

Collier's
Encyclopedia

20

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Collier's Encyclopedia

with Bibliography and Index

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The following three tools are indispensable to the user of Collier's Encyclopedia if he is to take full advantage of its resources. They may be found by consulting the Table of Contents on Page iii of Volume 24.

HOW TO USE THE BIBLIOGRAPHY HOW TO USE THE INDEX NOTE ON THE PRONUNCIATION SYSTEM

The Pronunciation System

The system employed to indicate pronunciation in this encyclopedia is based on the alphabet of the International Phonetic Association. This alphabet has two notable advantages over other pronunciation systems: it is widely known beyond the bounds of any one nation, and it is readily applicable to all the languages of the world.

In the application of the system in the encyclopedia, the phonetic symbols are printed in square brackets following the article heading, and stresses are indicated by accents placed immediately after stressed vowels, a heavy or a light accent indicating respectively a primary or a secondary stress.

| | | | | | |
|----|--|----|---|----|--|
| ɑ | arm, father, shot | i | eve, heat, baby | s | saw, also, pass |
| ɑ̃ | (Fr.) <i>elan, emploi</i> ¹ | ɪ | if, sting | ʃ | she, ration, hash |
| a | (Fr.) <i>attacher, bal</i> | k | cane, broken, lake | tʃ | chin, hatchet, reach |
| æ | at, back, can | χ | (Ger.) <i>ich, ach</i> ³ | t | two, matter, hat |
| æ̃ | (Fr.) <i>ainsi, vin</i> ¹ | l | lot, allow, real | θ | three, ether, bath |
| ai | ice, spine, cry | m | me, farmer, him | θ | this, other, bathe |
| au | ounce, loud, cow | n | no, funny, in | u | rule, loop, shoe |
| b | bat, rabbit, tab | ŋ | rang, singing, | ü | (Fr.) <i>cru</i> ; (Ger.) <i>grün</i> ⁵ |
| d | do, ladder, had | o | old, note, go | ʊ | bull, book |
| e | elite, fate, pray | ö | (Fr.) <i>eux</i> ; (Ger.) <i>schön</i> ⁴ | ʌ | up, but, son |
| ɛ | end, yet | ɔ | orb, ball, saw | v | vine, avid, live |
| ə | ago, maker, charity ² | ɔ̃ | (Fr.) <i>bon, rompre</i> ¹ | w | we, awake |
| ɜ | earth, first, burn | œ | (Fr.) <i>leur</i> ; (Ger.) <i>können</i> ⁴ | y | yes, cure |
| f | for, effort, life | œ̃ | (Fr.) <i>brun, lundi</i> ¹ | ʏ | (Fr.) <i>montagne</i> ⁶ |
| g | go, figure, bag | ɔi | oil, point, toy | z | zoo, dazzle, raise |
| h | hot, behave | p | pat, upper, mop | ʒ | pleasure, rouge |
| | | r | red, worry, hear | dʒ | joke, fudge |

¹ The tilde (˜) indicates that the vowel above which it appears is nasalized.

² The schwa (ə) is used to indicate a vowel sound common in unstressed syllables in English. It is closely akin to ʌ, the vowel sound in *but*.

³ The single symbol χ has been used to represent both the consonant sounds found in the German words *ich* and *ach*. Since, as a rule, the vowel that precedes this sound makes it either palatal or velar, it is unnecessary to indicate the distinction by phonetic symbols.

⁴ The symbol ö may be approximated by pronouncing the vowel sound in *urn* or *fir* but with the *r* silent, as in Southern speech. The symbol œ represents the same sound, but shortened.

⁵ The ü sound may be approximated by rounding the lips as if to pronounce *u* while saying *i*.

⁶ The symbol ʏ, which occurs with some frequency in French and Russian names, represents a consonantal *y*, approximated by pronouncing all but the last two sounds of the word *canyon*.

RENNER to SIBELIUS

RENNER, KARL [re'ner] (1870-1950), first chancellor of the Austrian republic. Renner was born in German Moravia on Dec. 14, 1870, of peasant stock. He studied law in Vienna, supporting himself by private tutoring, through which he obtained a post as a governmental librarian. He was already a socialist (though he never became an orthodox Marxist) when he wrote several remarkable works on the nationality problem in the Austrian republic. In these writings he defended the idea of the multinational state in general, and of multinational Austria in particular, suggesting a federal democratic commonwealth based on equal political and cultural rights for all minorities.

Renner entered the Reichsrat (Parliament) in 1907 and soon became leader of the Social Democratic Party, though his position was challenged after 1917 by a more radical wing led by Otto Bauer, who repudiated Renner's doctrine of the multinational state. It was Renner, however, who in 1918 carried through the peaceful transition of German Austria into a republic. He was chancellor and head of the Council of State in the provisional government of November 1918, then chancellor in the coalition governments of March 1919-June 1920. After the Social Democrats were driven into opposition, he was overshadowed by his more forceful rival, Bauer, but remained leader of the party's right wing. He was senior president of the Nationalrat (lower house) of the last elected Austrian Parliament before World War II, which was elected in 1930 and was suspended by Chancellor Engelbert Dollfuss in 1933.

Renner was unmolested by the Nazis in 1938 because of his support of *Anschluss* (Austro-German union). He was living in retirement when the Russians entered Austria in 1945 and called on him to form a provisional administration (April 27). The first Nationalrat of the reconstituted republic elected him president of Austria (November 25). He died in Vienna, Dec. 31, 1950. C. A. MACARTNEY.

RENNES [ren], capital of the department of Ille-et-Vilaine, situated at the base of the Brittany peninsula in northwest France, about 190 miles (306 km) southwest of Paris and 135 miles (217 km) southeast of Brest. It lies on both banks of the River Vilaine where it joins the Ille.

Originally the capital of the Redones, a Celtic tribe, Rennes was the center of a road network in Roman times. After the Bretons established their independence from the Franks it became in the tenth century the seat of the first duke of Brittany, Geoffrey, son of Conan, count of Rennes. It remained capital of the duchy, which was an English fief after 1169 but had almost the status of an independent state until absorbed by France in 1532. Rennes was the meeting place of the Parlement of Brittany, founded in 1551, until Louis XIV removed it to Vannes in 1675. Almost the entire city was destroyed in 1720 by fire; it was rebuilt on a regular plan, with wide streets. During World War II, structures throughout the city were considerably damaged.

The city's finest building is the Palace of Justice, built between 1618 and 1655 to house the Parlement of Brittany. The Cathedral of St. Pierre, with twin towers erected between 1541 and 1703, was rebuilt between 1820 and 1844. The medieval abbey church of Notre-Dame-en-Saint-Melaine adjoins the Thabor, a park in the former abbey gardens with one of the richest botanical collections in France. Among the historic churches are St. Germain (1434-1585), Toussaints (1624-1651), the Chapel of the Visitation (1660), St. Étienne (1700), and St. Sauveur (1703-1728). The Porte Mordelaise is a remnant of the 15th-century city ramparts. The University of Rennes was founded in 1735, and there is a museum containing an important collection of paintings.

Rennes dominates the economy of Brittany. It is a railroad center located on a rich agricultural plain, surrounded by less productive upland regions. Its location has long made it the most important market city in Brittany for poultry, dairy, and other farm produce. It has also become a center for consumer industries, such as shoe, textile, and furniture manufacturing. Since 1962 the automobile manufacturer Citroën has maintained factories in Rennes and its environs, providing work for inhabitants of the town and its surrounding area. This industrialization has helped solve the problem of unemployment in central Brittany. Pop. 1975, 195,000. WALTER McELROY AND J. CHARDONNET

RENO, a city in western Nevada, the seat of Washoe Co., on the Truckee River, at the foot of the Sierra Nevada Mountains, 25 miles (40 km) north of Carson City. It was founded in 1868 and incorporated in 1903. Nevada was the first state in the country with short-term residence requirements in its divorce law, and Reno became renowned as the center for the temporary residence of people seeking divorces in the state. The development of winter sport facilities in the district has also made it a winter resort. Reno is the seat of the University of Nevada. The Fleischmann Atmospherium-Planetarium forms part of its Desert Research Institute. Reno is a popular year-round resort, known for its night clubs and gambling casinos, which bring in much revenue. The city profits from its proximity to the Squaw Valley and Lake Tahoe resorts on the California border. Reno is the state's commercial center for lumber products, wool, livestock, mining machinery, and potatoes. Local manufactures include sheet-metal and iron products, chemicals, airplane parts, and sashes and doors. Reno is governed by a mayor, council, and city manager. Pop. 1970, 72,863.

RENOIR, JEAN (1894-), French movie director, noted for his brilliant treatment of individual lives understood within the context of social class and occupation. He was born in Paris on Sept. 15, 1894, the second son of the impressionist painter Pierre August Renoir. After studying at the University of Aix and serving as pilot-observer during World War I, he became a ceramicist until, in 1924, he saw

Erich von Stroheim's *Foolish Wives*, was overwhelmed, and decided to undertake a film career. He made his first movie, *La Fille de l'eau* in 1924. Among his silent films are *Nana* (1926) and *La petite marchande d'allumettes* (1928).

Renoir's best-known films of the 1930's include *Boudu sauvé des eaux* (*Boudu Saved from Drowning*, 1932) and *Le Crime de M. Lange* (*The Crime of M. Lange*, 1936), which explore questions of freedom and responsibility within the Parisian lower middle classes; *Une Partie de campagne* (*A Day in the Country*, 1936), a short pastoral based on a Guy de Maupassant story; *La Grande Illusion* (*Grand Illusion*, 1937), which dramatizes the conflict between national and class loyalties among French officers and enlisted men in a World War I German prison camp; and *La Règle du jeu* (*The Rules of the Game*, 1939), a comic-tragedy set among the French upper classes and the nouveau-riche on the eve of World War II.

With the outbreak of the war, Renoir moved to the United States. Among his English-language films are the American *Swamp Water* (1941), *The Southerner* (1945), and *The Diary of a Chambermaid* (1946); and *The River*, made in India in 1950. After returning to work in Europe in 1951, he directed such highly theatrical film comedies as *Le Carosse d'or* (*The Golden Coach*, 1952) and *French CanCan* (1954), which use the idea of theater as a metaphor for the relation between art and life. In *Le Déjeuner sur l'herbe* (*Picnic on the Grass*, 1959) Renoir returned to a natural world resembling the sumptuous nature painted by his father. And in *Le Caporal épinglé* (*The Elusive Corporal*, 1962), a war-prisoner film set during World War II, he revised and updated the situation treated in *Grand Illusion*.

The qualities universally recognized in Renoir—warmth, humanity, good humor, and compassion—helped create a popular bias in favor of his 1930's films of social concern, somewhat to the exclusion of his later works, especially the 1950's comedies. However, throughout his career, he brought the same sophisticated, tough-minded, balanced intelligence to the romantic art of film making.

Renoir has written three books: a memoir of his father, *Renoir* (1962); a novel, *Les Cahiers du Capitaine Georges* (*The Notebooks of Captain Georges*, 1966); and the autobiography *My Life and My Films* (1974).

ROGER GREENSPUN

RENOIR, PIERRE AUGUSTE [rənwa'r] (1841-1919), French impressionist painter, was born at Limoges, Feb. 25, 1841. His family soon moved to Paris, where at twenty-one he entered the studio of Charles Gleyre, a conventional painter but a sound technician, who taught him a life-long respect for the painter's craft. There he met Claude Monet and Camille Pissarro, among others, who interested him in painting out-of-doors. Although he participated in several impressionist exhibitions, he continued to send his work to the official salon, where he had a marked success with the portrait of *Mme. Charpentier et ses filles* (New York City, Metropolitan Museum), which established him as a fashionable portraitist. Renoir's principal contribution to the impressionist movement was his use of brilliant colors for painting figures and intricate compositions, subjects which had been banished from the strictly landscape repertory of Monet and Alfred Sisley. During the 1870's and 1880's, in such works as *Le Bal au Moulin de la Galette* (Paris, Louvre) and *Le Déjeuner des Canotiers* (Washington, Phillips Gallery), the iconography of his paintings is a beguiling expression of the pastimes of the lower and mid-



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PIERRE AUGUSTE RENOIR

dle classes under the Third Republic. By 1885 Renoir realized that his iridescent colors were inadequate for the representation of substantial form. After a trip to Italy, where he studied the frescoes of Raphael, and a renewed analysis of the French masters of the 18th century, he devoted more attention to drawing and three-dimensional design in what is known as his "dry style."

Renoir was an instinctive rather than a theoretical colorist.

The somber tones of his earliest work gradually lightened into a blue and green tonality under the influence of Monet and Pissarro in the 1870's. Warm yellows and reds prevailed in the 1880's, indicative of his admiration for François Boucher and Eugène Delacroix, but his greatest affection was reserved for Peter Paul Rubens, from whose reds he derived the predominant coloration. Renoir suffered so severely from arthritis that after 1912 he could paint only with brushes strapped to his hands. He died at his home at Cagnes, Dec. 17, 1919.

GEORGE HEARD HAMILTON

RENSELAER [rɛˈnsələr; rɛˈnsəlɪr], a city in eastern New York, in Rensselaer Co., situated on the east bank of the Hudson River opposite Albany, with which it forms the Albany-Rensselaer Port District. Rensselaer is a manufacturing community. Rensselaerswyck, a large tract of land, was a patroon estate founded in 1630 that included the villages of Greenbush, Bath-on-the-Hudson, and East Albany. Greenbush was incorporated in 1815, and in 1897 all three villages joined under the name of Rensselaer. Chief manufactures of Rensselaer are wool products, dyes, chemicals, petroleum, concrete blocks, and drugs and pharmaceuticals. Pop. 1970, 10,136.

RENSELAER POLYTECHNIC INSTITUTE, an accredited, privately controlled, nonsectarian, technological school located on 245 acres (99 hectares) in Troy, N.Y. The school was established in 1824 by Stephen Van Rensselaer and chartered two years later. In 1850 it was reorganized as a general polytechnic institute. The Hartford Graduate Center was established in 1955 near Hartford, Conn.

Programs are available leading to appropriate bachelor's degrees in the following fields: aeronautical, chemical, civil, electrical, environmental, management, mechanical, and metallurgical engineering; architecture; biology; building industry; chemistry; economics; engineering science; geology; literature; mathematics; mechanics; philosophy; physics; and psychology. Graduate study is offered in the fields of architecture, engineering, science, and the humanities and social sciences. Rensselaer is academically affiliated with Russell Sage College (for women) in Troy, and women may earn engineering, science, and architecture degrees at the institute while they live at Russell Sage.

Scholarships and student loans are available. *For statistics, see COLLEGES AND UNIVERSITIES.*

RENT, the payment for the use, for a limited period, of a durable goods, which is to be returned by the user intact, except for the ordinary depreciation, to the owner. In the rental contract, the user gets possession of, but not title to, the goods. Not all rents are paid in money; some cases of rent contract, for example, the renting of farm land on shares, call for payment "in kind." Not only land but also commercial and residential buildings, producers' machinery and equipment, and even durable consumer goods may be rented or leased by the month or year. In economic theory, a distinction is made between explicit or contractual rent, the income obtained when a durable goods is used by another, and implicit or imputed rent, the income received when the durable goods is used by the owner himself. The amount of imputed rent usually is considered to be the amount which the owner could have obtained by renting to another.

In the conventional treatment, gross or commercial rent is a contractual payment as distinguished from economic rent. The commercial payment would include not only payment for the use of the item but also for its upkeep and maintenance and for the risk and uncertainty involved in renting it. Commercial rent of a site might contain not only economic rent but also interest on the investment in buildings and improvements. The net commercial rent of land will tend to approximate its economic rent. Since durable goods often are desired for the income that they may yield, the net income from their use capitalized at the current rate of interest determines their value. Thus if the net income from a piece of land is \$100 and the going rate of interest from investments is 5 percent, the value of the land would be \$2,000—the amount that would yield \$100 if invested at 5 percent.

Although in normal times competition has been supposed to regulate the rental market for land and buildings, there have always been many elements that have prevented the operation of perfect competition and have created semi-monopolistic conditions. During World War I and World War II, these elements of friction were strengthened. The decline in construction for civilian use, the rise in building costs, and the greater returns possible from investments in war industries all created an acute housing shortage. Extensive governmental regulation was undertaken to prevent excessive rises in rent and wholesale evictions. Rents have also been regulated in peacetime in areas with severe housing shortages like New York City.

JOSEPH A. BATCHELOR

RENTON, a city in west-central Washington, in King Co., on the Cedar River, 11 miles (18 km) southeast of Seattle. Renton's industries manufacture airplanes, railroad cars, tanks, containers, and brick and clay products. It was incorporated in 1901. Pop. 1970 (revised), 26,648.

RENWICK, JAMES [re'nik] (1818-1895), American architect, was born in New York, Nov. 3, 1818, the son of Professor James Renwick of Columbia University. Trained at Columbia at a time when there was little distinction between the training of the architect and the engineer, Renwick at first was employed by the Erie Railroad. An important engineering project was his reservoir for New York's Croton Aqueduct. Renwick early espoused Gothic Revival architecture and, with Richard Upjohn, stands out as a leader of that movement. However, he designed in other styles, as evidenced by the Smithsonian Institution, in the construction of which he was associated with Dr. David Dale Owen. He

also designed the original Corcoran Art Gallery in Washington, D.C., the earlier buildings for Vassar College at Poughkeepsie, N.Y., and Grace Church, Booth's Theatre, old Saint Bartholomew's Church, and the Church of the Covenant, all in New York. In later years Renwick was a member of the firms of Renwick and Aspinwall and of Renwick, Aspinwall, and Renwick. He died in New York, June 23, 1895.

REXFORD NEWCOMB

REORGANIZED CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS, the second largest religious denomination that claims to be the true successor of the church founded by Joseph Smith, Jr. in 1830 at Fayette, N.Y. The church has a membership of about 215,000, of whom 90 percent live in the United States and Canada.

After the assassination of Joseph Smith in Carthage, Ill., on June 27, 1844, a period of confusion existed among his followers. In 1846-1847, Brigham Young led a large group to Utah and established what is known as the Mormon Church. In 1852 many of the congregations that remained in the Midwest formed what was later called the Reorganized Church of Jesus Christ of Latter Day Saints. From 1860 to his death in 1914, Joseph Smith III, son of Joseph Smith, Jr., served as prophet-president of the church. After his death, leadership of the church passed to his descendants. Headquarters of the church moved to Plano, Ill., in 1865, to Lamoni, Iowa, in 1881, and finally to Independence, Mo., in 1920.

Fundamentals of belief are faith in God, in Jesus Christ as risen Lord, and in the Holy Ghost. Church doctrines are based upon the Bible and such extra-biblical scriptures as the *Book of Mormon* and the *Doctrine and Covenants*. Full membership in the church is attained through baptism by total immersion, followed by confirmation. The minimum age for baptism is eight years.

The ecclesiastical and administrative officers of the church are a first presidency, a council of 12 apostles, a presiding bishop, and various other councils and administrators. There are two orders of priesthood, Melchisedec and Aaronic. Non-ordained members are also involved in the policy and decision-making structures of the church. The highest legislative assembly is the world conference, which is held biennially in Independence, Mo.

The church operates a large hospital, several retirement homes, a social service center, and two colleges—Graceland College, in Lamoni, Iowa, and Park College, in Parkville, Mo. It also operates as part of its missionary activities medical clinics and schools in various parts of Africa and in South Korea, French Polynesia, Haiti, the Philippines, and India. *See also* MORMONS.

RICHARD P. HOWARD

REPRODUCTION, ANIMAL. *See* ANATOMY, COMPARATIVE; CELL; EMBRYOLOGY; HEREDITY; and articles on INSECTS, MAMMALS, and other animal groups.

REPRODUCTION, HUMAN, the physiologic function necessary for maintaining the human species. The human reproductive process begins at conception, that is, when the male sperm cell enters (fertilizes) the female egg cell (ovum). When the nuclei of these two cells fuse, the formation of a new individual is initiated. The human embryo develops within the uterus of the female during a gestation, or pregnancy, of about 265 to 270 days. At the end of this time, the uterus spontaneously begins rhythmic muscle contractions; the contractions become stronger and more frequent; the amniotic sac, or "bag of waters" (a membranous

4 REPRODUCTION, HUMAN

sac protecting the fetus), ruptures; and finally the full-grown fetus, or infant, is delivered (expelled) through the vagina. Shortly after expulsion of the infant, the placenta, or "after-birth" is expelled. The entire process from the beginning of the contractions to the final expulsion of the infant and placenta is called parturition, or labor. (See also EMBRYOLOGY, HUMAN.)

In about 98 percent of all births, only one ovum is fertilized at the time of conception and this develops into a single individual. Two percent of births are twins. Twins may develop from the splitting of a single fertilized ovum into two developing cells, resulting in identical twins, or from the fertilization of two different ova, resulting in fraternal twins. Thus, identical twins are of the same sex and fraternal twins may be of the same or opposite sex. Triplets occur about once in 7,500 births. (See also MULTIPLE BIRTHS.)

The reproductive function exists only in the biologically mature individual. Puberty is the transition period—both physically and chemically—from biologic immaturity to biologic maturity. At puberty the young female begins to develop the adult female form. There is an increase of fat about the hips and thighs, the breasts begin to enlarge and round out, hair appears about the external genitalia and in the armpits, and, shortly after the appearance of these so-called secondary sex characteristics, the girl begins to menstruate.

During puberty the male shows marked alteration in body contour: fat diminishes in the abdomen and thighs, the shoulders broaden, the voice deepens in pitch, and body and facial hair appear. Spermatogenesis occurs somewhat later in the male than menstruation does in the female.

REPRODUCTIVE FUNCTION OF THE HUMAN FEMALE

Female Reproductive Organs. The internal organs of reproduction in the female consist of the ovaries, the Fallopian tubes, the uterus, or womb, and the vagina.

Ovaries. The ovaries are two glandular structures, each weighing from 2 to 3.5 grams, that lie one on either side of and behind the uterus. At birth there are about 70,000 undeveloped ova in each ovary. Each ovum is contained in a small, round, transparent sac called the Graafian follicle. When the female becomes sexually mature, these follicles grow and burst, releasing the ovum into the Fallopian tube. The ruptured follicle sinks into the ovary and develops into the corpus luteum. During a normal reproductive life, approximately 500 of these ova are discharged, becoming capable of being fertilized. About once each month, approximately halfway between menstrual periods, an ovary expels an ovum which is caught by the Fallopian tube. This expulsion of the ovum from the ovary is called ovulation.

Fallopian Tubes. The Fallopian tubes are paired structures like the ovaries. Each extends from an ovary and connects to one side of the uterus. Each tube is about 3 inches (8 cm) long, slightly twisted, and about as thick as a lead pencil; the lumen (passageway) of each tube is connected with the lumen of the uterus. There are muscle fibers in the inner and outer walls of a tube which produce a constant, rhythmic, wavelike movement. The inner wall is lined with a thin membrane that contains ciliated cells (cells having microscopic, hairlike projections). After an ovum has been caught by a Fallopian tube, these cells and the muscular movements of the walls send the ovum into the uterus.

Uterus. The uterus is a hollow, muscular organ lying in the pelvic cavity of the abdomen. It measures about 3 inches (8 cm) by 2 inches (5 cm) by one inch (2.5 cm). The tubes

open into its upper portion and its cavity opens into the vagina. The main portion is called the body, or corpus. In the nonpregnant uterus the corpus cavity is only a slit. The lower portion of the uterus is the cervix, which is about one inch (2.5 cm) long and projects into the vagina. The cavity of the cervix, the cervical canal, opens into the vagina. If a fertilized ovum is carried into the uterus, it embeds itself in the uterine lining until gestation is completed.

Vagina. The vagina is a sheathlike structure from 3 to 3.5 inches (7-9 cm) long. It is attached around the cervix and extends to the external genital organs. Its principal functions are to permit external passage of menstrual blood, to receive the male organ during copulation, to receive semen from the male, and to act as a passageway for the fetus at birth. A crescent-shaped fold of tissue, the hymen, partly closes the external vaginal opening. In the virgin, the opening is typically large enough to allow the escape of menstrual blood; following sexual intercourse, this opening is widened.

Mammary Glands. As in other higher mammals, the mammary glands, or breasts, of the human female normally begin to lactate, or produce milk, about four to five days after delivery, in preparation for nourishing the offspring. The sucking of the infant upon the nipple provides a further powerful stimulus, reflex in nature, for the production of milk by the glands.

Menstrual Cycle. The menstrual cycle, which begins shortly after the onset of puberty, is brought about by the influence of internal secretions, or hormones. Hormones are chemical substances that are produced by endocrine glands and that are secreted into the bloodstream and circulated throughout the body. At the beginning of puberty, the hormones of the pituitary gland initiate the chemical activity of the ovaries, starting a complex pattern of events which extends from puberty to menopause, a period of about 35 years. The pituitary gland cyclically secretes three hormones which directly stimulate the ovary. The first of these is called the follicle-stimulating hormone (FSH), which causes ripening of the Graafian follicle; the second is called luteinizing hormone (LH), which is a companion to the FSH hormone; and the third is the luteotropic hormone (LTH), which stimulates the corpus luteum.

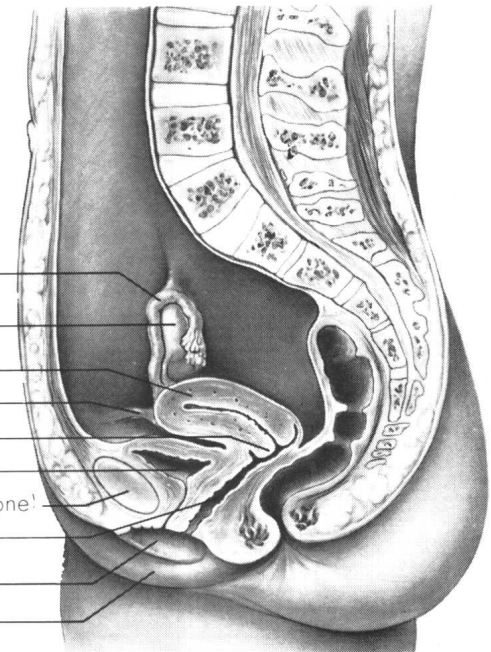
As the follicle grows, due to the FSH and LH of the pituitary, the follicular cells multiply, and a large, fluid-filled cavity is formed. The growth and activity of the follicular cells results in the secretion of the estrogens, or female sex hormones, by these cells. These hormones are found in both the fluid of the follicle and the circulating blood. The word estrogen is derived from the Greek word *oistros*, meaning "frenzy," and is applied to a group of substances that have the ability to produce estrus, or "heat," in animals. Estrogens are found in humans and in many other mammals.

The luteinizing hormone exerts an influence on the cells of the follicle, causing them to rupture and expel the ovum. The cells and fluid undergo certain remarkable changes, and a new structure, the corpus luteum, or yellow body, develops. It, in turn, is stimulated by the LTH, which initiates the production of the hormone progesterone. Progesterone inhibits pituitary secretion and induces changes in the lining of the uterus, preparing it for the reception, embedding, and gestation of the fertilized ovum. This prepared lining is a thick, mucosal surface which contains glycogen and a rich blood supply favorable for the nourishment of the early embryo. The coordinated action of estrogen and progesterone is necessary for the formation of this indispensable environment, the survival of the embryo, and the maintenance of pregnancy.

REPRODUCTION, HUMAN

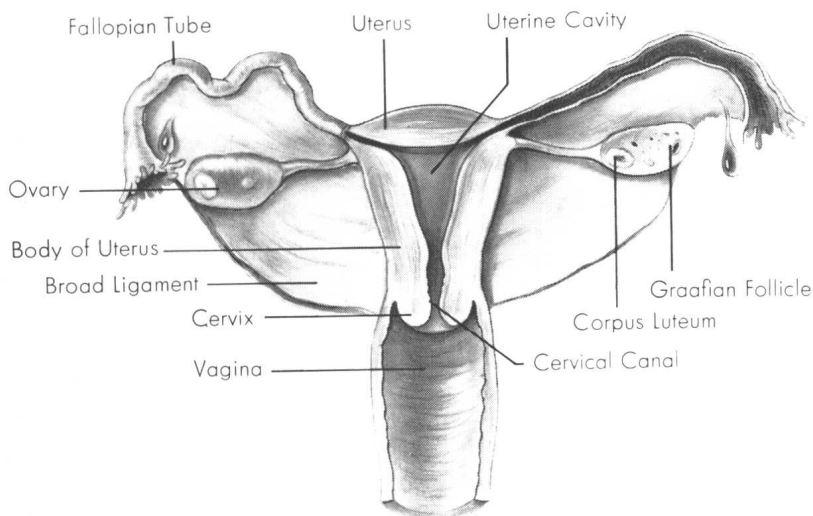
The female organs of reproduction, shown (right) in a side-view section, are the ovaries, the Fallopian tubes, the uterus, and the vagina. All are supported by ligaments and lie within the basin formed by the pelvic bones. The ovaries have a double function: they produce the eggs, or ova, and secrete the hormones that regulate the menstrual cycle and maintain female characteristics. The Fallopian tubes conduct the ovum from the ovary to the hollow, muscular uterus; it is in the tubes that fertilization customarily takes place. The uterus serves as the cradle for the developing child. The fertilized ovum embeds itself in the lining of the uterus, and the uterine walls expand as the fetus develops. The lower part of the uterus is called the cervix; it extends into the vagina, which is the passageway to the external opening of the female reproductive organs. At the end of pregnancy the uterus begins spontaneous, rhythmic contractions, and the infant is delivered through the vagina.

Fallopian Tube
Ovary
Uterus
Round Ligament
Cervix
Urinary Bladder
Symphysis Pubis (Bone)
Vagina
Labium Minus
Labium Majus



FEMALE REPRODUCTIVE ORGANS

FRONT VIEW



DRAWINGS BY DEMEREST AND HARDY

Approximately every four weeks the pituitary gland initiates this cyclic activity in the ovary. If the ovum has not been fertilized, most of the lining of the uterus, mixed with blood, is discharged through the cervix into the vagina. This cyclic bloody discharge is referred to as menstruation (menses). In most women the period of bleeding commences about every 27 to 30 days and lasts from three to five days. The entire cycle, ending with the discharge of the uterine lining, is called the menstrual cycle. It repeats itself with regularity throughout the reproductive life of the human female. At its onset after puberty, menstruation may be irregular. Since many of these early menstrual periods are not preceded by ovulation, we say that the young girl often begins the menstrual cycle with anovulatory cycles.

Menstruation is not the discharge of "bad" blood. Actually it consists of rather small amounts of blood mixed

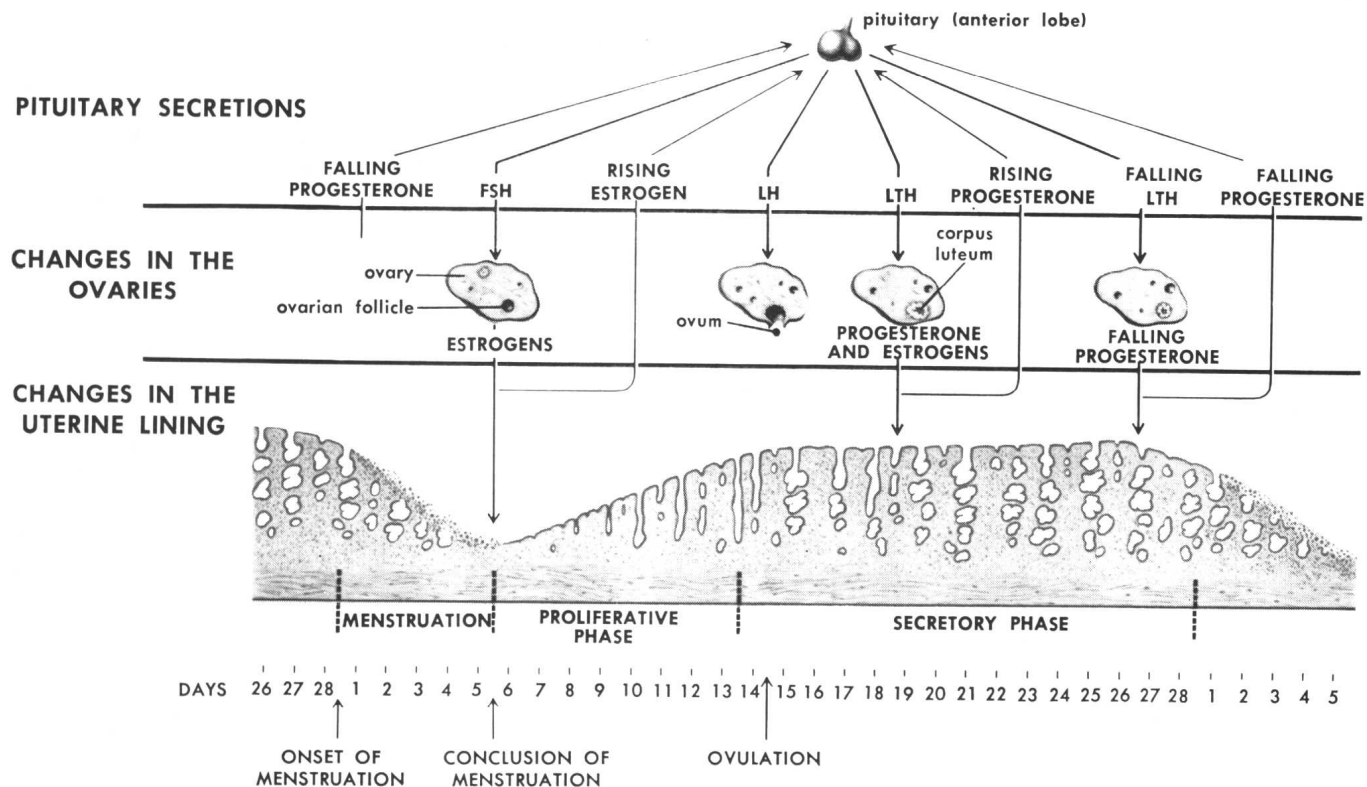
with mucus and broken-down tissue from the lining of the uterus. The amount of blood lost during a menstrual period varies in different women, but the average is about five to eight tablespoonfuls. Occasionally there is very slight bleeding at the middle of a cycle, which is often associated with the slight abdominal pain occurring at ovulation. This pain is referred to as *mittelschmerz*. Pain experienced during the menstrual period is called dysmenorrhea. Typically, dysmenorrhea occurs at the onset of the menses and lasts from one to two days.

Pregnancy. The mature ovum is usually expelled from the Graafian follicle at about the middle of the menstrual cycle, some 10 to 15 days after the first day of menstruation. It reaches the Fallopian tube in about 48 hours. Conception occurs when a sperm cell enters the egg while it is still in the tube. Development of the fertilized egg begins in the tube. The fertilized ovum is then gradually carried down

A cross section of the female reproductive organs as seen from the front (left) shows the attachments of the various organs to one another. Also shown within the ovary are the developing egg sacs, or follicles. Each month a follicle ruptures and releases an ovum. The follicle then develops into a hormone-producing body, the corpus luteum; its hormone, progesterone, prepares the uterus to receive the ovum.

THE MENSTRUAL CYCLE

This diagram shows the important anatomical and physiological events that constitute the menstrual cycle. These events occur at three sites in the body: 1) The *pituitary*, an endocrine gland located at the base of the brain, which secretes the hormones that regulate and coordinate the entire cycle. 2) The *ovaries*, which produce ova (eggs) and secrete hormones, including those that maintain secondary sex characteristics. 3) The *uterus*, a muscular organ, whose blood-rich lining (endometrium) is the medium for growth of a fertilized ovum; it is the breakdown of this lining, when the ovum remains unfertilized, that is the source of menstrual discharge. All events shown on the chart are highly variable, from woman to woman and even from month to month with a single individual, depending on such factors as health and emotional state.



FSH (Follicle Stimulating Hormone) is secreted by the anterior lobe of the pituitary into the bloodstream on about the 5th day of the cycle. FSH acts on the ovary to bring about maturation of a follicle containing an ovum (egg). Estrogens, hormones released in the ovary, stimulate development in the uterus of a spongy lining called the endometrium.

As the estrogen level in the blood rises, the pituitary reduces its output of FSH, and on approximately the 10th day of the cycle, begins to secrete LH (Luteinizing Hormone). The LH acts on the ovary, causing the fully matured follicle to rupture and expel the ovum. This process, called ovulation, generally takes place on about the 14th day of the cycle.

Shortly after ovulation, the pituitary begins to secrete in increased quantities a third hormone, LTH (Luteotrophic Hormone). LTH, acting on the ruptured follicle, converts it into the large corpus luteum, or yellow body, which begins almost immediately to put out elevated levels of estrogens and a further hormone progesterone. These hormones maintain the uterine lining and promote the engorgement of its tissues with blood and mucoid glands.

Rising progesterone in the blood appears to inhibit pituitary production of LTH. As the LTH falls off, the corpus luteum breaks down, sharply reducing its output of progesterone. Without sufficient progesterone to maintain it the uterine lining begins to slough off, marking the onset of menstruation. The lowered progesterone is also believed to permit renewed secretion of FSH by the pituitary, thus triggering continuation of the cycle.

the tube and into the uterine cavity. After lying free in the uterine cavity for three to four days, the fertilized ovum embeds itself in the lining of the uterus and continues to develop into an embryo with its associated structures, such as the placenta, the umbilical cord, and so forth.

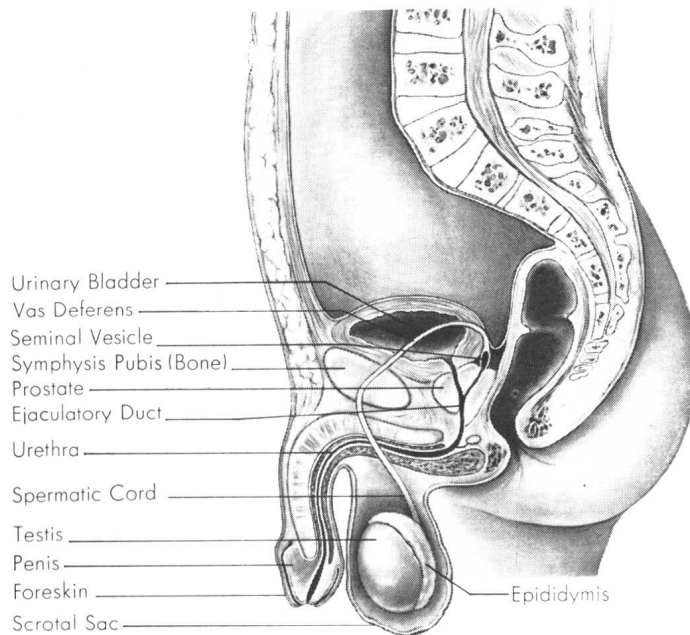
Pregnancy is accompanied by many physical and physiological changes. Menses cease, the uterus grows and greatly increases in weight, the abdomen enlarges, and the mammary glands develop in preparation for lactation. At one point during pregnancy, the amount of circulating blood in a pregnant woman's body is over 50 percent greater than normal. There is an increased load of work for her heart, and, in general, the period is one of great physical stress.

At the end of pregnancy the uterus begins spontaneous rhythmic contractions, and the infant is expelled through the vagina. After delivery of the infant, the uterus returns to its former small size, a process that takes about six weeks.

Menopause. The term menopause is derived from the Greek words *meno*, meaning monthly, and *pausis*, meaning cessation. Thus menopause means cessation of the menses. The terms "climacteric" and "change of life" refer to the entire period of sexual regression including the menopause. The disappearance of the menses usually accompanies other changes indicating cessation of ovarian function. However, it has been shown that there is still ovarian hormone in the blood and it is probably secreted by the partially active, though shrinking, ovaries and the other endocrine glands.

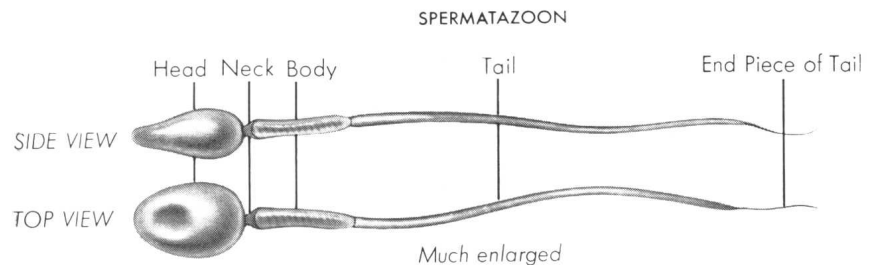
The surgical removal of both ovaries for some diseased condition is followed by a cessation of menstruation. Exposure of the ovaries to X-ray or radium treatments may terminate ovarian activity and bring on the menopause.

About 90 percent of women cease to menstruate between the ages of 45 and 50. This cessation may take place abruptly, or it may occur gradually over a period of many



MALE REPRODUCTIVE ORGANS

A mature sperm cell, or spermatozoon, is a tadpole-shaped cell about 1/500-inch long. It has a distinct head, neck, and tail. The motion of the tail provides locomotion; the head is considered to be the nucleus of the cell. Its union with the female cell, or ovum, is known as fertilization and is the formation of the first cell of a new individual.



months. When the menopause is gradual, it may be characterized by irregularity of the periods, increasing intervals between periods, and a gradual decrease in the duration and amount of bleeding. Occasionally, cessation of the menses occurs in women in their thirties. There are also women who continue to menstruate regularly until their middle fifties; this also is uncommon. Any vaginal bleeding after menopause requires immediate medical investigation.

Symptoms. Just before or during the time that the menses disappear, many women experience a complex set of symptoms, all of which are referred to as the menopausal syndrome. These symptoms may be one or more of the following: the "hot flush," a sudden flushing or sensation of heat about the neck and head; headache; dizziness; nervous instability; giddiness; and joint pains. Most women experience only the flushes, which may occur several times during the day, usually worsening at night. About 15 percent experience nothing more than abrupt and complete cessation of the menstrual periods and remain in excellent health.

Many women have erroneous ideas of what to expect during the menopause and climacteric. They may worry that they will no longer be sexually attractive to their husbands or that their sex life will cease abruptly with the menopause.

The male reproductive organs include the testes and their ducts, the prostate gland, and the penis and its duct, the urethra. Each testis is an oval gland consisting of small, convoluted tubules and is suspended in the scrotal sac by the spermatic cord. The testes produce the male germ cells, the spermatozoa or sperm, and secrete the hormones that maintain the functioning of the male reproductive system as well as cause the development and maintenance of the male secondary sex characteristics. Sperm mature in the epididymis, an oblong body also consisting of convoluted tubules, attached to the upper portion of the testis. Sperm pass up a tube called the vas deferens, or ductus deferens, inside the spermatic cord, to the seminal vesicle, where they are stored. Inside the seminal vesicle the sperm mix with the seminal fluid secreted by the prostate gland. The seminal vesicle opens into the urethra, the duct through which the semen is expelled.

Some have fears of mental derangement or deterioration. Such fears are founded largely on gossip and have no basis in medical fact.

REPRODUCTIVE FUNCTION OF THE HUMAN MALE

The reproductive function of the human male consists of producing sufficient numbers of normal, actively motile sperm cells to fertilize the mature ovum. The male genital organs are the testes and its ducts, the penis, and an accessory organ, the prostate gland.

Testes. The testes are paired, oval glands, each weighing from 10 to 14 grams, suspended in the scrotum by the spermatic cord. A testis is composed of a large number of small tubes which unite to form the epididymis, an oblong body attached to the upper part of each testis. The testes secrete the androgens, or male sex hormones, and produce the male germ cells, the spermatozoa or sperm.

Spermatozoa. Spermatozoa are small, actively motile cells consisting of a nucleus, or head; neck; body; and tail process. They develop from cells in the small, convoluted, seminiferous tubules in the testes. At maturity, spermatozoa are free-moving cells which proceed from these tubules to the larger ducts leading into spiral tubules, the vasa efferen-

tia of the testes. These tubules carry the sperm to the epididymis. The epididymis contains one tubule which connects with the vas deferens, or duct of the testis, and this duct joins the seminal vesicle to form the ejaculatory duct of the prostate gland. At the climax of sexual union, the sperm, mixed with secretions from the prostate gland, vas deferens, seminal vesicle, and mucous glands, is expelled from the vesicle, into the ejaculatory duct, and through the urethra in the penis. Normally, the volume of this ejaculate, or semen, is 2.5 to 5 cubic centimeters (cc.) of fluid, each cc. containing over 100 million spermatozoa.

Fertilization. When spermatozoa are deposited in the female vagina, they propel themselves by their tails up into the Fallopian tubes within about six hours. The alkaline environment of the uterus and tubes favors this motility. The random movements of millions of spermatozoa in the tubes bring them in contact with the ovum, and, if one of the sperm penetrates the ovum, the two cell nuclei fuse and fertilization is complete. The spermatozoa are believed to survive for from twenty-four to thirty-six hours in the tubes.

INFERTILITY

Infertility, the inability to produce offspring, is dependent upon many factors. Infertility caused by failure to produce either ovum or sperm, is rare.

Female Infertility. Female fertility is directly associated with age, general health, mental and nervous tension, and the phase of the menstrual cycle. Physiological infertility in the female may include failure to ovulate; incomplete formation of the uterine lining; infection of the reproductive organs; narrowing or closure of the Fallopian tubes; or congenital malformations of the reproductive organs. Chronic diseases, malnutrition, anemia, and endocrine disorders are conditions which, if untreated, can cause infertility.

Sterility Tests. A complete physical examination and diagnostic laboratory tests are necessary procedures to determine the cause. The tubal-insufflation test determines whether or not the tube lumen is open. In order to examine the lining of the uterus, an endometrial biopsy (tiny piece of tissue) is taken and examined microscopically. Hormone assay will give an index to the function of the reproductive organs.

Male Infertility. If normal sperm cell forms constitute less than 75 percent of a sample, fertilization rarely takes place. Normally, about 80 percent of the sperm are actively motile three hours after ejaculation, and a few are still sluggishly motile twenty-four hours later. About ten percent of human males have semen deficiencies which result in failure of fertilization. In these males, one or more deficiencies may exist; there may be a low total number of sperm, large numbers of abnormal sperm forms, diminished or absent motility of the sperm, or an inadequate volume of ejaculate. Inflammation of the testes, associated with an attack of mumps, may cause sterility. If the testes have not descended at the onset of puberty, the sperm-forming cells may be permanently damaged. Obstruction of the seminal vesicles interferes with the flow of seminal fluid and transport of the sperm. Infections and endocrine disorders may cause decreased fertility.

Sterility Tests. Specimens of semen are examined for the total number, the number of normal forms, the motility of the sperm, and the volume of ejaculate. A testicular biopsy is made in order to microscopically study the tissue and tubule cells. Urinary hormone assay will give an index to hormone secretion.

Psychological Infertility. It is believed that fertility may be influenced by emotional factors. Today, it is thought

that anxiety may cause tubal spasms that interfere with the passage of the ovum and sperm cells. In many instances women who have overcome their tensions and anxieties have conceived successfully.

Treatment and Research. In recent years, much progress has been made in treating infertility. Newly-developed hormone therapy can be used to stimulate the production of sperm in males or, in females, to stimulate the release of egg cells. The development of special instruments makes it possible to directly view the pelvic organs without surgery, thus aiding diagnosis, and new microscopic surgical techniques make possible the repair of blocked tubes and ducts.

A landmark in infertility research was the birth, on July 25, 1978, of the world's first infant ever to develop from an egg fertilized outside the mother's body. This so-called "test-tube" baby, the daughter of Lesley and Gilbert Brown, was born in Oldham, Great Britain. Her birth was the culmination of years of research by two British scientists, Dr. Patrick C. Steptoe, a gynecologist, and Dr. Robert G. Edwards, a physiologist. Because of a defect in her oviducts, the tubes leading from the ovaries to the uterus, Mrs. Brown had been unable for nine years to conceive a child. To bypass the defective tubes, eggs were removed from Mrs. Brown's ovary, placed in a glass dish, where they were fertilized by exposing them to sperm from her husband, and then allowed to incubate. When the fertilized eggs began to divide, one was inserted into Mrs. Brown's uterus, where it implanted itself and developed normally. Delivered by Caesarian section, the infant weighed 5 pounds 12 ounces (1200 grams) at birth, and her condition was normal in all respects. Using the same techniques, Drs. Steptoe and Edwards have induced pregnancy in several other women.

IRVING A. BUNKIN

REPRODUCTION, PLANT. See BREEDING; CELL; FLOWERING PLANTS; HORTICULTURE; SEED; and articles on ALGAE, FERNS, FUNGI, LICHENS, MOSS, and other plant groups.

REPTILES, vertebrate animals of the class Reptilia, intermediate in position between the amphibians and the birds and mammals. These last two classes have evolved separately from reptile ancestors and their distinctive body coverings are derived from reptile scales. In many respects, reptiles share more similarities with birds than with amphibians or mammals. Present-day reptiles include the lizards, crocodiles, alligators, turtles, snakes, and the tuatara. The gigantic dinosaurs of the Mesozoic Era are among the well-known fossil reptiles.

General Characteristics. Like amphibians and the lower animals, reptiles are cold blooded, that is, the temperature of the body depends upon the environment. Reptiles can, however, exercise temperature control by seeking shelter from low or high temperatures. Hibernation is a means of avoiding cold, and nocturnal activity is a way of avoiding heat.

All reptiles have a tough, dry skin covered by scales. The skin's primary function is to preserve body moisture. Turtles are enclosed by a bony structure, an upper carapace and a lower plastron. The heads and backs of crocodiles are protected by rigid, bony plates.

Unlike amphibians, which have a gilled, generally aquatic, larval stage (some retain gills throughout life), reptiles breathe by means of lungs. In most reptiles the lungs are developed equally, but in snakes and in some lizards, the left lung is enlarged at the expense of the other, extending

the length of the body cavity. The presence of a shell in the turtles renders the ribs immovable and has necessitated the development of a different method of breathing as compared with other reptiles. Air must be forced into their lungs by swallowing or by pumping movements of the forelegs.

The skeleton of the reptiles is strong and bony. Ribs are quite characteristic, but they differ in number and form. In most turtles, the bony plates have been fused to the ribs and backbone; in the snakes, ribs are the organs of locomotion; in some lizards, elongated ribs support the fanlike membranes which enable them to glide, or volplane, through the air.

Many reptiles have short, nonprotrusible, sometimes oddly colored tongues. Snakes and some lizards have long, forked tongues which are retractile. The tongue is an important sense organ for smell and other sensations.

Protection from injury in the smaller reptiles lies chiefly in protective coloration. The slow-moving tortoises and turtles are protected by their heavy shells. Many snakes are provided with a poison apparatus.

The reproductive organs are birdlike; the intromittent organ of the male in snakes and lizards is paired. As a rule, reptiles are oviparous, but there are many forms which retain their eggs until hatched in an enlargement of the ovarian tube. Many viperine snakes, horned toads, and some lizards are examples and are said to be ovoviviparous.

Distribution. Reptiles are widely distributed over the world but are most abundant in warm regions and are virtually absent beyond the limit of trees in the Arctic. Some reptiles live on land; others dwell in trees. Some inhabit fresh water, and a few enter salt water. Sea turtles and sea snakes are found in warm oceans.

Classification. Today only four living orders of reptiles remain. They are turtles (Chelonia), 300 species; crocodiles and alligators (Crocodylia), 25 species; lizards and snakes (Squamata), approximately 5,500 species; tuatara (Rhynchocephalia), one surviving species.

Fossil Reptiles. Reptiles made their geological appearance during the Carboniferous Age. During the following periods, the Permian and the Triassic, reptiles increased and multiplied in great numbers, adapting themselves to different environmental conditions. They were the ruling animals of the air, land, and sea during the Mesozoic Era, and this era is aptly called the Age of Reptiles. Plesiosaurs and ichthyosaurs inhabited the waters; flying reptiles, the pterodactyls, developed flight and inhabited the air; the largest group, the dinosaurs, inhabited the land.

Value To Man. Many reptiles are used as food; some supply leather; and others have medicinal uses. Some reptiles are valued for their services in insect and rodent control. Children have no instinctive fear of snakes or other reptiles, but prejudice is so widespread that most children soon learn to fear snakes. *See also* ALLIGATOR; CROCODILE; DINOSAUR; LIZARD; SNAKE; TURTLE.

M. GRAHAM NETTING

REPUBLICAN PARTY, one of the two major political parties in the United States. The party emerged during the 1850's in a period of political realignment motivated by sectional conflict on the slavery question. Passage of the Kansas-Nebraska Act of 1854 reopened an issue generally believed to have been permanently settled by the Compromise of 1850. The act repealed the Missouri Compromise of 1820 and opened the remaining territories of the United States to slavery by allowing the electorate of each territory to decide whether it would be slave or free. The reaction against this act and consequent events in Kansas tended to

dissolve older party allegiances. Many new local groups appeared to demand repeal of the Kansas-Nebraska Act, as well as the Fugitive Slave Act of 1850. These groups soon coalesced into state organizations that generally denounced slavery as a political, social, and moral evil.

Origin of Name. The first use of the name Republican seems to have been by a group which met at Ripon, Wis., Feb. 28, 1854. This group of reformers, professing to be Thomas Jefferson's spiritual heirs, dropped the word Democratic from the name of the earlier Democratic-Republican party of Jefferson and his followers. Believing Jefferson to have influenced the writing and passage of the Northwest Ordinance of 1787, which abolished slavery from those territories of the United States lying north of the Ohio River, these "Republicans" considered themselves as representing the principles of the Declaration of Independence—a view implied in their party declarations. A state convention, meeting at Jackson, Mich., July 6, 1854, formally adopted the name Republican, and shortly various other organizations held meetings, adopted the designation of Republican, and proceeded to perfect their machinery. Many conventions met on July 13, 1854, to commemorate the enactment of the Northwest Ordinance, including state conventions in Vermont, Ohio, Indiana, and Wisconsin.

First National Campaign. The movement thus initiated gained momentum during the next two years, and representatives to a national convention held in Philadelphia in 1856, including the remnants of the Free Soil Party, committed the new party to its first participation in a presidential contest. All of the Northern states, as well as Delaware, Kentucky, Maryland, and Virginia, sent delegates. The convention adopted a platform asking for support from those opposed to the Missouri Compromise repeal, the administration of President Franklin Pierce, and the extension of slavery; and from those favoring the admission of Kansas as a free state and the return of government to the principles of George Washington and Jefferson. The platform denied the authority of Congress and of territorial legislatures "to give legal existence to slavery" in the territories and declared that the Constitution conferred upon Congress power over the territories, and that right and duty demanded that Congress prohibit in the territories "those twin relics of barbarism, polygamy and slavery." Other major planks of their first platform called for admission of Kansas as a free state; disapproval of the Ostend manifesto as dishonorable to the United States; construction of a railroad to the Pacific Ocean; and appropriation of money for the improvement of rivers and harbors of a national character.

The convention nominated John C. Frémont, of California, for president on the first ballot, and William L. Dayton, of New Jersey, for vice-president. Frémont, although his name possessed glamor, lacked political strength.

In the canvass, Frémont received 1,339,932 popular votes to 1,832,955 votes for James Buchanan, the Democratic nominee. Because of the presence in the campaign of Millard Fillmore, the American and Whig parties' nominee, Buchanan failed to achieve a clear majority, although he carried the electoral college by 174 votes to Frémont's 114 and Fillmore's 8. The Republicans drew about one third of their strength from the Democrats through the Free Soil Party and about two thirds from the Whig Party. All of Frémont's support came from Northern states.

First Victory with Lincoln. The struggle for Kansas, the Dred Scott Decision of 1857, and the growing animosity between the sections further sharpened the political cleavages developing within the nation. The Republican Party, meet-



REPUBLICAN BANNER for the 1860 presidential campaign shows Abraham Lincoln (left), the party's successful candidate for president, and Hannibal Hamlin, who was elected vice-president.

ing in Chicago, May 16-18, 1860, was represented by delegates from all of the free states, as well as from the states of Delaware, Kentucky, Maryland, Missouri, Texas, and Virginia, the territories of Kansas and Nebraska, and the District of Columbia. Following a brief contest between the supporters of William H. Seward and Abraham Lincoln, of Illinois, the convention nominated Lincoln, originally a Whig, and Hannibal Hamlin, of Maine, a former Democrat, for the presidency and vice-presidency, respectively.

The platform adopted in 1860 went beyond the free soil declarations of 1856, indicating a tendency to extend the appeal of the party to a broader segment of the electorate. Planks dealing with the following issues gained acceptance: opposition to disunion; maintenance of states' rights in domestic affairs; denunciation of the Buchanan administration for its treatment of Kansas; denial of the authority of Congress, or of a territorial legislature, to make slavery legal in a territory; immediate admission of Kansas as a free state; advocacy of a protective tariff; protests against alienation of lands held by actual settlers; demands for a free homestead policy; approval of easy naturalization laws; appropriations for river and harbor improvements; a demand for a railroad to the Pacific Ocean and support for its construction; and the prompt establishment of a daily overland mail.

Earlier, in May 1860, the Constitutional Union Party had met and nominated John Bell, of Tennessee, and Edward Everett, of Massachusetts, as candidates for the election of that year. The Democratic Party, having failed to nominate

candidates at its convention in April at Charleston, S.C., split into Northern and Southern factions, each presenting candidates. Stephen A. Douglas, of Illinois, and H. V. Johnson, of Georgia, were the candidates of the Northern faction, and John C. Breckinridge, of Kentucky, and Joseph Lane, of Kansas, represented the Southern wing of the party.

In the four-way contest, the Republican electors won 1,865,593 popular votes, or about 40 percent of the total, and 180 electoral votes; Democratic electors pledged to Douglas gained 1,382,713 popular votes and 12 electoral votes; Democratic electors pledged to Breckinridge secured 848,356 popular votes and 72 electoral votes; Constitutional Union electors pledged to Benn polled 592,906 popular votes and 39 electoral votes.

Republican Civil War Administration. The election of Lincoln, regarded by Southern extremists as the leader of a sectional party, became the prelude to secession by 11 Southern states, beginning with South Carolina on Dec. 20, 1860. Under the leadership of Lincoln, the party minimized the slavery issue and emphasized the necessity of preserving the Union—by coercion, if necessary.

Lincoln at first followed a careful policy regarding the slavery issue in order to hold the allegiance of the border states. By 1862 abolition of slavery was regarded as a war aim of importance since it would weaken the Confederacy and might aid in the Union's negotiations with European powers. Although the Republican platform of 1860 had indicated the party's unwillingness to disturb slavery in the states where law and custom protected it, the Emancipation Proclamation, effective Jan. 1, 1863, initiated legal measures looking toward total abolition of slavery under the Thirteenth Amendment to the Constitution in 1865.

During the conflict, the Republican Party sponsored other policies believed necessary to the successful prosecution of the war or designed to attract support from segments of the electorate not hitherto sympathetic. These measures not only affected the nation's development, but tended to fashion the Republican Party into an agency for the promotion of Hamiltonian principles of national government, finance, and commercial and industrial primacy. Such legislation included the National Banking Act, the subsidization of a railroad to the Pacific Coast, the Morrill Tariff, the Homestead Act, and the Morrill Act for the promotion of land-grant colleges.

Change of Party Name. Considerable opposition developed in the North to the administration's conduct of the war. Partly as a consequence of this opposition and partly as a means of drawing strength from Northern War Democrats, the party changed its name to the National Union Party. The convention in June 1864, at Baltimore, Md., was attended by delegates from 31 states, including 8 Southern states. Although it renominated Lincoln for the presidency, the party chose a Tennessee Democrat, Andrew Johnson, for the vice-presidency. The platform emphasized loyalty to the Union, approved the administration's conduct of the war, advocated the "complete extirpation" of slavery from the republic, favored a liberal immigration policy, endorsed the construction of a railroad to the Pacific coast, and, without naming it, reaffirmed the principles of the Monroe Doctrine.

Earlier, a faction opposed to Lincoln had met at Cleveland, Ohio, and adopted a platform implying criticism of Lincoln's administration. It held that reconstruction is a function of Congress and not the president, and proposed to confiscate rebel lands for distribution among the soldiers and settlers. The faction's nominees, John C. Frémont and John Cochran, later withdrew in favor of Lincoln and Johnson. The

Democratic Party nominated George B. McClellan, of New Jersey, and George H. Pendleton, of Ohio, for president and vice-president.

Lincoln's Reelection and Assassination. Lincoln electors won 2,206,938 popular votes and 212 electoral votes, while McClellan electors polled 1,803,787 popular votes and 21 electoral votes. The successful prosecution of the war, along with the adoption of policies appealing to business and agriculture, secured the party widespread support in the North and West. The assassination of Lincoln on Apr. 14, 1865, brought Johnson to the presidency.

Radical Republican Revolt. In the ensuing contest for control of the party, extremists (Radical Republicans) under the leadership of Charles Sumner, in the Senate, and Thaddeus Stevens, in the House of Representatives, came to the fore. Warring against Johnson, who sought to carry out Lincoln's moderate program of reconstruction, the Radical Republicans succeeded in imposing an unwise and impractical scheme of reconstruction upon the former states of the Confederacy. Johnson, believing the Congressional program unnecessarily vindictive, vetoed many of the harshest measures, but Congress promptly passed them over his veto. The fight against Johnson culminated in his impeachment in 1868.

Election of Grant. The Republicans repudiated Johnson in the campaign of 1868 and at their convention at Chicago in May nominated the military hero Ulysses S. Grant for the presidency, and Schuyler Colfax, of Indiana, for the vice-

presidency. The platform of the party denounced Johnson and upheld the Radical Republicans' program of reconstruction. All shades of Republicans—Black, Black and Tan, and White—supported Grant, while the party, capitalizing on its war policy, appealed as the savior of the Union to the electorate and sought to attach the stigma of treason and rebellion to the Democratic Party.

In the canvass, Grant won 3,013,421 popular votes against the Democratic nominee Horatio Seymour, of New York, who polled 2,706,829 votes; Congress had debarred Mississippi, Texas, and Virginia from participating in the election. The electoral college voted 214 to 80 in favor of Grant.

With the inauguration of Grant in 1869, the postwar Republican Party under the leadership of the Radicals enjoyed a freer hand. This leadership sought to make permanent the advantages which the party had won during the war and in the early period of reconstruction. One of the long-time results, however, proved to be the alienation of Southern Whigs, who might have been won over to the Republicans to strengthen the party. In general, Republican domination in the South and the disorders attending the reconstruction governments in the former Confederate states solidified opposition to the Republican Party, which in turn benefited the Democratic Party, the agency for expressing the political views of the Solid South.

Liberal Bolt of 1872. Grant's second administration, marked by continued harshness of reconstruction, and by the revelation of many scandals, produced a strong opposition

THE "WIGWAM" CONVENTION, held in May 1860 at Chicago, was the second Republican national assembly for nominating the party's presidential candidate. Wood engraving is from Harper's, May 19, 1860.

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movement within the party leading to a contest for supremacy. Some of the more liberal elements bolted the party and assisted in the organization of the Liberal Republican Party at Cincinnati in May 1872. While this new group pledged itself "to maintain the union, emancipation, and enfranchisement, and to oppose any reopening of the questions settled by the Thirteenth, Fourteenth, and Fifteenth amendments to the Constitution," it asked for universal amnesty, withdrawal of federal troops from the Southern states, reform of the civil service, and cessation of further grants of land to railroads or other corporations. The convention recognized "irreconcilable differences of opinion" over the tariff issue and did not commit the party to free trade or to protection. Departing thus from the parent body in principles, the Liberal Republicans nominated Horace Greeley, of New York, and B. Gratz Brown, of Missouri, for president and vice-president.

The Republican Party, confident of victory, renominated Grant in its convention at Philadelphia in June 1872. The platform commended the party for its services to the nation in suppressing a "gigantic rebellion," emancipating the slaves, decreeing equal citizenship and universal suffrage, reconstructing the union, aiding the construction of the "Pacific Railroad," and other achievements. While commending Grant for his modest patriotism, sound judgment, and integrity, the platform contained some vague references to civil service reform, state rights, and the "admission of women to wider fields of usefulness" as citizens.

The Democratic Party, in the full knowledge of a split in Republican ranks, met at Baltimore in July and endorsed the Liberal Republican platform and nominees of 1872. Efforts to split the Democratic vote by holding a "straight out" Democratic convention at Louisville in September, with the nomination of Charles O'Connor, of New York, and John Quincy Adams, of Massachusetts, failed to attract support.

In the voting, in which all states participated, Grant won 3,596,745 popular votes and Greeley polled 2,843,446 votes. Greeley died shortly following the election and the electoral college gave Grant 286 votes and scattered Greeley's 63 electoral votes among four other candidates.

Party Reunion in 1876. Liberal Republican opposition did not survive Grant's second administration and a reunited party approached the election of 1876. Those hoping to achieve reform in national politics looked to a number of "third parties," notably the Independent National (Greenback) Party. The Republican National Convention, following a contest for the nomination among James G. Blaine, of Maine, Oliver P. Morton, of Ohio, and Benjamin H. Bristow, of Kentucky, selected Rutherford B. Hayes, of Ohio, for president and William A. Wheeler, of New York, for vice-president. The platform reiterated major Republican principles and gave special consideration to the currency issue, demanding fulfillment of the promise to redeem the paper currency in coin.

The Democratic Party nominated Samuel J. Tilden, of New York, and Thomas H. Hendricks, of Indiana, for president and vice-president, respectively. Tilden, possessing a good record, gathered great strength in the campaign.

The canvass took on more of a two-party contest than had characterized the election of 1872. The Democratic nominee won a clear majority: 4,284,020 to 4,036,572 votes out of a total vote of 8,402,329. Many charges of irregularities in the polling led to the appointment of an Electoral Commission (composed of a majority of Republicans) which, by a strictly partisan vote, threw out disputed returns in Oregon, Florida, South Carolina, and Louisiana, thus insuring Hayes's election by the electoral college by a vote of 185 to 184. Since then,

political students have taken the view that the American people demonstrated their good sense and political maturity in accepting the verdict of the Electoral Commission in this disputed election.

The Democratic Party retained in 1876 the control of the House of Representatives won in 1874. President Hayes wisely fulfilled his campaign promises respecting reconstruction, despite warm protests by many of his own party. During Hayes's administration the federal government withdrew the remaining troops from the South, thereby ending Republican domination of state governments in the former Southern Confederacy.

Period of Political Evasion. With the passing of the Southern question, party history in the United States was largely marked by its failure to deal with the basic issues dividing the electorate. Henry Adams' characterization of the period as poor in purpose and barren in results is regarded by many as valid. The stage had been set, as it were, for the playing of a great drama in American life as industrialism transformed the country, the great West came under the subjection of exploiters of its resources, and business challenged the leadership of agriculture and commerce in the economic and social life of the nation. The major parties became institutionalized and tended to evade the important issues facing the republic. Each party posed as the defender of a sound bimetallic currency, each preached reform of the civil service, each hoped to regulate business, and each supported protective tariff measures. The spoils of office became the objective of groups within the parties struggling for control of the organizations.

In the Republican Party, this conflict developed between the Stalwarts, led by Roscoe Conkling, of New York, and the Half-Breeds, led by Blaine, of Maine. Not until the fires of dissent and protest reached serious proportions in the 1890's did party leadership sense the necessity of a realignment with the realities of politics. Meanwhile, the tendency to change control of Congress during the mid-term elections developed, and this not only hampered the administration but revealed the underlying discontent with party government as practiced up until 1897.

Garfield's Election and Assassination. Despite the fact that Hayes proved a capable administrator during his single term in office, disgruntled elements within the party prevented his renomination at the Republican National Convention at Chicago in June 1880. Grant, the Stalwart's choice for the nomination, and Blaine, leader of the Half-Breeds, fought for supremacy throughout 35 ballots; the deadlock ended on the 36th ballot in a stampede to James A. Garfield, of Ohio. The convention selected Chester A. Arthur, of New York, as the vice-presidential candidate.

The election was close, with Garfield and Winfield S. Hancock, of Pennsylvania, the Democratic presidential nominee, together polling 8,867,377 of the 9,186,260 total votes cast. Reform elements generally supported James B. Weaver, of Iowa, the Greenback Party nominee, who won 308,578 votes largely from the Midwest. Although Garfield gained less than 40,000 more popular votes than Hancock, he obtained 214 electoral votes against his opponent's 155. Arthur succeeded to the presidency following Garfield's assassination in 1881 and conducted the affairs of office with unexpected merit.

Defeat by Cleveland. President Arthur, however, failed to gain control of the party at its national convention in June 1884, again in Chicago. The convention nominated Blaine, leader of the Half-Breed faction, on the fourth ballot, following a contest with the Stalwart forces, nominally headed by Arthur.

The Democratic Party, in an effort to emphasize the need for reform, nominated Grover Cleveland, of New York, who had gained the reputation of a reformer as mayor of Buffalo and governor of New York.

The failure of parties to reflect differences over basic issues led to a campaign in which the character and personalities of the principal candidates became the chief stock-in-trade of the party workers. Blaine lost strength when the Democrats exposed alleged irregularities in public office, some of the more liberal elements known as "Mugwumps" throwing their support to Cleveland, whose private life was bitterly assailed by the Republicans. Following a bitter and unworthy canvass, the electorate gave Cleveland 4,879,507 and Blaine 4,850,293 popular votes. Greenback and Prohibition electors polled together only slightly more votes than in 1880, but these were sufficient to prevent a clear majority of the popular votes from going to either major party's nominees. Cleveland won 219 votes in the electoral college and Blaine 182 votes.

President Cleveland, without precedent, devoted his entire annual message in 1887 to a single issue, the tariff, and thus provided the Republican Party with its principal campaign weapon for 1888.

Return to Power in 1888. During the years out of the presidential office, no new leaders of the Republican Party emerged to contest Blaine's control of the organization. Blaine, however, removed himself from consideration by the party, thus permitting a wide-open fight at the convention at Chicago in June 1888. The Republicans voted on 19 contenders, including Blaine, before giving Benjamin Harrison, of Indiana, a majority of the votes on the eighth ballot; Levi P. Morton, of New York, was named for vice-president. The party in its platform declared especially for protective tariff legislation and for a more liberal pension program for Union Civil War veterans. Harrison emphasized the need for protective tariff as the basis for continued prosperity.

Although Cleveland won a plurality of the popular votes cast and over 100,000 more than Harrison, he lost his own state of New York and enough other states to give Harrison 233 of the electoral votes, to Cleveland's 168.

The Republican Party possessed an unusual opportunity as it came to office in 1889, since for the first time in many years it controlled not only the presidency but both houses of the Congress. Finding in Thomas Brackett Reed, of Maine, a speaker who could wield great power, the Republican majority in the House of Representatives reorganized the rules of that body and embarked upon an ambitious program of legislation. The Congress under Republican leadership admitted several new states into the Union; enacted a liberal pension law; sought to provide for regulation of the "trusts" in the Sherman Anti-Trust Act; favored "easy money" advocates and silver-producing areas with the Sherman Silver Purchase Act; enacted a highly protective tariff, the McKinley tariff, described as "protective in every paragraph and American in every line and word"; and proposed a new federal elections bill which would have permitted the use of troops in supervising federal elections.

Partisan opponents of the Republicans went out from Washington immediately after the passage of the McKinley tariff to warn the country in time for the Congressional elections in November 1890 that prices would rise. As a result, the Democrats won in a landslide, gaining 235 seats to the Republicans' 88; William McKinley, author of the tariff measure, was one of those who failed of reelection.

Second Loss to Cleveland. Failing during his administration to win the warm support of the party leaders, President Harrison faced a serious threat to his control at the

convention in June 1892, at Minneapolis. Blaine, Harrison's secretary of state, dramatically resigned just before the convention opened and served for a time as a rallying point of opposition. The convention, however, passed over the aging and ailing Blaine, and renominated Harrison for the presidency and Levi P. Morton for the vice-presidency.

Shortly after, the Democrats renominated Cleveland, who had managed to maintain control of his party despite growing factionalism and opposition on the part of several state "bosses."

The People's Party complicated the political situation in 1892, tending to draw upon Republican strength, particularly in the middle border states of the Midwest, and upon the Democratic Party in the South. In a spiritless canvass marked by Populist gains in the Midwest, Harrison lost to Cleveland by 5,182,690 to 5,555,426 popular votes, and 145 to 277 electoral votes.

The Republican leadership during Cleveland's hapless second administration consolidated its forces for the campaign of 1896. The country underwent one of its severest depressions following the panic of 1893, which indirectly contributed to Republican strength. Moreover, Cleveland, by his monetary policies, particularly, so weakened his party that it split into factions. In the meantime, the Populist Party increased in strength and placed more and more reliance upon the free coinage of silver as a panacea for the country's ills.

The Republicans Under McKinley. Mark A. Hanna, a Cleveland, Ohio, businessman, saw during these years a threat to American business in the rise of populism and sought to offset it by making his friend William McKinley, of Ohio, president. The Republican convention, meeting at St. Louis in June 1896, nominated McKinley on the first ballot and wrote a platform emphasizing the tariff and the party as the means for achieving prosperity.

Cleveland, no longer leader of his party, lost control of the Democratic convention to William Jennings Bryan, who not only became the party standard bearer but committed it to the Populist Party's panacea, free silver.

The election of 1896 stands out as the most significant election after 1860. In general, the agricultural South and West supported Bryan while the industrial Northeast upheld the Republican Party and its nominee. McKinley won 7,102,246 popular and 271 electoral votes, Bryan 6,492,559 popular and 176 electoral votes. Bryan attracted farmers and, to some extent, laboring men, while McKinley had the support of businessmen. In this respect the election resembled a contest between class elements more than had any previous election since the organization of the Republican Party.

The McKinley administration proved sensitive to American business interests; indeed, evidence suggested that a new Republican Party—a party of business and large interests—had come to power. The party did nothing to molest the trusts, while it redeemed its high-tariff pledges in the Dingley Tariff of 1897. The party made no effort to deal with the financial problem, although the money question had played a prominent part in the campaign of 1896; the time seemed inauspicious because of the presence of Silver Republicans in the Senate. Moreover, increased stores of gold accomplished a partial inflation of the currency, and this factor, combined with returning prosperity, temporarily reduced the pressure for financial legislation. In foreign affairs, the Republican Party expressed the expansionist sentiments welling to the surface in the 1890's. While *big business* in 1898 seemingly opposed going to war against Spain over Cuba, popular opinion supported such a move.

The successful prosecution of the Spanish-American War