the Marshall Islands.
- 1953:** Francis Harry Compton Crick, English biochemist, and James Dewey Watson, American biochemist, work out the double-helix or double spiral DNA model. This model explains how it is able to transmit heredity in living organisms.
- 1954:** Sen. Joseph R. McCarthy begins hearings of the House Un-American Activities Committee, publicly accusing military officials, politicians, media, and others of Communist involvement.
- 1954:** Landmark decision of the United States Supreme Court, *Brown v. Board of Education*, ends segregation of schools in the United States.
- 1954:** The first frozen TV dinners become available in the United States.
- 1955:** Emmett Till, age fourteen, is brutally murdered for allegedly whistling at a white woman. The event galvanizes the civil rights movement.
- 1955:** Rosa Parks refuses to give up her seat on a Montgomery, Alabama, bus to a white passenger, defying segregation.
- 1955:** Warsaw Pact solidifies relationship between the Soviet Union and its communist satellite nations in Eastern Europe.
- 1955:** Chlorpromazine and lithium are first used to treat psychiatric disorders.
- 1957:** President Eisenhower sends federal troops to Central High School in Little Rock, Arkansas, to enforce integration.
- 1957:** Soviet Union launches the first satellite, Sputnik, into space. The Space Race between the USSR and the United States begins.
- 1958:** Explorer I, first American satellite, is launched.
- 1960:** African American students in North Carolina begin a sit-in at a segregated Woolworth's lunch counter; the sit-in spreads throughout the South.
- 1961:** Soviet Cosmonaut Yuri Gagarin becomes the first human in space.
- 1961:** Berlin Wall is built.

1950–1999

- 1950:** President Truman commits U.S. troops to aid anti-Communist forces on the Korean Peninsula. The Korean War lasts from 1950–1953.

- 1961:** Bay of Pigs Invasion: the United States sponsors an invasion to overthrow Cuba's socialist government but fails.
- 1962:** *Silent Spring* published; environmental movement begins.
- 1962:** Cuban Missile Crisis.
- 1963:** Rev. Martin Luther King, Jr., delivers his "I Have a Dream" speech at a civil rights march on Washington, D.C.
- 1963:** The United States and the Soviet Union establish a direct telephone link called the "hot line" between the White House and the Kremlin. It is intended to permit the leaders of both countries to be able to speak directly and immediately to each other in times of crisis.
- 1964:** U.S. President Lyndon Johnson announces ambitious social reform programs known as the Great Society.
- 1964:** Congress approves Gulf of Tonkin resolution.
- 1964:** President Johnson signs the Civil Rights Act of 1964.
- 1965:** March to Selma: state troopers and local police fight a crowd of peaceful civil rights demonstrators, including the Rev. Martin Luther King, Jr., as the group attempted to cross a bridge into the city of Selma.
- 1965:** First U.S. combat troops arrive in South Vietnam.
- 1965:** Voting Rights Act prohibits discriminatory voting practices in the United States.
- 1965:** Watts Riots: thirty-five people are killed and 883 injured in six days of riots in Los Angeles.
- 1965:** Francois Jacob, French biologist, André-Michael Lwoff, French microbiologist, and Jacques-Lucien Monod, French biochemist, are awarded the Nobel Prize for Physiology or Medicine for their discoveries concerning genetic control of enzyme and virus synthesis.
- 1965:** Geoffrey Harris, British anatomist, shows that sexuality is built into the hypothalamus.
- 1966:** Betty Friedan and other leaders of the feminist movement found the National Organization for Women (NOW).
- 1966:** Choh Hao Li, Chinese-American chemist and endocrinologist, describes the structure of human growth hormone and first synthesizes it (1966–1971).
- 1967:** The new fertility drug clomiphene is introduced. Although it can result in multiple births, it proves very successful in increasing a woman's chances of getting pregnant.
- 1968:** Rev. Martin Luther King, Jr., is assassinated in Memphis, Tennessee.
- 1968:** Cesar Chavez leads a national boycott of California table grape growers, which becomes known as "La Causa."
- 1969:** Stonewall Riots in New York City spark the gay rights movement.
- 1969:** The United States successfully lands a manned mission, Apollo 11, on the moon.
- 1970:** Four anti-war demonstrators are killed when the National Guard fires into a crowd of protesters at Kent State University.
- 1972:** Arab terrorists massacre Israeli athletes at the Olympic Games in Munich, Germany.
- 1973:** Roe v. Wade: Landmark Supreme Court decision legalizes abortion on demand during the first trimester of pregnancy.
- 1973:** The American Psychiatric Association removes the classification of homosexuality as a mental disorder.
- 1973:** Last U.S. troops exit Vietnam.
- 1974:** U.S. President Richard Nixon resigns as a result of the Watergate scandal.
- 1975:** As the South Vietnamese government surrenders to North Vietnam, the U.S. Embassy and remaining military and civilian personnel are evacuated.
- 1976:** Steve Jobs and Steve Wozniak invent personal computer.
- 1977:** Earliest known AIDS (Acquired Immunodeficiency Syndrome) victims in the United States are two homosexual men in New York who are diagnosed as suffering from Kaposi's sarcoma.
- 1978:** The Camp David Accord ends a three-decade long conflict between Israel and Egypt.
- 1979:** Three Mile Island nuclear reactor in Pennsylvania suffers a near meltdown.
- 1979:** Iran hostage crisis begins when Iranian students storm the U.S. embassy in Teheran. They hold sixty-six people hostage who are not released until 1981, after 444 days in captivity.
- 1980:** 130,000 Cuban refugees flee to the United States during the Mariel Boatlift (April 4–October 31).
- 1980:** President Carter announces that U.S. athletes will boycott Summer Olympics in Moscow to protest Soviet involvement in Afghanistan.

- 1981:** Sandra Day O'Connor is sworn in as the first woman justice on the Supreme Court of the United States.
- 1981:** Urban riots break out in several British cities, protesting lack of opportunity for minorities and police brutality.
- 1981:** AIDS identified.
- 1982:** Deadline for ratification of the Equal Rights Amendment to the Constitution; without the necessary votes the amendment failed.
- 1982:** New surgical technique for prostate cancer that does not result in impotency is developed by Patrick Walsh.
- 1984:** Steen A. Willadsen successfully clones sheep.
- 1986:** U.S. space shuttle Challenger explodes seventy-three seconds after liftoff.
- 1986:** Chernobyl nuclear disaster in the Soviet Union contaminates large swath of Eastern Europe with radioactive fallout. The disaster is the worst nuclear accident to date.
- 1987:** U.S. President Ronald Reagan challenges Soviet leader Mikhail Gorbachev to open Eastern Europe and the Soviet Union to political and economic reform.
- 1988:** Henry A. Erlich of the United States and colleagues develop a method for identifying an individual from the DNA in a single hair.
- 1989:** The Berlin Wall falls.
- 1989:** Tiananmen Square protest in Beijing, China begins.
- 1989:** Oil tanker Exxon Valdez runs aground in Prince William Sound, spilling more than 10 million gallons of oil (March 24).
- 1989:** Denmark becomes the first country to legalize same-sex partnerships.
- 1989:** Tim Berners-Lee invents the World Wide Web while working at CERN.
- 1990:** Human Genome Project begins in the United States.
- 1990:** The U.S. Census includes questions about gay couples and families.
- 1991:** The Soviet Union dissolves.
- 1991:** Persian Gulf War (January 16-February 28): The United States leads "Operation Desert Storm" to push Iraqi occupying forces out of Kuwait.
- 1991:** The sex of a mouse is changed at the embryo stage.
- 1991:** U.S. FDA (Food and Drug Administration) announces it will speed up its process for approving drugs. This change in procedure is due to the protests of AIDS activists.
- 1992:** U.S. and Russian leaders formally declare an end to the Cold War.
- 1992:** L.A. Riots: The acquittal of four white police officers charged with police brutality in the beating of black motorist Rodney King sparks days of widespread rioting in Los Angeles.
- 1992:** WHO (World Health Organization) predicts that by the year 2000, thirty to forty million people will be infected with the AIDS-causing HIV. A Harvard University group argues that the number could reach more than 100 million.
- 1993:** A terrorist bomb explodes in a basement parking garage of the World Trade Center, killing six.
- 1993:** Software companies introduce programs making the Internet easier to use, and several on-line information services open gateways into this "network of networks", making its popularity explode.
- 1993:** After analyzing the family trees of gay men and the DNA of pairs of homosexual brothers, biochemists at the United States National Cancer Institute reported that at least one gene related to homosexuality resides on the X chromosome, which is inherited from the mother.
- 1993:** The U.S. military adopts the "Don't Ask, Don't Tell" policy, permitting gay individuals to serve in the military only if they do not disclose their homosexuality and do not engage in homosexual acts; military recruiters and personnel are barred from inquiring about an individual's sexuality.
- 1994:** The first all-race elections in South Africa are held; Nelson Mandela is elected President.
- 1996:** The Federal Defense of Marriage Act (DOMA) is enacted; states permitted to enact legislation refusing to honor same-sex marriages entered into in another state.
- 1998:** Terrorist attacks on U.S. embassies in Kenya and Tanzania.
- 1998:** House of Representatives votes to impeach President William Jefferson Clinton. The Senate acquits President Clinton two months later.
- 1998:** Matthew Shepherd, a gay college student, is tortured and murdered.
- 1999:** NATO forces in former Yugoslavia attempt to end mass killings of ethnic Albanians by Serbian forces in Kosovo.

2000–

- 2001:** Terrorists attack the World Trade Center in New York and the Pentagon in Washington, D.C. killing 2,752.
- 2001:** The controversial Patriot Act is passed in the United States.
- 2001:** United States and coalition forces begin War on Terror by invading Afghanistan (Operation Enduring Freedom), overthrowing the nation's Islamist Taliban regime in December of 2001.
- 2002:** Slobodan Milosevic begins his war crimes trial at the UN International Criminal Tribunal on charges of genocide and crimes against humanity. He is the first head of state to stand trial in an international war-crimes court but dies before the trial concluded.
- 2002:** After United States and coalition forces depose the Islamist Taliban regime in Afghanistan, girls are allowed to return to school and women's rights are partially restored in areas controlled by U.S. and coalition forces.
- 2002:** The International Olympic Committee suspends gender verification procedures for the Olympics in Sydney, Australia citing potential harm to "women athletes born with relatively rare genetic abnormalities that affect development of the gonads or the expression of secondary sexual characteristics."
- 2002:** The agricultural chemical atrazine, used in weed control, is thought to be partially responsible for the dramatic global decline in amphibians, as it is found to disturb male frog sex hormones, altering their gonads.
- 2003:** U.S. space shuttle Columbia breaks apart upon re-entry, killing all seven crew members.
- 2003:** The Supreme Court of the United States strikes down sodomy laws in the landmark decision, *Lawrence v. Texas*
- 2003:** United States and coalition forces invade Iraq.
- 2003:** The United States declares an end to major combat operations in Iraq. As of June 2006, U.S. fighting forces remain engaged in Iraq.
- 2003:** American troops capture Iraq's former leader, Saddam Hussein.
- 2003:** Studies indicate that women with a history of some sexually transmitted diseases, including the human papilloma virus, are at increased risk for developing cervical cancer.
- 2003:** Canada recognizes same-sex marriages throughout the country.
- 2003:** On November 18, the Massachusetts Supreme Judicial court rules that denying same-sex couples marriage rights violates the state constitution, legalizing same-sex marriages.
- 2004:** Islamist terrorists bomb the commuter rail network in Madrid, Spain.
- 2004:** Jason West, mayor of New Paltz, New York, defies state law and performs same-sex weddings. Later charged with twenty-four misdemeanor counts of performing illegal marriages, he was cleared of all charges in 2005.
- 2004:** The California State Supreme Court, in a 5-2 decision, voids nearly 4,000 same-sex marriages performed in San Francisco earlier that year.
- 2005:** Illinois outlaws sexual orientation discrimination.
- 2005:** Massachusetts Supreme Court rules that same-sex couples who live in other states cannot marry in Massachusetts unless gay marriage is also legal in their home state.