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How to use the MICROPAEDIA

The 12 volumes of the MICROPAEDIA contain tens of thousands of shorter articles on specific persons, places, things, and ideas, arranged in alphabetical order. The MICROPAEDIA can be used as an information resource on its own; and it can function as support for the longer articles in the MACROPAEDIA (to which it refers whenever appropriate). The MICROPAEDIA in turn is supported by references in the INDEX and by the lists of suggested readings in the PROPAEDIA. Finally, the MICROPAEDIA is the portion of the *Encyclopædia Britannica* best suited for the reader who wishes to browse among the countless subjects in all fields of human learning and history in all times and places.

Alphabetization

Entry titles are alphabetized according to the English alphabet, A to Z. All diacritical marks (such as in ö, ł, or ñ) and foreign letters without parallels in English (such as ayin [ʿ] and hamza [ʾ]) are ignored in the alphabetization. Apostrophes likewise are ignored. Titles beginning with numbers, such as **1812, War of**, are alphabetized as if the numbers were written out (**Eighteen-twelve, War of**).

Alphabetization proceeds according to the "word-by-word" principle. Thus, **Mount Vernon** precedes **mountain**; any **John** entry precedes **John Henry**, which in turn precedes **Johne's disease**. Any character or string of characters preceding a space, hyphen, or dash is treated as a word and alphabetized accordingly. Thus, **De Broglie** precedes **debenture**, and **jack-o'-lantern** precedes **jackal**. Titles with identical spellings are arranged in the following order: (1) persons, (2) places, (3) things.

For many rulers and titled nobility, chronological order, as well as alphabetical order, governs placement. Rulers of the same given name (*e.g.*, William) may be grouped together, separate from other entries, and indicated by the symbol •. They may be subgrouped alphabetically by country and, within each country, arranged chronologically (**William I, William II**, etc.). Nobility or peers of the same titled name (*e.g.*, **Essex, EARLS OF**) are similarly grouped together, separate from other entries; they are indicated by the symbol • and arranged chronologically.

Places with identical names are arranged in the alphabetical order of the countries where they are located. Identical place-names in the same country are alphabetized according to the alphabetical order of the state, province, or other political subdivision where they are found.

Entry arrangement

The titles of entries are arranged according to the forms commonly found in indexes and dictionaries, with some special conventions.

Entry titles for certain physical features, institutions, structures, events, and concepts are ordinarily inverted to place the substantive word first. Thus, the Bay of Bengal is entered as **Bengal, Bay of**; the Bank of England as **England, Bank of**; the Tower of London as **London, Tower of**; the Siege of Vienna as **Vienna, Siege of**; and the balance of power as **power, balance of**. If the name of a physical feature, institution, structure, event, or concept has two or more descriptors, it is entered under the descriptor appearing first. Thus, the Episcopal Church in Scotland is entered as **Episcopal Church in Scotland** (not **Scotland, Episcopal Church in**); the Leaning Tower of Pisa as **Leaning Tower of Pisa**; and the kinetic theory of gases as **kinetic theory of gases**.

The entries for most Western persons are arranged so that one can read a name in correct order by beginning after the first comma, proceeding to the end of the boldface type, returning to the beginning word or words, and proceeding forward to the first comma. Thus, the entry **March, Patrick Dunbar, 2nd Earl of**, is read "Patrick Dunbar, 2nd Earl of March"; the entry **Orléans, Louis, duc d'**, is read "Louis, duc d'Orléans." Names of Far Eastern origin are given in Oriental order, with the surname preceding the personal name (*e.g.*, **Tōjō Hideki, Deng Xiaoping, Nguyen Cao Ky**).

Cross-references

Some cross-reference entries appear in the MICROPAEDIA for the purpose of leading a reader from names that are familiar to alternate names that may not be. Cross-references also appear frequently within or at the ends of standard entries, where they are identified by *see, see also, see under, q.v.* (*quod vide*, "which see"), or *qq.v.* (*quae vide*, "which see," plural).

Certain entries serve both as relatively brief essays on general subjects and as cross-references to the same subjects treated at greater length and in greater depth in the MACROPAEDIA. Such an entry (*e.g.*, **igneous rock**) begins with a definition of the subject and then provides the following cross-reference: "A brief treatment of igneous rocks follows. For full treatment, *see* MACROPAEDIA: Minerals and Rocks.

Entries on certain broad subjects (*e.g.*, **music**) direct the reader to several relevant articles in the MACROPAEDIA and also to the PROPAEDIA for listings of related articles in the MICROPAEDIA.

Abbreviations

Abbreviations used in the MICROPAEDIA are given in a list that appears at the end of every MICROPAEDIA volume.

Territorial boundaries

In articles and maps indicating disputed geopolitical boundaries and territories, the attribution of sovereignty or administrative subordination to any specific area does not imply recognition of the status claimed by an administering power.

Ceará, *estado* ("state") of northeastern Brazil. It is bounded on the north by the Atlantic Ocean, on the east by the Atlantic and the states of Rio Grande do Norte and Paraíba, on the south by the state of Pernambuco, and on the west by the state of Piauí. It covers an area of 57,150 square miles (148,016 square km). The capital, Fortaleza, is the principal cultural, commercial, and seaboard shipping centre. Other principal towns are Juazeiro do Norte, Sobral, Crato, Iguatu, and Crateus. The seaboard, the mountains and mesas, and the backlands are the main topographic regions of the state.

The state lies partly upon the northeastern slope of the great Brazilian Highlands and partly upon the sandy coastal plain. Its surface is a succession of great terraces, facing north and northeast, formed by the erosion of an ancient sandstone plateau; the terraces are seamed by watercourses, and their valleys are broken by hills and ranges of highlands. The sandy coastal plain is nearly bare of vegetation; behind it is an elevated region with sandy soil that is amenable to cultivation and produces fruit, cotton, and many tropical products. The soil of the backlands is thin and porous.

The long dry season turns the backlands into a barren wasteland, or *sertão,* relieved by vegetation only along riverbanks and on mountains; spiny, stunted groves of caatinga, or scrub forest, the trees of which lose all their leaves in the dry season and turn gray, are typical.

Ceará is semiarid, precipitation ranging from 63 inches (1,600 mm) on the seaboard and in the mountains to 16 inches (400 mm) in the backlands. Regardless of the amount, the rainfall is almost wholly concentrated in the three months of March, April, and May, so that there is a long dry period during which all rivers and streams eventually become dry beds. Occasionally the rains may fail altogether, and then severe droughts cause famine, economic disruption, and migrations of rural peoples. Average temperatures year-round range from 79° to 82° F (26° to 28° C) but may peak to 86° or 90° F (30° or 32° C) in the backlands during the dry season, thus aggravating the aridity.

Like other states of northeastern Brazil, Ceará was settled as a "captaincy," or fief, of the Portuguese crown, its economy in the 18th century centring on sugar plantations worked by black slaves. Ceará in 1884 became the first state in Brazil to free all its slaves. As early as the 18th century cattle were introduced to the *sertões,* and in the 19th century long-staple cotton was planted and thrived. Ceará is one of the largest producers of cotton in Brazil. With a few million head of cattle, it has one of the largest herds in northeastern Brazil. Sugarcane, though now less important, is still grown. Other commercial crops include cashew nuts, cassava, carnauba wax, oiticica oil, fruits, and vegetables. Cotton is grown and cattle are raised on the great estates, which support sharecroppers, whereas the large population of smallholders are restricted to a life of subsistence farming.

There are some mineral resources in the state, but prospecting has not proceeded far enough to establish their economic potential. Gypsum, limestone, copper, and manganese are produced in modest quantities.

The cities of Ceará have developed as centres for collecting, processing, and marketing the regional products, particularly cotton. Trade has been accompanied by industrial activity, involving the production of textiles, food, chemicals, and pharmaceuticals. Fortaleza is the site of the Federal University of Ceará (founded 1954). Pop. (1989 est.) 6,356,100.

cease-fire, a total cessation of armed hostilities, regulated by the same general principles as those governing armistice. In contemporary diplomatic usage the term implies that the belligerents are too far apart in their negotiating positions to permit the conclusion of a formal armistice agreement. *See also* armistice.

Ceauşescu, Nicolae (b. Jan. 26, 1918, Scornicesti, Rom.—d. Dec. 25, 1989, near Bucharest), Communist official who was leader of Romania from 1965 until he was overthrown and killed in a revolution in 1989.

A prominent member of the Romanian Communist youth movement during the early 1930s, Ceauşescu was imprisoned in 1936 and again in 1940 for his Communist Party activities. In 1939 he married Elena Petrescu (b. Jan. 7, 1919, Oltenia region, Rom.—d. Dec. 25, 1989, near Bucharest), a devout Communist. While in prison Ceauşescu became a protégé of his cell mate, the Communist leader Gheorghe Gheorghiu-Dej, who would become the Communist leader of Romania beginning in 1952. Escaping prison in August 1944 shortly before the Soviet occupation of Romania, Ceauşescu subsequently served as secretary of the Union of Communist Youth (1944–45). After the Communists' full accession to power in Romania in 1947, he first

Ceauşescu
Pictorial Parade—EB Inc.

headed the nation's ministry of agriculture (1948–50), and from 1950 to 1954 he served as deputy minister of the armed forces with the rank of major general. Under Gheorghiu-Dej, Ceauşescu eventually came to occupy the second highest position in the party hierarchy, holding important posts in the Politburo and Secretariat.

With the death of Gheorghiu-Dej in March 1965, Ceauşescu succeeded to the leadership of Romania's Communist Party as first secretary (general secretary from July 1965); and with his assumption of the presidency of the State Council (December 1967), he became head of state as well. He soon won popular support for his independent, nationalistic political course, which openly challenged the dominance of the Soviet Union over Romania. In the 1960s Ceauşescu virtually ended Romania's active participation in the Warsaw Pact military alliance, and he condemned the invasion of Czechoslovakia by Warsaw Pact forces (1968) and the invasion of Afghanistan by the Soviet Union (1979). Ceauşescu was elected to the newly created post of president of Romania in 1974.

While following an independent policy in foreign relations, Ceauşescu adhered ever more closely to the communist orthodoxy of centralized administration at home. His secret police maintained rigid controls over free speech and the media and tolerated no internal dissent or opposition. In an effort to pay off the large foreign debt that his government had accumulated through its mismanaged industrial ventures in the 1970s, Ceauşescu in 1982 ordered the export of much of the country's agricultural and industrial production. The resulting drastic shortages of food, fuel, energy, medicines, and other basic necessities drove Romania from a state of relative economic well-being to near starvation. Ceauşescu also instituted an extensive personality cult and appointed his wife, Elena, and many members of his extended family to high posts in the goverment and party. Among his grandiose and impractical schemes was a plan to bulldoze thousands of Romania's villages and move their residents into new apartment buildings.

Ceauşescu's regime collapsed after he ordered his security forces to fire on antigovernment demonstrators in the city of Timisoara on Dec. 17, 1989. The demonstrations spread to Bucharest, and on December 22 the Romanian army defected to the demonstrators. That same day Ceauşescu and his wife fled the capital in a helicopter but were captured and taken into custody by the armed forces. On December 25 the couple were hurriedly tried and convicted by a special military tribunal on charges of mass murder and other crimes. Ceauşescu and his wife were then shot by a firing squad.

Ceawlin (d. 593), king of the West Saxons, or Wessex, from 560 to 592, who drove the Britons from most of southern England and carved out a kingdom in the southern Midlands.

Ceawlin helped his father, King Cynric, defeat the Britons at Beranbyrg (Barbury) in 556. In 568, eight years after he assumed the West Saxon kingship, Ceawlin and his brother Cutha severely defeated King Aethelberht I of Kent. Ceawlin's victory over the Britons at Deorham (Dyrham) in 577 led to the capture of Gloucester, Cirencester, and Bath. The valley of the lower Severn River was thereby opened to West Saxon colonists, and the Britons of Wales were cut off from their kinsmen on England's southwestern peninsula.

Nevertheless, a king named Ceol seized at least part of Ceawlin's lands in 591. After being defeated by Ceol at Woddesbeorg (or Wodnesbeorg; now Adam's Grave in Wiltshire) in 592, Ceawlin was driven into exile. He was killed the next year. The 8th-century historian Bede included him in his list of seven successive rulers who were overlords (bretwaldas) of all the lands south of the Humber.

Cebidae, family of agile, forest-dwelling platyrrhine, or New World, monkeys; they range from Mexico in the north to Argentina in the south. The family includes the durukuli, uakari, saki, howling monkey, capuchin monkey, squirrel monkey, spider monkey, woolly monkey, and woolly spider monkey (*qq.v.*).

Cebu, island, central Philippines. It is the centre of Visayan-Cebuano culture and has preserved a strong Spanish tradition in its cultural life. Attracted by the island's focal position, the Portuguese navigator Ferdinand Magellan landed there and converted the ruler and chiefs to Christianity. He later was killed on nearby Mactan Island. There are numerous relics of the event in Cebu City.

The island of Cebu is 122 miles (196 km) long and has an area of 1,707 square miles (4,422 square km); nowhere does it exceed 20 miles (32 km) in width. The surrounding waters are the Visayan Sea (north), Tanon Strait (west), Bohol Strait (southeast), and Camotes Sea (east). Bisected by a range of low volcanic hills, the island has very little level land except for the Bogo Plain in the far north, which is mainly a commercial sugarcane area. There are few harbours, and the settlement pattern is one of numerous small agricultural villages that grow corn (maize), coconuts, yams, agave, and tobacco. Cebu suffers from both overpopulation and soil depletion. There was extensive timber cutting for the building of Spanish galleons on the historic Manila–Acapulco route, and the land was further impaired by the erosive powers of the island's short, rapid rivers and by poor agricultural methods. The Central Cebu National Park (1937), encompassing a triangular area (38,049 acres

[15,394 hectares]) between Balamban, Toledo City, and Cebu City, constitutes the only remaining forest on the island. The island also has a game and bird sanctuary.

Cebu was probably the first Philippine island to cultivate corn on a widespread basis after that plant's introduction by the Spaniards. Coarse-ground corn remains the staple food, though grain is imported from Mindanao, for Cebu is not agriculturally self-sufficient. Cebu's manufacturing industries are limited primarily to food processing. Coal, copper, limestone, gold, and silver are mined in the central hill country of the island. In addition to Cebu City, the major settlements on Cebu are Danao, Lapu-Lapu (formerly Opon), Toledo, and Mandaue. Pop. (1990 prelim.) Cebu and smaller adjacent islands, 2,646,000.

Cebu City, city, Cebu Island, south-central Philippines. Located on Cebu Island's eastern coast, it is protected by offshore Mactan Island and by the inland Cordillera Central. It is one of the nation's largest cities and a bustling port. Its harbour is provided by the sheltered strait between Mactan Island and the coast.

The nation's oldest settlement, it is also one of its most historic and retains much of the flavour of its long Spanish heritage. A thriving port occupied the site when Ferdinand Magellan, the Portuguese navigator, landed there on April 7, 1521. He sealed a blood compact with Humabon, the chief of Cebu, but was killed later by Chief Lapulapu of nearby Mactan Island. On April 27, 1565, Miguel López de Legazpi and the friar Andrés de Urdaneta arrived on Cebu and founded the first Spanish settlement and Catholic mission in the Philippine archipelago. For six years, until Legazpi's removal to Manila, Cebu was the Spanish colonial capital. It remained the primary Spanish bastion in the southern part of the Philippines.

The cultural and commercial core of the central Visayan region, Cebu was opened to foreign trade in 1860. It was chartered as a city in 1936. Although it imports few foreign goods, it is the main collection centre for such interisland commodities as copra, abaca, sugar, timber, and fish. Cebu is a major point of passenger traffic by air and sea and is served by an airport at Lahug and an international airport across the harbour on Mactan Island.

Many Manila-based industrial and commercial firms maintain branches in Cebu City. Warehousing and assembly plants for wholesale trade are important to the economy. Textiles, footwear, processed foods, vegetable oil, furniture, and chemicals are leading products. Other manufactures include cosmetics, candles, pearl and aquamarine jewelry, and *sistas* (guitars and ukuleles), the latter primarily made on Mactan Island. The city is easily accessible from all points on Cebu Island. A coastal railway reaches from Cebu City north to Danao and south to Carcar, and highways cross the nearby Cordillera Central. The city was almost destroyed by the Japanese in May 1942, but the port was left intact. The city was subsequently rebuilt and enlarged. Its layout follows the configuration of the shoreline, with the main business district adjoining the port area. Urban residents are concentrated nearby, and population influx has contributed to a housing shortage. Suburbs are located to the north and south along the coastal plain.

Cebu City is a Roman Catholic archbishopric and is a centre of education. It is the site of five major universities: the University of San Carlos (1595), Cebu Institute of Technology (1946), Southwestern University (1946), University of the Southern Philippines (1927), and University of the Visayas (1919). The ruins of the Spanish Fort San Pedro are near the harbour. Pop. (1990 prelim.) 610,000.

Cebuano, also called CEBUAN, or SUGBUHANON, the largest cultural-linguistic group in the Philippines, numbering about 14,600,000 in the late 20th century. They speak an Austronesian (Malayo-Polynesian) language and are sometimes grouped with the Hiligaynon and Samaran under the generic name of Visayan (Bisayan) peoples. The Cebuano inhabit the islands of Cebu, Siquijor, and Bohol, as well as eastern Negros, western Leyte, southern Masbate, and northern Mindanao.

Most Cebuano follow a traditional way of life, tilling the soil and fishing the seas. The typical Cebuano village consists of bamboo and wooden dwellings of two or three rooms built on pilings and thatched with palm. The diet is mainly rice and fish, with some vegetables and fruits. In Cebu and eastern Negros, however, ground cornmeal replaces rice as the staple cereal. Social life centres on baptisms, marriages, funerals, school programs, annual fiestas, and the Roman Catholic religious calendar. The major Cebuano urban centre is Cebu City, situated in the most densely populated island of the Philippines, Cebu.

Cebuano language, also spelled SEBUANO, also called SUGBUHANON, member of the Western, or Indonesian, branch of the Austronesian (Malayo-Polynesian) language family. It was spoken in the late 20th century by as many as 14,600,000 persons in the Philippines (speakers are spread over eastern Negros, Cebu, Bohol, western Leyte, the Camotes Islands, and the northern and western coasts of Mindanao). Cebuano is closely related to the Hiligaynon (Ilongo) and Waray languages, with which it is sometimes grouped as dialects of a Visayan (Bisayan) language.

Native Cebuano speakers constitute about one-fourth of the population of the Philippines and as such comprise the largest linguistic and cultural group in the country. Despite its spoken frequency, Cebuano is little used as a literary language, although newspapers and films both use the language.

Cech, Thomas Robert (b. Dec. 8, 1947, Chicago, Ill., U.S.), American biochemist and molecular biologist who, with Sidney Altman, was awarded the 1989 Nobel Prize for Chemistry.

Cech attended Grinnell College in Grinnell, Iowa (B.A., 1970), and the University of California at Berkeley (Ph.D., 1975, in chemistry). After serving as a National Cancer Institute fellow at the Massachusetts Institute of Technology (1975–77), he joined the Department of Chemistry at the University of Colorado in 1978, becoming a full professor in 1983. Concurrently he was an investigator for the National Institutes of Health from 1978 and for the Howard Hughes Medical Institute from 1988.

Cech and Altman received a Nobel Prize for their independent discoveries that RNA, traditionally considered to be only a passive messenger of genetic information, can also take on an enzymatic role in which it catalyzes, or facilitates, intracellular chemical reactions essential to life. Before their discoveries, enzymatic activity had been attributed exclusively to proteins. Cech was the first person to show that an RNA molecule could catalyze a chemical reaction, and he published his findings in 1982. Altman, whose earlier research had pointed strongly to such a conclusion, conclusively demonstrated such enzymatic activity by an RNA molecule in 1983.

Cecchetti, Enrico (b. June 21, 1850, Rome, Papal States [Italy]—d. Nov. 13, 1928, Milan), Italian ballet dancer and teacher noted for his method of instruction and for his part in training many distinguished artists.

Both of Cecchetti's parents were dancers, and he was born in a dressing room at the Tordinona Theatre in Rome. A pupil of Giovanni Lepri, who had studied under Carlo Blasis, Cecchetti developed a brilliant technique and was noted for his pirouettes. Popular throughout Europe, he appeared with great success at La Scala in Milan and in London. In 1887 he went to the Mariinsky Theatre, St. Petersburg (now the Kirov State Academic Theatre of Opera and Ballet), where he created the roles of the Bluebird and Carabosse in Peter Ilich Tchaikovsky's *Sleeping Beauty*.

Between 1890 and 1902 he taught many dancers of the Imperial Russian Ballet and its associated school, including Olga Preobrajenska, Tamara Karsavina, and Vaslav Nijinsky. From 1910 to 1918 Cecchetti was the official instructor of Sergey Diaghilev's Ballets Russes but left in 1913 to tour with his world-famous private pupil, Anna Pavlova. In 1918 he and his wife, the dancer Giuseppina de Maria, opened a school in London, where Alicia Markova and Serge Lifar were among his pupils. From 1925 he directed the ballet

Cecchetti
Dance News

school at La Scala; he continued to teach until the day before he died.

The Cecchetti method of ballet training prescribes a strict exercise routine using the five positions and seven basic movements of classical ballet. It is widely used both in England, where the Cecchetti Society (now incorporated in the Imperial Society of Teachers of Dancing) was founded in 1922, and in the United States, where the Cecchetti Council of America was established in 1939.

Cecil FAMILY, originally also spelled SITSILT, SYSSELL, or SEISILL, one of England's most famous and politically influential families, represented by two branches, holding respectively the marquessates of Exeter and Salisbury, both descended from William Cecil, Lord Burghley, Elizabeth I's lord treasurer. Burghley's elder son, Thomas, was created Earl of Exeter, and his descendant the 10th Earl was made a marquess in 1801. This line has remained seated at Burghley House in Northamptonshire, the great mansion built by Lord Burghley. Burghley's second son, Robert, created Earl of Salisbury in 1605, built a new house at Hatfield, the seat of his descendants the earls (later marquesses) of Salisbury, who in the 19th and 20th centuries were prominently connected with the British Conservative Party.

Cecil, Lord David, in full LORD EDWARD CHRISTIAN DAVID GASCOYNE CECIL (b. April 9, 1902, London, Eng.—d. Jan. 1, 1986, Cranborne, Dorset), English biographer, literary critic, and educator, best known for his discerning, sympathetic, and elegantly written studies of many literary figures.

Lord Cecil was the younger son of the 4th marquess of Salisbury. Educated at Oxford, he was a fellow of Wadham College (1924–30) and of New College (1939–69). He served as Goldsmiths' professor of English literature at Oxford University from 1948 to 1969.

Among his subjects for biography were the poet William Cowper (*The Stricken Deer,* 1929), *Jane Austen* (1935), Lord Melbourne (*The Young Melbourne,* 1939), *Hardy, the*

Novelist (1943), the 17th-century letter writer Dorothy Osborne, the poet Thomas Gray (*Two Quiet Lives,* 1948), and the writer and caricaturist Sir Max Beerbohm (*Max,* 1964). *Library Looking-glass* (1975) was a personal anthology, tracing his intellectual history.

Cecil, Robert: *see* Salisbury, Robert Cecil, 1st earl of; Salisbury, Robert (Arthur Talbot Gascoyne-)Cecil, 3rd marquess of.

Cecil, Robert (Arthur Talbot Gascoyne-): *see* Salisbury, Robert (Arthur Talbot Gascoyne-)Cecil, 3rd marquess of.

Cecil, Lord Robert: *see* Cecil of Chelwood, (Edgar Algernon) Robert Gascoyne-Cecil, 1st Viscount.

Cecil (of Essendine), Robert Cecil, Baron: *see* Salisbury, Robert Cecil, 1st earl of.

Cecil (of Chelwood), (Edgar Algernon) Robert Gascoyne-Cecil, 1st Viscount, also called (until 1923) LORD ROBERT CECIL (b. Sept. 14, 1864, London—d. Nov. 24, 1958, Tunbridge Wells, Kent, Eng.), British statesman and winner of the Nobel Peace Prize in 1937, one of the principal draftsmen of the League of Nations Covenant in 1919 and one of the most loyal workers for the League until its supersession by the United Nations in 1945.

The third son of the 3rd marquess of Salisbury, who three times was British prime minister, Lord Robert, during World War I, was successively under secretary of state for foreign affairs, minister of blockade, and assistant secretary of state for foreign affairs. As early as 1916 he began to draw up an international peace-keeping agreement, and in 1919, when he was sent to the peace conference in Paris, his ideas proved generally compatible with

Cecil, detail of an oil painting by John Mansbridge; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

those of United States Pres. Woodrow Wilson and South African Field Marshal Jan Christian Smuts, the other prominent advocates of the League. Like Smuts, Lord Robert believed in a world order determined by the white nations; he successfully opposed a provision for absolute racial equality among League member states.

As the principal British delegate to the disarmament conference at Geneva (1926–27), Cecil disagreed with the instructions given him and resigned from Prime Minister Stanley Baldwin's government. During the 1930s he unsuccessfully argued for League measures against aggression by Japan in Manchuria and by Italy in Ethiopia. He was one of the few in Parliament to vote against concessions made to Nazi Germany at Munich in 1938.

Cecil, William, 1ST BARON BURGHLEY, Burghley also spelled BURLEIGH, also called (1551–71) SIR WILLIAM CECIL (b. Sept. 13, 1520, Bourne, Lincolnshire, Eng.—d. Aug. 5, 1598, London), principal adviser to England's Queen Elizabeth I through most of her reign. Cecil was a master of Renaissance statecraft, whose talents as a diplomat, politician, and

William Cecil, oil painting attributed to M. Gheeraerts; in the National Portrait Gallery, London

By courtesy of the National Portrait Gallery, London

administrator won him high office and a peerage.

Life. By service to the Tudors and marriage to local heiresses Cecil's father and grandfather acquired wealth, office, and the status of gentry. In childhood William served as a page of the robes at court, where his father was a groom of the wardrobe. In 1535 he entered St. John's College, Cambridge, where he studied classics under the versatile humanist John Cheke and came under Protestant influence. At the age of 20 he fell in love with Cheke's sister, Mary. They were married in 1541, but she died in 1543, leaving him a son, Thomas.

In 1542, for defending royal policy, William was rewarded by Henry VIII with a place in the Court of Common Pleas. A year later he first entered Parliament. Through his second marriage, to the learned and pious Mildred Cooke in 1545, he joined an influential Protestant circle at court; it included his father-in-law, Sir Anthony Cooke, his former brother-in-law, John Cheke, the future protector, Edward Seymour (Lord Hertford and duke of Somerset), and the queen consort Catherine Parr, for whom Cecil edited a devotional tract. When Edward VI succeeded, Cecil joined the protector Somerset's household and in 1548 became his secretary. On Somerset's first fall from power, in 1549, Cecil was briefly imprisoned in the Tower of London. By acting as go-between for Somerset and his rival, John Dudley, earl of Warwick, Cecil regained favour and became in 1550 a councillor and one of the two secretaries to the King, alongside William Petre. After Somerset's final fall, in 1551, Cecil was knighted by the victorious Warwick, who assumed the dukedom of Northumberland. Cecil was committed to Northumberland; but, when the Duke proposed to alter the succession, Cecil, though fearing for his life and contemplating flight, sided with the judges in opposition. He capitulated to Northumberland only on royal command. Ever loyal to the Tudors, Cecil deserted Northumberland after Edward VI's death. He approached the triumphant Mary Tudor as representative of the council, winning her approval as "a very honest man."

As junior secretary, Cecil had had little scope under Edward VI. He shared neither the social idealism nor the iconoclastic urge of the more extreme reformists at court. He did share in the spoils of a corrupt government; but he established himself as an able bureaucrat, a moderate with a sense of legal propriety, and, like his ally the archbishop of Canterbury Thomas Cranmer, a gradualist in religious reform. Yet, although offered employment on Mary's accession, he, unlike most of his colleagues, withdrew from the Catholic court. On Elizabeth's accession, in 1558, Cecil was appointed her sole secretary. His first major diplomatic achievement was to persuade a reluctant queen to intervene in Scotland and conclude the Treaty of Edinburgh (1560), which removed French forces from Scotland. His gift for compromise facilitated the church settlement in 1559; his financial sense, the recoinage in 1561. Elizabeth's flirtation with John Dudley's son Robert, however, weakened Cecil's position. Despite threats of resignation and opposition to Robert Dudley, Cecil retained Elizabeth's trust and was rewarded with the lucrative mastership of the Court of Wards in 1561.

Decision on the succession was necessary to settle policies. While Cecil intrigued to thwart Dudley, he sympathized with Protestant efforts in Parliament to make Elizabeth marry. He resisted Mary Stuart's claims to succeed but recommended the Habsburg suitor, the archduke Charles. Dudley, capturing the initiative, backed an ill-fated expedition to France to aid the Huguenots, which ended in the Treaty of Troyes, became a councillor, and in 1564 became earl of Leicester. On the defensive, Cecil restored the balance by introducing Thomas Howard, 4th duke of Norfolk, into the council. But the consequences of Mary Stuart's marriage to Lord Darnley in 1565 worked to Cecil's disadvantage; Cecil's hopes of drawing England and Scotland together were threatened.

Mary Stuart's flight to England in 1568 embarrassed Cecil; although it opened diplomatic opportunities in Scotland, it led to Norfolk's plan to marry the widowed queen of Scots. Norfolk opposed Cecil over Mary's fate, over secret aid to the Huguenots, and over policy toward Spain. Resenting the threat of the Duke of Alba's Spanish army in the Netherlands, Cecil nearly precipitated war in December 1568 by instigating the seizure of ships carrying bullion to Alba, who retaliated by closing Antwerp to English trade. Leicester joined Norfolk, and they prepared to oust Cecil; but they faltered before the Queen's support for her secretary.

His challengers defeated, Cecil was created a peer, 1st Baron Burghley, in 1571, and in 1572 he became a knight of the Garter and lord treasurer; he now shared royal favour on equal terms with Leicester. Meanwhile, the papal bull of 1570, deposing Elizabeth, confirmed Cecil in his defense of the Elizabethan church, in which he cooperated with his nominee, Archbishop Matthew Parker. The intrigue called the Ridolfi Plot, a planned Spanish invasion of England to put Mary Stuart on the throne, led to Norfolk's execution in 1572 and discredited Mary Stuart and the pro-Spanish interest. Burghley's rebuff to Spain was underlined by the Treaty of Blois with France in 1572. Neither French influence in the Netherlands nor the St. Bartholomew's Day Massacre (1572) deterred Burghley from the French alliance; but he also soothed Spain, and the embargo on trade with Antwerp was lifted. In Scotland he settled the regency; but he failed to persuade the Scots to try to depose their queen, who remained a focus of Catholic intrigue in her English prison.

In the 1570s Leicester, supported by Francis Walsingham, who became a secretary in 1573, courted Puritan support; agitated for aid to William of Orange, Protestant leader of the rebels in the Netherlands; and favoured negotiations with France. Burghley, restraining the French and trying to avoid open commitment to the rebels, pursued a policy that, in advocating nominal Spanish suzerainty over a Netherlands enjoying its traditional liberties, ignored Philip II's obvious intentions. Failing

to gain a settlement in 1576, Burghley finally joined Leicester in urging Elizabeth to act on behalf of Orange. Rather than fight openly, Elizabeth tried to utilize French influence in the Netherlands by marriage negotiations with the Duke of Anjou. Burghley accepted royal policy, but Puritan opposition prevented a definite conclusion to the Anjou affair.

Although his hopes for moderate reform collapsed when his chosen archbishop, Edmund Grindal, was made powerless following a quarrel with the Queen, Burghley could not afford to weaken the Puritan militants against aggressive Catholicism. A Jesuit mission and papal intervention in Ireland in 1580 roused Burghley to anti-Catholic action and to alarm over the intentions of Catholic Spain. The assassination of William of Orange in 1584 and the knowledge of a planned French landing at Arundel led Burghley to take measures to protect the Queen's life and to incline toward war against Spain. His hesitation over the costs of war and the peace feelers he extended to Alessandro Farnese, the 3rd duke of Parma, the Spanish commander in the Netherlands, created ill will with Leicester. But by 1585 Burghley supported Leicester's expedition to the Netherlands and Sir Francis Drake's voyage to the Caribbean. In 1586, on Walsingham's revelation of the Babington plot—a plan by Anthony Babington, once page to Mary Stuart, to assassinate Elizabeth—Burghley pressed to ensure the trial of Mary Stuart and her execution in 1587. His initiative put him in brief disgrace with the diplomatically outraged Elizabeth. Under the growing threat of the Spanish Armada in 1587, Burghley parleyed with Parma, courted Henry of Navarre and James VI of Scotland, and kept a sharp eye on the Irish and English Catholics. His diplomatic, military, naval, and financial preparations proved just adequate in 1588 to defeat the Armada. He exploited victory with propaganda, and his fame as principal councillor of Elizabeth spread through Europe.

After the failure of the Armada, Leicester died (1588), but Burghley survived to preside over the politics of a new generation. He coached his son Robert, born in 1563, for the secretaryship, which he obtained for him in 1596; Robert had taken over its responsibilities after Walsingham's death in 1590. Despite ill health, Burghley remained active, performing his official duties, writing memorandums, and dealing with suits. But he devised no new policies to check declining prosperity. Instead, he intensified a program of retrenchment and pressed the Commons for grants. In foreign affairs he supported campaigns waged against Spain in France and the Netherlands and naval expeditions by Drake and Essex. But finally he urged peace with Spain, fearing a Franco-Spanish settlement and the strain of prolonged war. He died before the negotiations were concluded.

Assessment. As a statesman Burghley saw that his duty was to give the Queen his best advice and then to carry out whatever policy seemed expedient to her. His loyalty in this task won Elizabeth's confidence. A master of discretion, Burghley as a royal servant assumed an official mask and learned "to walk invisible." His contribution to policy-making was his intuitive appreciation of the national interest, which he strove to convey to the Queen. The inspiration of the "common cause" of European Protestantism did not lead him to subordinate insular national interests; he reduced the ideological ends of international Protestantism to the more practical aims of secular patriotism. Preferring diplomacy to war on practical grounds, he exploited informal contacts, rebels, and factions among foreign enemies. In economic affairs he tried to maintain England's security by conventional statecraft. In agriculture and industry he encouraged self-sufficiency; in commerce, those trades that amassed bullion. His pragmatism as an administrator usually overcame any tendency as an intellectual and lawyer to indulge in balanced appreciations and legalistic argument rather than in action. His removal of Mary Stuart, the Catholic pretender, secured the Protestant succession, and his preparations enabled England to survive the Armada. But he failed to induce Elizabeth to marry or to reform her church; and his policy over the Netherlands was unrealistic and in the end led to open conflict with Spain. Often Burghley was frustrated by the equivocations of the Queen, but he came to accept her good fortune as the care of Providence for Protestant England.

Burghley's recommendation was his diligence and competence in handling the administration. No eager innovator, he fought corruption and made the existing system work. His patronage in church and state enabled him to harness the clergy, the gentry, and the nobility to the tasks of administration. His attendance in council and Parliament was constant, and he understood how to manage both. He directed censorship, propaganda, and an intelligence network at home and abroad.

As lord treasurer he maintained solvency until the overwhelming war expenditure of the late 1580s. Convinced of the damaging political and constitutional effects of heavy taxation on the Queen's relations with her people and on Parliament, he pursued retrenchment and economy rather than expansion of revenues. Through financial control of the royal household and of the military and naval establishments, he increased their efficiency. In the conciliar and departmental courts he gained a reputation for probity as a judge. His handling of royal finance and justice was scrupulous. His personal fortune derived from the unofficial opportunities for profit that attached to office in the 16th century; but in exploiting fees and gifts Burghley was careful not to go beyond the limits of contemporary public morality. He presided over one of the least oppressive and most efficient administrations in 16th-century Europe.

As chancellor of the University of Cambridge from 1559, he influenced discipline rather than the curriculum, but he made his household a resort of scholars and an educational centre for the Queen's wards and the young aristocracy. His intellectual interests, like his italic handwriting, were formed in the advanced humanist circle of John Cheke. His artistic eclecticism, developed under Somerset and Northumberland, was revealed in his personal planning for his three houses—Burghley House at Stamford, Cecil House in the Strand, and Theobalds in Hertfordshire; their decoration, furnishings, collections of pictures, coins, and "things of workmanship," and their gardens, supervised by the botanist John Gerard, won universal admiration. Burghley made a creative contribution to the Elizabethan architectural achievement.

Burghley has always been a controversial figure. The hostility of his Catholic victims, foreign ambassadors, disappointed suitors, and rivals started a critical tradition that was perpetuated by Catholic historians. The favourable treatment of Lord Burghley by Protestant historians was begun by Francis Bacon and William Camden. Inevitably, religious partisanship affected Burghley's reputation as a statesman and as a man. The estimates of his responsibility for policy have depended on the roles in government assigned by historians to the Queen and to his colleagues. The assessments of his professional competence have emerged from studies of Elizabethan administration, finance, faction politics, and diplomacy. The lineaments of Burghley's public role and of his characteristics as a man of his time are becoming clearer, but the depths of his individuality remain difficult to probe.

(B.W.B./Ed.)

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Cecilia, SAINT, Cecilia also spelled CECILY (fl. 2nd or 3rd century, Rome; feast day November 22), patroness of music, one of the most famous Roman martyrs of the early church, and historically one of the most discussed. According to a late 5th-century legend, she was a noble Roman who had vowed her virginity to God as a child. When she was married against her will to the future St. Valerian, then a pagan, she told him that an angel of God wished her to remain a virgin. He promised to respect this wish if he were allowed to see the angel. She replied that he would if he were baptized. On his return from Baptism he found Cecilia talking to the angel. She then converted his brother Tiburtius, who also saw the angel. Both men were martyred before she was. She distributed her possessions to the poor, which enraged the prefect Almachius, who ordered her to be burned. When the flames did not harm her, she was beheaded. Cecilia was buried in the catacomb of St. Callistus, near Rome. At the beginning of the 9th century, Pope St. Paschal I discovered her relics in the catacomb of St. Praetextatus and had them moved to Rome. She became the patron saint of musicians and music and is often represented in art playing the organ.

Cecrops, traditionally the first king of Attica in ancient Greece. He was said to have instituted the laws of marriage and property and a new form of worship. The introduction of bloodless sacrifice, the burial of the dead, and the invention of writing were also attributed to him. He acted as arbiter during the dispute between the deities Athena and Poseidon for the possession of Attica. As one of the aborigines of Attica, Cecrops was represented as human in the upper part of his body, while the lower part was shaped like a snake.

cecum, also spelled CAECUM, pouch or large tubelike structure in the lower abdominal cavity that receives undigested food material from the small intestine and is considered the first region of the large intestine. It is separated from the ileum (the final portion of the small intestine) by the ileocecal valve (also called Bauhin's valve), which limits the rate of food passage into the cecum and may help prevent material from returning to the small intestine.

In humans, the cecum's main functions are to absorb fluids and salts that remain after completion of intestinal digestion and absorption and to mix its contents with a lubricating substance, mucus. The cecum's internal wall is composed of a thick mucous membrane through which water and salts are absorbed. Beneath this lining is a deep layer of muscle tissue that produces churning and kneading motions.

The structure and function of the cecum varies in other animals. Vertebrates such as rabbits and horses, which live on a diet composed only of plant life, have a larger cecum

that is an important organ of absorption and contains bacteria that help digest cellulose. Animals that eat only meat have a reduced or absent cecum. In cats and dogs, muscle contractions of the cecum are much more vigorous and are reversible. Materials already passed to the next region of the large intestine can be brought back to the cecum for mixing with new food substances. *See also* appendix.

cedar, any of four species of ornamental and timber evergreen conifers of the genus *Cedrus* (family Pinaceae), three native to mountainous areas of the Mediterranean region and one to the western Himalayas. Many other coniferous trees known as "cedars" resemble true cedars in being evergreen and in having aromatic, often red or red-tinged wood that in many cases is decay-resistant and insect-repellent. The giant arborvitae, incense cedar, and some junipers (*viz.,* red cedar; *q.v.*) provide the familiar "cedarwood" of pencils, chests, closet linings, and fence posts; an oil distilled from the wood is used in many toiletries.

The Atlas cedar (*C. atlantica*), the Cyprus cedar (*C. brevifolia*), the deodar (*C. deodara*), and the cedar of Lebanon (*C. libani*) are the true cedars. They are tall trees with large trunks and massive, irregular heads of spreading branches. Young trees are covered with smooth, dark-gray bark that becomes brown, fissured, and scaly with age. The needlelike, three-sided, rigid leaves are scattered along the long shoots and clustered in dense tufts at the ends of short spurs. Each leaf bears two resin canals and remains on the tree three to six years. The large, barrel-shaped, resinous female cones, greenish or purplish, are borne on short stalks; they are covered by broad, thin, closely overlapping woody scales, each with a clawlike projection.

Cedarwood is light, soft, resinous, and durable, even when in contact with soil or moisture. It is an important structural timber in native regions but is infrequently used elsewhere. Distillation of the wood releases an aromatic oil. Many varieties of the Atlas cedar and the deodar are popular ornamentals in North America, especially along the Pacific and Gulf coasts.

Distinctions between the four species of true cedar are often difficult to define. Interbreeding occurs, and some authorities consider the four to be geographical variants of one species, usually the cedar of Lebanon.

Cedar of Lebanon (*Cedrus libani*) showing (top) form and (bottom) leaves and cone

G.E. Hyde from the Natural History Photographic Agency—EB Inc.

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cedar-apple rust, common disease in North America of red cedar (*Juniperus virginiana*), related *Juniperus* species, apple, and crab apple, caused by the fungus *Gymnosporangium juniperi-virginianae.* Both hosts, the junipers and the apples, are required for completion of the rust life cycle. Greenish-brown to chocolate-brown galls (cedar apples) that are round to kidney-shaped and up to two inches (5 centimetres) in diameter form on red cedar and other juniper twigs. In rainy spring weather, the galls are covered with jellylike, yellow to orange-brown spore horns up to two inches long. A single gall may produce several billion spores (basidiospores or sporidia). The windborne spores infect young leaves and fruits of apple and crab apple. Pale yellow to orange-yellow spots that develop sticky centres and minute, black fruiting bodies (pycnia) form on the leaves and usually near the calyx end of fruit. Orange, tubelike structures (aecia) later develop on the undersides of leaves and on fruits, which drop early. Spores produced in the aecia (aeciospores) are wind-borne in late summer to junipers on which leaf infections occur. Galls do not produce spores until the second spring, completing the two-year life cycle.

Cedar-apple rust

John H. Gerard

Control is by eradication of either host or by timely application of a fungicide, in spring for junipers and in summer for apples.

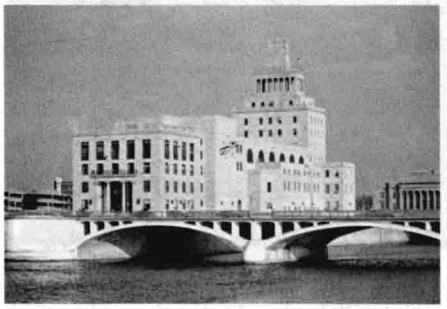
Cedar Breaks National Monument, national monument consisting of a vast natural amphitheatre (10 sq mi [26 sq km]) eroded in a limestone escarpment (Pink Cliffs) 2,000 ft (600 m) thick, in southwestern Utah, U.S., 15 mi (24 km) southeast of Cedar City. Once a part of Sevier (now Dixie) National Forest, it was established in 1933. It is situated on the Markagunt Plateau at elevations reaching 10,700 ft. Iron and manganese oxide impurities in the limestone cliff formations produce an amazing variety of colours that change constantly with the angles of the Sun's rays. When the spring snows melt, many colourful flowers (including the marsh marigold, buttercup, larkspur, gentian, lupine, and sunflower) appear on the slopes and meadows. Wildlife includes mule deer, chipmunks, squirrels, badgers, and a variety of birds.

Cedar City, city, Iron county, southwestern Utah, U.S., on the scarp of the Hurricane Fault, 5,800 ft (1,768 m) above sea level. Founded in 1851, following the discovery of iron ore, it was named for the abundance of cedar trees in the locality. Part of an earlier Mormon colony then moved from Parowan (17 mi [27 km] northeast) to Cedar City. Completion in 1923 of a branch line of the Union Pacific Railroad from Lund stimulated development of the community. The economy is based on tourism, mining, farming, and livestock raising. The city's Iron Mission State Historical Monument is the site of the first blast furnace west of the Mississippi. Cedar City is the headquarters for the nearby Dixie National Forest. Also nearby are Cedar Breaks National Monument and Bryce Canyon and Zion national parks (*qq.v.*).

Southern Utah State College (established 1897) is the site of the summer Utah Shakespearean Festival. The Palmer Memorial Museum contains Paiute Indian relics. Inc. 1868. Pop. (1990) 13,443.

Cedar Falls, city, Black Hawk county, east central Iowa, U.S., on the Cedar River, adjacent to Waterloo (east). Settled in 1845 by William Sturgis and laid out in 1853, it was named for the cedar trees along the river. It boomed as a shipping point for grain, livestock, and lumber and served as the county seat from 1852 to 1855. Now primarily residential, it has some light manufactures, including rotary pumps and farm equipment. It is the home of the University of Northern Iowa (founded as the Iowa State Normal School in 1876). Inc. 1857. Pop. (1990) city, 34,298; Waterloo–Cedar Falls MSA, 146,611.

Cedar Rapids, city, seat (1833) of Linn county, east central Iowa, U.S., astride the Cedar River, in the middle of the Corn Belt, adjoining the city of Marion (northeast), 112 mi (180 km) north-northeast of Des Moines. The east bank, settled in the 1830s and surveyed in 1841, was called Rapids City for the rapids that supplied abundant waterpower. It was renamed when incorporated as a town in 1849. With the advent of the railroads in 1859, it developed as a grain and livestock market. Kingston (on the west bank) was annexed in 1870, and Kenwood Park in 1926. The economy, now well diversified, represents in particular farming and related industries (cereals, packaged meats, farm implements, stock feeds, and milk-processing machinery); the manufacture of electronic equipment is also important. May's Island in the river's main channel is the hub of the city's civic plan. The large Quaker Oats plant is a riverside landmark. The Bohemian culture of early immigrants still marks the city's urban life. Cedar Rapids is the home of Coe College (1851), Mt. Mercy College (1928), and Kirkwood Community College (1966). The city's Masonic Library and Grand Lodge Office



Civic building on May's Island, Cedar Rapids, Iowa

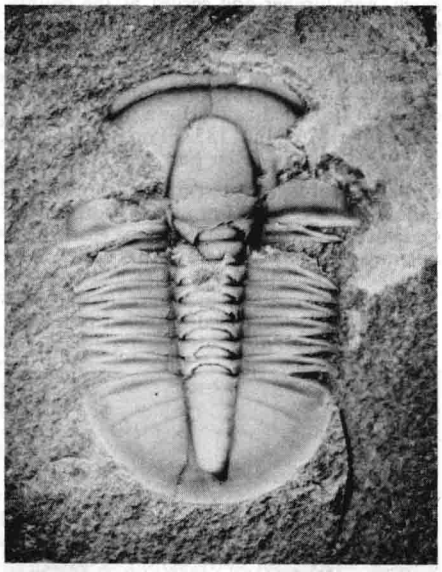
Milt and Joan Mann from CameraMann

Building houses one of the largest collections of Masonic material in the world. Inc. city, 1856. Pop. (1990) city, 108,751; Cedar Rapids MSA, 168,767.

Cedar River, nonnavigable stream in the north-central United States, flowing from southeastern Minnesota southeasterly across Iowa and joining the Iowa River about 20 miles (32 km) from the Mississippi. Over the river's 329-mile (529-kilometre) course, it descends 740 feet (226 m). The river valley, geologically young, exhibits bedrock only where glacial material has been removed; in the Palisades-Kepler State Park, near Cedar Rapids, Iowa, wooded cliffs rise from 30 to 75 feet (9 to 23 m) above the valley floor. The Cedar River's 7,819-square-mile (20,251-square-kilometre) drainage basin is mostly fertile farmland. There are several small hydroelectric dams on the river.

The river passes through Austin, Minn., and Charles City, Cedar Falls, Waterloo, and Cedar Rapids, Iowa. Its principal tributaries are the Little Cedar and the Shell Rock rivers. The river is named for the stands of red cedar along its lower course.

Cedaria, genus of trilobites (extinct arthropods) that is a useful index fossil for Late Cambrian rocks and time (from 523 to 505 million years ago). The *Cedaria* was small, with a well-developed tail section and a prominent head section.



Cedaria

By courtesy of the trustees of the British Museum (Natural History); photograph, Imitor

Ceduna, town and port, west-central South Australia. It lies on Denial Bay along the Great Australian Bight, 340 miles (550 km) northwest of Adelaide. It was founded in 1896. Its name is of Aboriginal derivation and means "resting place," referring to a nearby waterhole. It is situated on the Eyre Highway east of the Nullarbor Plain, has a rail link to Port Lincoln, and specializes in the catching and packing of fish. Nearby is the Isles of St. Francis Conservation Park, home for a variety of fauna, including the rare Cape Barren goose. Pop. (1986) 2,877.

Cefalù, town and episcopal see, Palermo *provincia,* northern Sicily, Italy. It lies at the foot of a 1,233-foot (376-metre) promontory on the Tyrrhenian Sea, east of Palermo city. It originated as the ancient Cephalaedium, which was probably founded as an outpost of the Greek city of Himera and first appeared in history about 395 BC as an ally

Norman cathedral, Cefalù, Sicily

SCALA—Art Resource/EB Inc.

of the Carthaginian leader Himilco. Valued for its strategic position on the height of the promontory, the ancient town was in turn conquered by the Syracusan tyrants Dionysius I the Elder and Agathocles and by the Carthaginians, from whom the Romans seized it in 254 BC. A new town was founded at the foot of the promontory by the Norman king Roger II in AD 1131, the year in which Cefalù's famous cathedral was begun. The exterior of the cathedral is well preserved, with massive four-story towers on each side of the facade. The cathedral's interior was considerably restored in the 16th and 17th centuries. The Byzantine-style mosaics in the apse and in the first spaces between the arches of the choir (1148) are among the most beautiful in Sicily. Among ancient remains in the area are included the so-called temple of Diana, a pre-Hellenic sanctuary of megalithic construction (9th or 8th century BC) on the promontory site of the ancient city, and portions of a megalithic wall dating from the 6th century BC. The Mandralisca Museum contains archaeological and art collections.

A port and road and rail junction, Cefalù is a tourist centre. Grapes, olives, and citrus fruits are cultivated. Fishing is important, and there is a canning industry. Pop. (1988 est.) mun., 14,490.

Cegled, also spelled CZEGLÉD, town, southeastern Pest *megye* (county), central Hungary. It is a characteristic peasant community of the Great Alfold, or Great Hungarian Plain. The town is a long-established agricultural marketplace for a wide area to the south in which vegetables, fruit, poultry, and livestock are raised for the markets of Budapest, 45 miles (72 km) northwest. Two famous historical speeches were delivered in the market square—one by a Hungarian revolutionary leader, György Dózsa, in 1514, and the second by Lajos Kossuth in 1848. At Cegled the main railway line from Budapest divides, one branch running south to Szeged and the other east to Szolnok, Debrecen, and Romania. The principal road from Budapest through eastern Hungary also passes through Cegled. Pop. (1989 est.) 40,000.

Ceglie Messapico, town, Brindisi *provincia,* Puglia (Apulia) *regione,* southern Italy, northeast of Taranto. It is an agricultural-trading centre and has a medieval castle with cylindrical towers. In the surrounding area are numerous *trulli* (one-room houses built from local limestone, without the use of mortar, and topped by conical roofs). Pop. (1988 est.) mun., 21,069.

ceiba (fibre): *see* kapok.

Ceiba, La, city, northern Honduras. It lies along the Gulf of Honduras, in a lush, hot valley at the foot of 7,989-foot (2,435-metre) Mount Bonito.

Developed in the late 19th century as a banana port, La Ceiba is one of the nation's major Caribbean ports. Besides bananas, the port handles pineapples, citrus fruits, coconuts, abacá fibre, fish, meat, coffee, and lumber. The Standard Fruit and Steamship Company, which operates large banana, citrus-fruit, and coconut plantations in the hinterland, is centred in the city. La Ceiba is also an industrial centre; shoes, soap, jams, dairy products, furniture, cement, metalware, paper, plastics, and pharmaceuticals are manufactured in the city, which also contains the world's largest banana chip and puree plant, a major vegetable-oil plant, palm-oil processing factories, rice mills, sawmills, breweries, tanneries, and a winery. Fishing has become an important industry, and refrigeration and packing plants have been built. In the 1970s La Ceiba became a major transit point for tourists to the Bay Islands. It has developed banking and finance facilities. The city is linked to the other Caribbean ports and the Aguán River valley by railroad and highway, and it has an international airport. Pop. (1988 prelim.) 68,289.

ceilometer, device for measuring the height of cloud bases. One important use of the ceilometer is to determine cloud ceilings at airports. The device works day or night by shining an intense beam of light (often ultraviolet), modulated at an audio frequency, at overhead clouds. Reflections of this light from the base of the clouds are detected by a photocell in the receiver of the ceilometer.

There are two basic types of ceilometers: the scanning receiver and the rotating transmitter. The scanning-receiver ceilometer has its separate light transmitter fixed to direct its beam vertically. The receiver is stationed a known distance away. The parabolic collector of the receiver continuously scans up and down the vertical beam, searching for the point where the light intersects a cloud base. When a reflection is detected, the ceilometer measures the vertical angle to the spot; a simple trigonometric calculation then yields the height of the cloud ceiling.

The rotating-transmitter ceilometer has its separate receiver fixed to direct reflections only from directly overhead while the transmitter sweeps the sky. When the modulated beam intersects a cloud base directly over the receiver, light is reflected downward and detected.

Ceiriog (Welsh lyricist): *see* Hughes, John Ceiriog.

Ceiriog, Eos (Welsh poet): *see* Morus, Huw.

Cela (Trulock), Camilo José (b. May 11, 1916, Iria Flavia, Spain), Spanish writer who won the Nobel Prize for Literature in 1989. He is perhaps best known for his novel *La familia de Pascual Duarte* (1942; *The Family of Pascual Duarte*) and is considered to have given new life to Spanish literature. His literary production—primarily novels, short narratives, and travel diaries—is characterized by experimentation and innovation in form and content. Cela is also credited by some critics with having established the narrative style known as *tremendismo,* a tendency to emphasize violence and grotesque imagery.

Cela attended the University of Madrid before and after the Spanish Civil War (1936–39), during which he served with Franco's army. His first novel, *Pascual Duarte,* established his European reputation. Traditional in form, it was a both a popular and critical success. His second novel, *La colmena* (1951; *The Hive*), with its fragmented chronology and large cast of characters, is an innovative and perceptive story of postwar Madrid. It solidified Cela's critical and popular reputa-

tion. Another of his better-known avant-garde novels, *San Camilo, 1936* (1969), is one continuous stream of consciousness.

Cela's acute powers of observation and skill in colourful description also are apparent in his travel books, based on his trips through rural Spain and his visits to Latin-American countries. The most noted of these are *Viaje a la Alcarria* (1948; *Journey to the Alcarria*), *Del Miño al Bidasoa* (1952; "From the Miño to the Bidasoa"), and *Judíos, moros y cristianos* (1956; "Jews, Moors, and Christians"). Among his numerous short narratives are *Esas nubes que pasan* (1945; "The Passing Clouds") and the four works included in the collection *El molino de viento, y otras novelas cortas* (1956; "The Windmill and Other Short Fiction"). Cela also wrote essays, poetry, and memoirs and in his later years made frequent television appearances.

In 1955 he settled in Majorca, where he founded a well-respected literary review, *Papeles de Son Armadans* (1956–79), and published books in fine editions. He began in 1968 to publish his multivolume *Diccionario secreto* (vol. 11 was published in 1972), a compilation of "unprintable" but well-known words and phrases. He became a member of the Spanish Academy in 1957.

BIBLIOGRAPHY. Robert Kirsner, *The Novels and Travels of Camilo José Cela* (1963); and D.W. McPheeters, *Camilo José Cela* (1969), discuss both the life and the literary output of the writer.

Čel'abinsk (Russia): *see* Chelyabinsk.

celadon, Chinese, Korean, Siamese, and Japanese stoneware decorated with glazes the colour range of which includes greens of various shades, olive, blue, and gray. The colours are the result of a wash of slip (liquefied clay) containing a high proportion of iron that is applied to the body before glazing. The iron interacts with the glaze during the firing and colours it. Celadons were prized in the Eastern world long before their comparatively late introduction to the West. A wide demand led to their export to India, Persia, and Egypt in the T'ang dynasty (618–907) and to most of Asia in the Sung (960–1279) and Ming (1368–1644) dynasties. The ware was popular because of its beauty, because of a superstition that a celadon dish would break or change colour if poisoned food were put into it, and because, to the Chinese, it resembled jade.

Yüeh ware, first made in the Han dynasty (206 BC–AD 220), is the earliest celadon; the glaze is olive or brownish green. The celadons of the Sung dynasty, which came from the kilns of Lung-ch'üan, were the first to reach Europe in the 14th century. Surviving wares include large dishes, bowls, and large vases. The glaze, superb in quality, is a transparent green colour. It is thick and viscous, usually with a well-marked crackle. Decoration is usually incised, but molded ornament is also found. On some pots the molding was left unglazed, so that it burned to a dark reddish brown—an effective contrast to the colour of the glaze. Most celadons attributable to the Ming dynasty have incised, under-the-glaze floral and foliate decoration.

Korean celadon vase with inlaid decoration (*mishima*), 13th century, Koryŏ dynasty; in the Museum of Fine Arts, Boston

By courtesy of the Museum of Fine Arts, Boston, Hoyt Collection

Korean celadons of the Koryŏ period (918–1392) have a glaze that varies from bluish green to a putty colour. Many of the forms are lobed, based on the melon or the gourd. Perhaps the major divergence from the typical Chinese celadon is the inlaid decoration beneath the glaze of many specimens. In later examples, often referred to as *mishima,* the designs are first incised into the clay; the incisions are then filled with black-and-white slip. The inlaid patterns are diverse; but most of the subjects are floral, with an occasional bird. Isolated flowers with symmetrically radiating petals are also found, principally on boxes. During the early part of the Yi dynasty (1392–1910), the pattern was often impressed by stamps rather than incised freehand. Sgraffito decoration, in which patterns were incised through a grayish white slip, is also found.

Siamese celadons, influenced by Chinese wares, had a translucent glaze, usually grayish green and often crackled, over a grayish white body. A common decoration consists of roughly scored vertical flutes, with incised circles at the shoulder to accentuate the form. Decoration of a more definite kind is always incised under the glaze and is usually floral. Covered bowls, dishes, ewers, and bottles with two small loop handles at the neck are common forms.

In Japan the importation of Yüeh ware and the respect for Korean celadon led during the Kamakura period (1192–1333) to imitative production near Seto (Aichi prefecture). The most important ware is known as Old Seto, a true celadon but often oxidized to what the Japanese call a "dead leaf" colour. Ritual vases, loop-handled jars, rice-wine vessels, ewers, and incense burners are among the Old Seto ware; glazes include black and olive green. During the 17th century (Edo period), fine examples of celadon were made at the famous Nabeshima kilns at Arita, Japan.

In modern times, large-scale production of traditional celadon domestic wares has been undertaken at Bangkok; and ingenious copies of early ware have been made in the 20th century in China and Japan and at Seoul.

Celaenae, ancient fortress city of Phrygia (in present Turkey), the starting point of the march of the "Ten Thousand" under Cyrus (401 BC) against Artaxerxes (recounted in Xenophon's *Anabasis*). In 333 Celaenae was conquered by Alexander the Great. The city was later renamed Apamea Cibotus (*q.v.*) by Antiochus I Soter, who refounded it on a more open site in order to benefit from the growing commerce on the great eastern trade route. The site is occupied by the modern town of Dinar, Tur.

Celâli Revolts: *see* Jelālī Revolts.

Celan, Paul, pseudonym of PAUL ANTSCHEL (b. Nov. 23, 1920, Cernăuți, Rom. [now Chernovtsy, Ukraine]—d. May 1, 1970, Paris, Fr.), poet who, though he never lived in Germany, gave its post-World War II literature one of its most powerful and regenerative voices. His poetry was influenced stylistically by French Surrealism, and its subject matter by his grief as a Jew.

When Romania came under virtual Nazi control in World War II, Celan was sent to a forced-labour camp, and his parents were murdered. After working from 1945 to 1947 as a translator and publisher's reader in Bucharest, Celan moved to Vienna, where he published his first collection of poems, *Der Sand aus den Urnen* (1948; "The Sand from the Urns"). From the outset his poetry was marked by a phantasmagoric perception of the terrors and injuries of reality and by a sureness of imagery and prosody.

Settling in Paris in 1948, where he had studied medicine briefly before the war, he lectured on language at the École Normale and translated French, Italian, and Russian poetry, as well as Shakespeare, into German. His second volume of poems, *Mohn und Gedächtnis* (1952; "Poppy and Memory"), established his reputation in West Germany. Seven volumes of poetry followed, including *Lichtzwang* (1970; "Lightforce"). The fullest English translation of his work is *Speech-Grille and Selected Poems* (1971). He died by his own hand.

celandine, any of several distinct flowering plants of similar appearance. The celandine proper, or greater celandine (*Chelidonium majus*), once a valued plant of the Old World herbalist, is now grown somewhat in wild gardens. A member of the poppy family (Papaveraceae), it has poisonous orange sap, coarsely toothed, divided leaves, and four-petaled yellow blooms about 2.5 cm (1 inch) across. Celandine produces narrow, thin seed pods. It was formerly known as wartweed for its reputed power to remove warts.

Celandine (*Chelidonium majus*)

G.E. Hyde

The celandine poppy (*Stylophorum diphyllum*), a North American plant of the poppy family, resembles *Chelidonium* but has flowers twice the size and two-paired, much-divided leaves on the stem below the flower cluster and basal leaves. Its sap is orange yellow. *Stylophorum diphyllum* is the sole species of the genus in the Western Hemisphere; several other species are Asian. It is grown as a garden flower in both the Old World and the New World, thriving in rich, moist soil and partial shade.

The lesser celandine, or pilewort (*Ranunculus ficaria*), is a member of the buttercup family (Ranunculaceae). It has heart-shaped leaves and typical buttercup flowers. Native to Europe, it has become naturalized in North America.

Celano, Lago di (Italy): *see* Fucino Basin.

Celastraceae, the staff-tree family, in the order Celastrales, comprising about 55 genera

of woody vines, shrubs, and trees, native in tropical and temperate zones but best known for ornamental forms of the genera *Euonymus* and *Celastrus* (bittersweet). Fruit of the family is often colourful. Leaves are frequently leathery and flowers are small, with four to five sepals and petals; alternating between the petals, stamens rise from a usually conspicuous nectar disk.

Khat (*Catha edulis*) is a slender, straight, East African tree reaching a height of 25 m (80 feet), with large oval, usually opposite, finely toothed leaves. The slightly bitter leaves are chewed for a stimulant they contain.

Paxistima (or *Pachystima*), five species of low, often creeping, North American shrubs, includes *P. canbyi,* with evergreen leaves and small, greenish flowers.

Celastrales, order of flowering plants, belonging to the class Magnoliopsida, or the dicotyledons (*q.v.;* characterized by two seed leaves). Its members are chiefly trees belonging to 12 families, 147 genera, and about 2,000 species. Four of the families—the Aquifoliaceae (holly), Celastraceae (staff-tree), Icacinaceae (icacina), and Hippocrateaceae (hippocratea)—are broadly distributed in the world and contain about 90 percent of the species. They are components of forests, requiring moderately rich soil.

Many of the 300 species of the holly family (Aquifoliaceae) are native in the tropics of Central and South America and the warmer regions of Asia. Several well-known hollies, however, range northward into southern Europe and the eastern United States. *Ilex aquifolium,* the European holly, grows 50 feet (16 m) tall and furnishes valuable wood for veneers. It is used for decoration, and hundreds of horticultural varieties are available for ornamental plantings.

The American holly (*I. opaca*) is widely distributed in the warmer areas of the eastern United States and is grown in commercial orchards for its red, yellow, or black berrylike fruits. Wood of this species is valuable in cabinetmaking and interior finishing. *I. opaca,* with more than 1,000 horticultural varieties, is also used as an accent tree, for street plantings, wind barriers, and even bonsai. The dried leaves of *I. paraguariensis* are used in South America to prepare a caffeine-rich beverage, yerba maté.

Of the 55 genera in the staff-tree family (Celastraceae), *Celastrus* and *Euonymus* are best known in the Northern Hemisphere. *Celastrus scandens,* the American bittersweet, is a shrub that can twine on a trellis or overrun a wooded area by climbing into tall trees. In autumn its dry capsules open to reveal bright orange clumps of berrylike arils that are often used for their colour in dry bouquets.

Many of the Asiatic species and cultivars of *Euonymus* are evergreen. *E. fortunei,* native to central and western China, has yielded many types of ground covers, hardy as far north as New England. Cultivars of the European spindle tree (*E. europaea*) attain heights of 20 feet (6 m) and display arils ranging in colour from orange to lavender-pink.

The Icacinaceae family is composed of tropical trees and vines with its major centre of distribution in the Southern Hemisphere. A few species of its 58 genera (and 400 species), such as *Pennantia* and *Villarsia,* are cultivated locally as ornamentals.

Members of the Hippocrateaceae, a family of woody vines and slender trees, are native chiefly to South America but are also found in Africa. Latex ducts, producing a milky sap, occur in many members.

In *Celastrus* and *Euonymus* a unique, asexual method of reproduction has evolved. In addition to the embryo that is formed by fertilization of the egg within the ovule, another embryo may arise from the inner seed-coat area. Thus the two embryos are derived by different processes; the first is sexual and the other asexual (apomictic). The second embryo is, in reality, an internal bud that carries only the attributes of the plant that produced it. Both embryos may establish themselves as seedlings when the seed germinates.

Many genera in this order produce flowers singly in the axil of a leaf (angle between stem and petiole). Others, as in the hollies, produce flower clusters (inflorescences), usually consisting of relatively few flowers. A model flower of this group possesses from four to six sepals, petals, and stamens (male) in each whorl. Sepals and petals may be partially united basally. The pistil (female) is composed of three to six carpels, differentiated into a basal, swollen ovary and a lobed, pollen-receptive stigma. Each chamber of the ovary, which is superior in position, produces two ovules.

Following pollination and fertilization, the ovule becomes the seed and the ovary the fruit. In the hollies the fruit, though fleshy, is not a true berry; it is a drupe, or drupaceous berry. Among other families of the Celastrales, fruit types range from dry fruits that split in half to samaras (winged fruits).

Several kinds of flowers may be produced in hollies and other members of the Celastrales. Male flowers, containing only functional stamens, and female flowers, in which only the pistil is fully developed, can occur on a plant that also produces perfect (bisexual) flowers. This diversity increases the chances of pollination.

Seven families of this order develop a unique nectar-secreting disk placed below, between, or above the stamens. Disk position aids in distinguishing families from each other; hollies lack the disk.

It is generally agreed that the four major families of this order form a coherent group. Many structural aspects of the minor families have not been studied in detail. Features unifying the families of the Celastrales include simple leaves, one or two ovules in each ovary chamber, and the presence of nectar disks near stamens. Families are separated on the basis of the following attributes: presence or absence of stipules; vine habit; type of inflorescence; distribution of staminate, pistillate, or perfect, flowers; structure of pistil; curvature of ovule; and the characteristics of the seed.

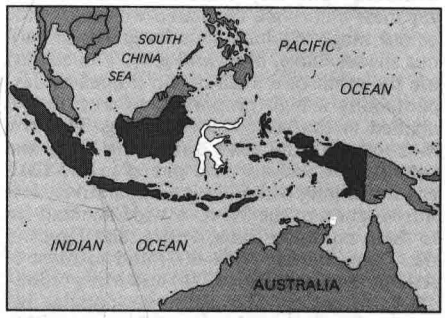
Celaya, city, south-central Guanajuato *estado* ("state"), north-central Mexico. It is in the fertile Bajío region on the Mexican Plateau, 2.5 miles (4 km) north of the Laja River and 5,774 feet (1,760 m) above sea level. Founded as Purísima Concepción de Celaya in 1571, the city played an important role in 19th-century Mexican history when it changed hands several times during Mexico's struggle for independence from Spain. General Álvaro Obregón defeated Pancho Villa at Celaya in 1915. With irrigation waters now available from the upper Lerma River, Celaya has become an important agricultural and livestock-raising centre. Corn (maize), beans, wheat, and chick-peas (garbanzos) are the principal crops, and cattle, pigs, and goats are raised. Dairying and the manufacture of candy (it is noted for its *cajetas de Celaya,* made of burnt sugar and milk) and textiles provide additional income. Lying approximately 30 miles (48 km) west of Querétaro and about 50 miles (80 km) southeast of Guanajuato city, the state capital, Celaya is a major railroad and highway junction.

Francisco Eduardo Tresguerras (1765–1833), architect, sculptor, painter, and poet, was born and did much of his work there. The Church of Nuestra Señora del Carmen (1807), considered his best work, is outstanding for the beauty of its dome. His other works include the Independence Monument in the main plaza, a bridge over the Laja, and altars in the colonial Church of San Francisco (1715), where he is buried. Pop. (1980) 141,675.

Celaya, Battle of (April 1915), decisive military engagement in the wars between revolutionary factions following the Mexican Revolution of 1911. One of the bloodiest battles in Mexican history, it was fought at Celaya, Guanajuato state, between the forces of Álvaro Obregón and Pancho Villa. In the course of the civil wars, Venustiano Carranza and Villa had eclipsed the other revolutionary leaders, and Obregón supported Carranza. After two deadly assaults, Villa's cavalry, the most formidable contingent among the revolutionary armies, failed to capture Obregón's positions, which were protected by trenches, barbed wire, and machine guns. His forces decimated, Villa retreated northward, leaving Carranza in virtual control of Mexico, though he continued his bandit rebel activities in the north until Carranza was overthrown in 1920.

Celebes, Indonesian SULAWESI, one of the four Greater Sunda Islands, Indonesia. A curiously shaped island with four distinct peninsulas that form three major gulfs—Tomini (the largest) on the northeast, Tolo on the east, and Bone on the south—Celebes has a coastline of 3,404 miles (5,478 km) and an area, including adjacent islands, of 87,897 square miles (227,654 square km).

The island is very mountainous, with some active volcanoes, but there are large plains



Celebes, Indon.

on the southern peninsula and in the south-central part of the island on which rice is grown. The highest peak is Mount Rantekombola, or Mario, at 11,335 feet (3,455 m). Major deep lakes (*danau*) are Towuti, Poso, and Matana, the latter having been sounded to 1,936 feet (590 m). The rivers are short and unimportant.

Celebes lies between the two shelves of the Australian and Asian continents. The broad central block is a complex of igneous rocks, in the southeastern corner of which is a broad band of volcanic detritus, known as tuff, more than 65 million years old; it is fringed occasionally by coral limestone. The southern ridge of Celebes has an axis of schist and quartzite, while the volcanic Minahasa area differs structurally from any other part of the island. The climate is hot but tempered by sea winds; annual rainfall varies from 160 inches (4,060 mm) in Rantepao (southwest-central section) to 21 inches (530 mm) in Palu (a rift valley near the western coast).

Generally, fauna is more Asian than Australian. Species unique to Celebes include the babirusa, or pig deer; the black-crested baboon; and the anoa, or dwarf buffalo. A distinct difference exists between the freshwater fish of Borneo and Celebes. Much of Celebes is still heavily forested, showing many floral resemblances to the Philippines but more Asian in the west and more Australian in the east.

Seven major ethnic groups inhabit Celebes: the Toala, Toradja, Buginese, Makasarese, Minahasan, Mori, and Gorontalese. The Toala,

who live throughout the island, are nomadic, shy jungle dwellers with their own language. The Toradja, inhabiting central, southeastern, and eastern Celebes, are of Austronesian (Malayo-Polynesian) stock; they have their own language and are primarily agriculturists. Most of them are Christians, although they still retain many animist practices. The Buginese and Makasarese are Muslims, well-built, energetic, fairly light-skinned, and devoted to gambling, feasting, and cockfighting; they live in southern Celebes and are extremely industrious, especially in the manufacture of plaited goods and in weaving, gold and silver work, and shipbuilding. The Minahasan, distinct from the rest, have light skin, high noses, prominent lips, widely separated eyes, and stiff, short black hair; they are tall and strong. Inhabiting the area around Manado, they are the most westernized of the island peoples and live in European style, each village having its Christian church and school. The Mori are a highland people inhabiting much of the eastern part of the island. The Gorontalese, in the west and south-central part of the northeastern peninsula, are short, smooth-haired, rather light-skinned, and of the Muslim faith.

Celebes and neighbouring islands are divided into four *provinsi* ("provinces"). The most economically advanced regions are the southern peninsula and the tip of the northeastern peninsula. In the south, wet rice is cultivated, and corn (maize), cassava, yams, and beans are raised. Some tobacco is cultivated, and salt is produced on the coast. Grain is raised on the alluvial plain around Tempe and Sidenreng lakes. There is a hydroelectric-power station located on the Sawito River east of Parepare. In the northeast, copra, forest products, and some sulfur are produced; there is also much fishing.

The eastern peninsula is largely undeveloped, with sparse population and predominantly subsistence agriculture. The southwestern peninsula and the central part of the island are centres for settlement programs, by means of which the national government is trying to resettle large numbers of people from Bali and Java to reduce population pressure on those islands. These areas of Celebes are thus becoming both more diverse and more highly developed. Roads link the principal towns of the southwestern peninsula, but elsewhere—with the exception of the Manado-Kema, the Kendari-Kolaka, and the Toraja highlands roads—they are limited to the coast. The major airports are at Makasar, Manado, Gorontalo, Kendari, Poso, and Palu.

The earliest traces of human habitation on Celebes are stone implements of the Toalian culture. Muslim sultanates of coastal Malay were established in the southern Celebes in the century before the arrival of the Europeans. The Portuguese arrived about 1512 in pursuit of a spice-trade monopoly, and the Dutch built a settlement at Macassar (Makasar) in 1607. Dutch control gradually spread until the states of Bone and Gowa lost their independence in 1905 and 1911, respectively. Occupied by Japan during World War II, the island joined the Republic of Indonesia in 1950. Political disturbances and rebellions have continued, but central government control has not been threatened. Pop. (1985 est.) 11,552,917.

To make the best use of the Britannica, consult the INDEX *first*

Celebes black ape, also called CELEBES CRESTED MACAQUE (species *Cynopithecus niger*), arboreal monkey of the family Cercopithecidae, found on Celebes, Bacan, and nearby islands. The Celebes black ape is a stump-tailed monkey with overhanging brows, a hairless black face, and a long, flat muzzle. It is about the size of a baboon (55–65 cm [22–26 inches] long without the tail [1 to 2 cm]) and is covered with dark brown or black fur. The male, especially, bears a longitudinal crest of crown hair. Little is known of the habits of this monkey. It is diurnal, feeds on fruit, and lives in rain forests. The people of certain tribes look on it as their ancestor.

Celebes Sea, Indonesian LAUT SULAWESI, sea of the western Pacific Ocean, bordered on the north by the Sulu Archipelago and Sea and Mindanao Island, on the east by the Sangi Islands chain, on the south by Celebes (Sulawesi), and on the west by Borneo. It extends 420 miles (675 km) north-south by 520 miles (837 km) east-west and occupies a total surface area of 110,000 square miles (280,000 square km). The sea, opening southwest through the Makassar Strait to the Java Sea, fills a steep-sided, generally flat-bottomed basin formed by downfaulting of a tectonic block. Over half of its area is more than 13,000 feet (4,000 m) deep, the greatest recorded depth being 20,406 feet (6,220 m). The edges of this enclosed basin are visible in the line of volcanic cones in northern Celebes and the Sang Islands and the mountains of the Sulu Archipelago and Mindanao. Deep water enters the sea from the Pacific south of Mindanao, flowing southwest to leave by the Makassar Strait. This pattern also holds true for surface currents.

Although the Dutch seized parts of Celebes and the Sang group early in the 17th century, the sea itself was long dominated by traders and pirates from Borneo and the surrounding islands. It did not come under colonial control until late in the 19th century. Fishing is important, and there is much coastal and interisland trade.

Celer, Quintus Caecilius Metellus: *see* Metellus Celer, Quintus Caecilius.

celery (species *Apium graveolens*), herb of the family Apiaceae (Umbelliferae). Native to the Mediterranean areas and the Middle East, celery was used as a flavouring by the ancient Greeks and Romans and as a medicine by the ancient Chinese. The ancient forms resembled smallage, or wild celery. Celery with large,

Celery (*Apium graveolens*)
Ingmar Holmasen

fleshy, succulent, upright leafstalks, or petioles, was developed in the late 18th century. The stringiness that characterizes most celery has been eliminated from some varieties, notably the Pascal.

In Europe celery is usually eaten cooked as a vegetable or as a delicate flavouring in a variety of stocks, casseroles, and soups. In the United States raw celery is served with spreads or dips as an appetizer and in salads.

The tiny fruit, or seed, of the celery resembles the plant itself in taste and aroma and is used as a seasoning, particularly in soups and pickles. Celery seed contains about 2 to 3 percent essential oil, the principal components of which are *d*-limonene and selinene.

Celeriac (*Apium graveolens* variety *rapaceum*), also called celery root, or turnip-rooted celery, has a large edible root used as a raw or cooked vegetable.

celery cabbage (*Brassica pekinensis*), species of mustard cultivated for its edible leaves. *See* Chinese cabbage.

celery-top pine, also called ADVENTURE BAY PINE (species *Phyllocladus asplenifolius*), slow-growing ornamental and timber conifer of the family Podocarpaceae, native to temperate rain forests of Tasmania at elevations from sea level to 750 m (2,500 feet). The tree is shrubby at high elevations but may grow to 18 m (60 feet) and occasionally 30 m (100

Celery-top pine (*Phyllocladus asplenifolius*)
G.R. Roberts

feet) in lower areas. The irregularly arranged branches bear inconspicuous, scalelike leaves; leaf functions are performed mainly by deciduous, green branchlets that are flattened into leathery, leaflike phylloclades resembling celery leaflets.

celesta, also spelled CELESTE, orchestral percussion instrument resembling a small upright piano, patented by a Parisian, Auguste Mustel, in 1886. It consists of a series of small metal bars (and hence is a metallophone) with a keyboard and a simplified piano action in which small felt hammers strike the bars. Each bar is resonated by a wooden box or similar chamber tuned to reinforce the fundamental harmonic (component tone) of the bar. A pedal lifts a felt-pad damper from the bars, permitting use of either sustained or short notes. The normal range is four octaves upward from middle C.

The typophone, a similar, softer-toned instrument with graduated steel tuning forks instead of bars, is sometimes mistakenly called a celesta. It was invented by Mustel's father, Victor, in 1865 and patented, with improvements, in 1868.

Celesta
By courtesy of Mustel, Paris

celestial globe, representation of stars and constellations as they are located on the apparent sphere of the sky. Celestial globes are used for some astronomical or astrological calculations or as ornaments.

Some globes were made in ancient Greece; Thales of Miletus (fl. 6th century BC) is generally credited with having constructed the first. Probably the oldest in existence is the Farnese Globe, estimated as from the 3rd century BC, now in the Museo Archeologico Nazionale at Naples. It shows constellation figures but not individual stars and would have been of little practical astronomical use; it is thought to be a Roman copy of a Greek globe. Some Arabic globes made as early as the 11th century are extant. Among the seafaring peoples of the Pacific islands, globes were used to teach celestial navigation.

celestial mechanics, branch of astronomy that deals with the mathematical theory of the motions of celestial bodies. The foundation was laid by Sir Isaac Newton with the publication in 1687 of his *Philosophiae Naturalis Principia Mathematica,* usually referred to as the *Principia.* Here he published the three laws of motion that express the principles of mechanics, consolidating progress begun with the pioneer work of Galileo earlier in the 17th century. Newton also formulated the universal law of gravitation, which states that any two particles of mass in the universe attract each other with a force that varies directly as the product of the masses and inversely as the square of the distance between them.

A brief treatment of celestial mechanics follows. For full treatment, *see* MACROPAEDIA: Mechanics.

Newton's fundamental principles permit the statement of a problem in celestial mechanics in the form of a set of equations of motion, ordinary differential equations of the second order. An important triumph of Newton's was that Johannes Kepler's three laws of planetary motion were obtained as a consequence of the law of gravitation in conjunction with the laws of motion, applied to the problem of two bodies.

The next in order of difficulty is the case in which three bodies are considered. The solar system, consisting of the Sun and nine known principal planets, all but three surrounded by one or more satellites, constitutes a problem of many bodies. The significant circumstance that the mass of the Sun is about 1,000 times that of the most massive planet, Jupiter, makes the Sun's gravitational attraction far outweigh the mutual attractions of the planets. This suggests a process of successive approximations that has become the standard procedure in the mathematical theory of planetary motion, the deviations from elliptic motion being called the perturbations. In the case of the Moon's motion, the Earth produces the principal attraction. Notwithstanding the very great mass of the Sun, the effect of the Sun's attraction is a small fraction of that of the Earth owing to the close proximity of the latter. In the case of some satellites, however, the perturbations produced by the Sun's attraction may become very sizable.

During the 18th century, powerful analytical methods, made possible by the development of differential and integral calculus, were applied to the problems of celestial mechanics. These methods were generally successful in accounting for the observed motions of bodies in the solar system.

The Moon's motion was an apparent exception until this problem was finally solved during the second quarter of the 20th century. The observed deviations between observations and theory were shown to be caused not by defects in the theory but by lack of uniformity of the Earth's rotation. This led, in 1950, to the introduction of "ephemeris time," which is independent of the Earth's rotation but based on the observed motions of the Moon and the Sun. Ephemeris time may thus be regarded as the independent variable of Newtonian mechanics.

It is now recognized that the Newtonian laws of motion and law of gravitation are approximations to the true laws governing the motions of celestial bodies. In the motion of the perihelion of the innermost planet, Mercury, and in a very few other cases, relativity effects are large enough to be revealed by the most precise observations. A comparison between observations and theory, in which the perturbations are properly taken into account, confirms the excess of the motion of the perihelion in the amount of 43 seconds of arc per century, as required by the theory of relativity. This is one of the most convincing observational proofs of that theory.

A branch of celestial mechanics deals with the gravitational theory of rotating liquid or gaseous masses, with applications to the Earth and the other large planets. Newton explained the ocean tides as caused by the gravitational attraction of the Moon and the Sun. Sir George Howard Darwin, in addition to developing modern methods of tidal analysis and tidal prediction, also treated the cosmogonic aspect of tidal theory in his work on the development of the Earth–Moon system.

An important method for the treatment of planetary perturbations was introduced during the 1770s by Joseph-Louis Lagrange. In an elliptic orbit the six orbital elements have constant values, completely determined by the three coordinates and the three components of the velocity at any time. Since the attractions by other planets cause a planet to follow a path differing from a fixed ellipse, the elements of its orbit so determined will necessarily vary with the time. Hence one may describe the "perturbed" orbit of a planet by giving the elements as functions of the time. Lagrange's method provides a process for deriving analytical expressions for the derivatives of the varying elements.

An accomplishment that demonstrated strikingly the power of the theory of planetary motions was the discovery of the planet Neptune in 1846. Its presence and location in the sky had been predicted with astonishing accuracy by J.C. Adams and by U.J.J. Leverrier from deviations in the motion of the planet Uranus. Attempts were made to discover planets beyond Neptune by a similar procedure, but the discovery of Pluto at the Lowell Observatory in 1930 must be ascribed to perseverance in systematic search rather than accuracy of prediction by mathematical theory.

celestial navigation, use of the observed positions of celestial bodies to determine a navigator's position. At any moment some celestial body is at the zenith of any particular location on the Earth's surface. This location is called the ground position (GP). GP can thus be stated in terms of celestial coordinates, with the declination of the celestial object equal to latitude and the Greenwich hour angle equal to longitude. Almanacs such as those published by the Nautical Almanac Office of the U.S. Naval Observatory provide these coordinates for the Sun, Moon, and planets (or navigator's stars); the tabulations are given in terms of Greenwich Civil Time. From this information a line of position can be plotted. In principle, the line could be drawn on a very large sphere, but, in practice, a Mercator chart, or plotting sheet, is used. The navigator then uses a sextant or bubble octant to measure the altitude of the celestial object and records this altitude using Greenwich Civil Time. The navigator estimates his position, this being the dead-reckoning position. The altitude and the bearing that the celestial object would have at this position are calculated or taken from tables. The dead-reckoning position is marked on the plotting sheet and a line drawn in the direction of the celestial object's calculated bearing. From this information and from the difference between the observed and computed altitudes of the celestial object, known as the intercept, the position of the navigator can be calculated.

celestial sphere, the apparent surface of the heavens, on which the stars seem to be fixed. For the purpose of establishing coordinate systems to mark the positions of heavenly bodies, it can be considered a real sphere at an infinite distance from the Earth. The Earth's axis, extended to infinity, touches this sphere at the north and south celestial poles, around which the heavens seem to turn. The plane of the Earth's Equator, extended to infinity, marks the celestial equator. *See also* hour circle; ecliptic; zenith.

Celestina, La, Spanish dialogue novel, generally considered the first masterpiece of Spanish prose and the greatest and most influential work of the early Renaissance in Spain.

Originally published in 16 acts as the *Comedia de Calixto y Melibea* (1499; "Comedy of Calisto and Melibea") and shortly thereafter in an expanded version with 21 acts as the *Tragicomedia de Calixto y Melibea* (1502), the work has been popularly known since its publication as *La Celestina* after its chief character, the bawd who serves as the go-between for the young lovers Calisto and Melibea. Celestina's deeply explored personality dominates the plot, ostensibly tragic, of the uncontrolled passion of the lovers, which ends in disaster after its consummation. Calisto is killed in a fall from the ladder to Melibea's window; Melibea commits suicide. Celestina's coarse humour and ironic commentary, however, undercut the tragic potential of the situation; the vivid depiction of her character overshadows the philosophical significance of the work in its theme of the vanity of the human struggle against the forces of fate.

Authorship of the work, which was published anonymously, is generally attributed to Fernando de Rojas (*c.* 1465–1541), a converted Jewish lawyer about whom little else is known. *La Celestina* was widely imitated and reprinted in Spanish more than 100 times by the mid-17th century. It was translated into many languages, including English (*The Spanish Bawd,* 1631), French, Italian, German, Hebrew, and Latin. Often considered the first European novel, *La Celestina* was profoundly influential in the development of European prose fiction and is valued by critics today as much for its greatness as literature as for its historical significance.

Celestine, Latin CELESTINUS, or COELESTINUS, name of Roman Catholic popes and an antipope, grouped below chronologically and indicated by the symbol •.

• **Celestine I,** SAINT (b. Roman Campania—d. July 27, 432, Rome; feast day July 27, Irish feast day April 6), pope from 422 to 432.

He was a Roman deacon when elected on Sept. 10, 422, to succeed Boniface I. His pontificate is noted for its vigorous attack on Nestorianism, the unorthodox teaching of Patriarch Nestorius of Constantinople, which stressed that Christ's human and divine natures were independent and which denounced the Virgin's title Theotokos (God-bearer). Celestine also refuted the doctrine of Pelagius (fl. 405–418), which minimized the role of divine grace in man's salvation. In 429 Celestine dispatched the French bishops SS. Germanus of Auxerre and Lupus of Troyes to combat Pelagianism in England.

After consecrating St. Palladius at Rome in 431, Celestine sent him as the first bishop to Ireland. Archbishop St. Cyril of Alexandria

was entrusted with Nestorius' recantation at the Council of Ephesus in 431. Celestine approved the council's decision to anathematize, depose, and banish Nestorius, which caused a schism that remained unresolved for more than a century.

•Celestine (II), original name TEOBALDO BUCCAPECO, English-Latin THEOBALD BUCCAPECUS (fl. early 12th century), pope who was elected in December 1124 but resigned a few days later and is not counted in the official list of popes.

After the death of Calixtus II, the rival houses of Frangipani and Pierleoni struggled for the papal throne. The Pierleonis' candidate, Theobald (who would have been Celestine II), was simultaneously elected pope with the Frangipanis' candidate, Honorius II. After Theobald's attempt to prevent the establishment of a Norman kingdom in southern Italy failed, he resigned in favour of Honorius.

•Celestine II, original name GUIDO DI CITTÀ DI CASTELLO, or GUIDO DE CASTELLIS (b. Città di Castello, Umbria, or Macerata, Ancona—d. March 8, 1144), pope from 1143 to 1144.

A scholar of noble birth, he studied under Peter Abélard, with whom he remained on friendly terms even after Abélard's condemnation at the Council of Sens (1140). He was made cardinal deacon in 1127 by Pope Honorius II and cardinal priest (*c.* 1134) by Pope Innocent II, whom he was elected to succeed on Sept. 26, 1143. As pope (consecrated October 3), Celestine immediately removed Innocent's interdict against King Louis VII of France. He died on the verge of a controversy with King Roger II of Sicily regarding Roger's prerogatives as apostolic legate.

•Celestine III, original name GIACINTO BOBONE, or BOBO-ORSINI (b. *c.* 1106, Rome—d. Jan. 8, 1198, Rome), pope from 1191 to 1198.

He was Peter Abélard's student and friend, and he carried out many important legations in Germany, Spain, and Portugal; St. Thomas Becket considered him his most reliable friend at the Roman Curia. He had been cardinal deacon of Sta. Maria in Cosmedin, Italy, for 47 years when, on March 30, 1191, at the age of 85, he was elected as the first member of the Roman Orsini family to become pope. On the eve of his consecration he was ordained priest (April 13), and the day after his consecration he crowned King Henry VI of Germany as Holy Roman emperor.

Celestine's pontificate was overshadowed by the spectacular successes of Henry, who not only ignored the fact that Sicily had been a vassal of the Holy See but, contrary to a treaty between the Holy Roman emperor Frederick I Barbarossa and Pope Clement III, also failed to restore the full extent of the Papal States to Celestine. Despite the anxiety that the Emperor's ambitious projects caused the Pope, he never excommunicated him, not even when Henry imprisoned the returning crusader-king of England, Richard I the Lion-Heart. Celestine weakly supported Henry's crusade, which would probably have led to a Latin conquest of the Byzantine Empire earlier than it occurred. The Pope and Henry died within a few months of each other. Celestine's conciliatory and temporizing policy toward Henry was probably caused not by senile weakness, as has been asserted, but rather by moderation and patience.

•Celestine IV, original name GOFFREDO CASTIGLIONI (b. Milan—d. Nov. 10, 1241), pope from Oct. 25 to Nov. 10, 1241. The nephew of Pope Urban III, Celestine had been made cardinal priest of St. Mark's in 1227 and cardinal bishop of Sabina in 1239 by his predecessor, Gregory IX, whom he was elected to succeed on Oct. 25, 1241. He was the first pope to be elected in a conclave, which had been set up by the senator of Rome, Matthew Rosso Orsini, who hoped to break a deadlock in the College of Cardinals. Celestine, an old and sick man, was consecrated on October 28 and died two weeks later during a controversy between the papacy and the Holy Roman emperor Frederick II.

•Celestine V, SAINT, original name PIETRO DA MORRONE, or PIETRO DEL MURRONE (b. *c.* 1209, Isernia?, Kingdom of the Two Sicilies—d. May 19, 1296, near Ferentino, Papal States; canonized May 5, 1313; feast day May 19), pope from July 5 to Dec. 13, 1294, the first pontiff to abdicate. He founded the Celestine order.

Formally a Benedictine, he became a hermit and lived in the Abruzzi Mountains, near Sulmona. His rigorous asceticism, comparable to that of the Eastern desert fathers, attracted followers, and he became head of a group of hermits (*c.* 1260), later called Celestines and incorporated into the Benedictine order.

Celestine was in his eighties when he was elected pope on July 5, 1294. He accepted only because of the perilous situation of the church: the papacy had been vacant for two years. Though a holy man, he lacked administrative ability and considered the papacy a distraction from his ascetic struggle for salvation. He distrusted the cardinals and became dependent on King Charles II of Naples, with whose supporters he filled the Curia. Further, he favoured his own hermits and the Franciscan Spirituals, whom he permitted to secede from the main part of their order, a solution that was much later made permanent after long struggle. His exhortations for peace between Naples and Aragon, and between France and England, were ineffectual.

After encountering great difficulty, Celestine realized it would be dangerous for the church and for his soul as well if he continued as pope. Hence he consulted the cardinals and resigned, on December 13.

After Cardinal Benedict Caetani became his successor as Boniface VIII, some claimed the resignation unlawful. Thus the majority of the cardinals found it advisable to keep Celestine under supervision, and he was not allowed to return to his hermitage. On the verge of escaping via the Adriatic Sea, he was captured and sent back to Boniface, who kept him interned in Fumone Castle, where he died. Although Celestine had the courage to terminate an impossible situation, Dante places him at the entrance of Hell for his abdication and alludes to the Pope (*Inferno,* iii, 59ff.) as ". . . him who made, through cowardice, the great refusal."

celestite, a naturally occurring strontium sulfate ($SrSO_4$). It resembles barite, barium sulfate, but is much less common. Barium is interchangeable with strontium in the crystal structure; there is a gradation between celestite and barite. It occurs in sedimentary rocks, particularly dolomites and dolomitic limestones, throughout the world and also is present in hydrothermal veins and in cavities in basic eruptive rocks. Celestite is mined as a source of strontium for use in sugar-beet refining and in the manufacture of pyrotechnics. It is abundant in Sicily; Bristol, Eng.; on South Bass Island, Lake Erie, Ohio; and in San Bernardino County, Calif. For detailed physical properties, *see* sulfate mineral (table).

Celestius (fl. 5th century, England), one of the first and probably the most outstanding of the disciples of the British theologian Pelagius (*q.v.*). Like Pelagius, Celestius was practicing law in Rome when they met. In reaction to contemporary immorality, they turned from temporal to religious pursuits, and their reforming views found much support at Rome.

When the Goths menaced Rome *c.* 409, they went first to Sicily and then, *c.* 410, to North Africa, where Celestius remained after Pelagius left for Palestine in 411. During a visit to Carthage, Paulinus, a deacon of Milan, accused Celestius of denying the existence of original sin and the remission of sins by Baptism. Celestius was condemned at the Council of Carthage (412), presided over by Bishop St. Aurelius, who excommunicated him. He left for Ephesus (near modern Selçuk, Tur.).

Celestius' propaganda and Pelagius' writings succeeded in making many converts, and a reaction against them grew with a powerful opposition that included St. Jerome, the great Latin biblical scholar, and Bishop St. Augustine of Hippo. Condemnation of Celestius and Pelagius was repeated at the Council of Diospolis (modern Lod, Israel) in 415 and at two African councils in 416. Although they were excommunicated in 417 by Pope St. Innocent I, the succeeding pope St. Zosimus was to prove sympathetic.

Celestius visited Zosimus, whom he impressed and who, after receiving a profession of faith from Pelagius, accused the African bishops in 417 of having acted precipitately. Violent outbreaks by the Pelagians in Rome caused the West Roman emperor Flavius Honorius to condemn Pelagianism and exile Celestius from Italy. Meanwhile, Celestius, who had been commanded to appear before the Pope, ignored the summons and fled from Rome. Thereupon, Zosimus excommunicated him and condemned Pelagianism. The Council of Ephesus (431) also condemned him.

celiac disease, also called NONTROPICAL SPRUE, relatively rare malabsorption syndrome of children and adults, characterized by the passage of foul, bulky, fatty stools (steatorrhea), progressive malnutrition, often with multiple vitamin deficiencies, stunting of growth, and, late in the disease, a blood picture of microcytic anemia (more often in children) or macrocytic anemia (usually in adults) similar to that of pernicious anemia. In children, celiac disease usually begins between the ages of 6 and 21 months, frequently following an infection; the course is chronic, with periods of intestinal upset, diarrhea, and wasting, interspersed with periods of apparent normality. Adult celiac disease commonly begins past the age of 30; 25 percent of cases report having had repeated attacks of diarrhea, or clinically evident celiac disease, in childhood. Symptoms of mild celiac disease include loss of appetite and weight, psychic depression and irritability, and constipation alternating with diarrhea. Advanced cases may display bone pain, deformation, and osteoporosis (increased bone porosity) from calcium and vitamin D deficiency, disturbances of vision from lack of vitamin A, bleeding tendencies from lack of vitamin K, or scurvy from deficiency of vitamin C (ascorbic acid). The cause of celiac disease is not known: many cases show a familial tendency; the symptoms of most patients are relieved by a diet free of glutens (protein constituent of wheat, barley, malt, and rye flours), and it is believed that a deficiency of certain enzymes (peptidases) necessary for the digestion of glutens may underlie the disease. Successful treatment consists of the use of diets high in proteins but low in glutens and saturated fats; other supportive measures may be necessary in advanced cases.

celibacy, the state of being unmarried, usually in association with the role of a religious official or devotee. Applied only to those for whom the unmarried state is the result of a sacred vow, act of renunciation, or religious conviction, celibacy has existed in some form or another throughout man's religious history and in virtually all the major religions of the world.

Wherever celibacy has appeared, it has generally accompanied the view that the religious

life is essentially different or even alienated from the normal structures of society and the normal drives of human nature. On the other hand, the religious style that disparages celibacy gives priority to the role of religion as employing and sanctifying the "natural" states of life: sexuality, family, and work.

Types of celibacy. Celibacy may be examined in terms of its various contexts. One type is sacerdotal celibacy, the celibacy of priests and priestesses. A priest may be defined as one who, as a mediator, performs the sacred function of communicating through rites the needs of the people to heaven and the sacred power and presence from heaven to the congregation. His function is objective. Its efficacy is assured if the priest conducts the proper rite and has the proper qualifications of ordination and, perhaps, of ritual purity, regardless of whether he is particularly moral or fervent. Celibacy would be such an objective mark of special state and ritual purity. Celibacy probably is derived from taboos that regarded sexual power as a rival to religious power, and the sexuality of the opposite sex as a polluting factor, especially in sacred or crisis situations.

Another type of celibacy is the monastic. The monk's main motive will be moral and spiritual advancement, not the ritual purity required for sacerdotal rites. To this end the interior freedom, the opportunity for asceticism and meditation, and perhaps the "new family" of the religious community, all contribute to a sense of separation from the ordinary that releases the monk for religious growth. Types of monasticism range from the solitary—the hermit in the woods or desert, the anchorite living in isolation in a church or monastery—through the cenobite living a stabilized monastic life in community, to the mendicant ascetic who wanders from place to place gathering alms. In any case, the celibate state is viewed as an inseparable part of his way of life.

Institutional celibacy for women frequently has no connection with sacerdotalism and is rather designed to aid spiritual advancement. Virginity and celibacy are considered to be assets in the attainment of spiritual goals. Generally, institutional female celibates are nuns in residential cloisters, although occasional solitaries, like the anchoress (female hermit) Dame Julian of Norwich (14th–15th century) may be noted.

Individual noninstitutional and nonsacerdotal religious celibacy is normally the state of the lay celibate or the occasional clergyman in a faith not requiring celibacy, who makes a vow to remain unmarried out of devotion or to allow the performance of some special religious service.

Celibacy in primitive religions. Among primitive peoples, the celibate state is chiefly connected with shamans and ritual purity. Not all shamans are unmarried, but because the shaman has undergone a profound initiatory experience and has had a quite extraordinary calling, the prototype of the celibate may be found among his ranks.

Celibacy in the ancient civilizations. In the great civilizations of antiquity, celibacy emerged in various contexts. The requirements for the Vestal Virgins of Rome, celibate for at least the thirty years of their service, indicate that celibacy had some place in a very ancient stratum of Roman religion. As classical civilization developed, two types of religious styles involving masculine celibacy appeared, that of the ascetic philosopher and that of the priest of the mystery religions. The Pythagoreans are an excellent example of the former. Pythagoras himself established a small community that set a premium on study, vegetarianism, and sexual restraint or abstinence. Later philosophers believed that celibacy would be conducive to the detachment and equilibrium required by the philosopher's calling. The Stoic philosopher Epictetus (born *c.* AD 50) taught that the ideal teacher would be unmarried and that his task required a calm freedom from family care.

A different mood was set by the celibate priests of the mysteries. Celibacy was especially characteristic of priest-devotees of the Great Mother cults. The well-organized priesthood of the religion of Isis, for example, represented serene sacerdotalism. Sexual abstinence was an absolute requirement of those who celebrated her holy mysteries.

Similarly, the increasing number of cults—*e.g.,* Manichaeans, Gnostics, and Hermeticists—typically had an inner circle requiring strict continence. Thus, many important religious movements in the classical world envisioned continence as an ideal and set the stage for Christian celibacy and monasticism.

Celibacy in the religions of the East. In Hinduism, celibacy is divorced from the priesthood, which is hereditary. Prominent, however, among the religious personages of India are the *sādhus,* "holy men," who live a life free of possessions and family obligation. The *sādhus* have no organization or corporate discipline. Many *sādhus,* male and female, become celibates after marriage or widowhood; others early in life. The *sādhu* is one who has left the type of life ruled by the order of *dharma* (cosmic and societal law; *i.e.,* of caste, family, money, state, and all their responsibilities and privileges) in order to seek *mokṣa* (final liberation). Worldly involvements are believed to increase one's activities and distractions and hence militate against attainment of a life of controlled equilibrium or devotional ecstasy that is the goal of the spiritual techniques.

Buddhism began as a celibate order in India dedicated to the attainment of enlightenment through the control of the passions and the withdrawal of the senses from attachment to external objects. As Buddhism became a world religion, certain variations arose: in Southeast Asia, most young men spent only a year in the order; in Tibet, Tantric monks were married; in Japan, the large Jōdo Shinshū denomination dispensed with the celibacy ideal altogether.

Chinese Taoism has monastics and independent celibate adepts. Originally the tradition was probably derived from shamanism, but now the Taoist monasticism and priesthood is modelled on the Buddhist. Shintō in Japan has no monks or celibate priesthood; it has embraced shamanesses "married" to the shrine god and celibate priestesses in major shrines, especially in premodern times.

Celibacy in the religions of the West. Celibacy was not part of the original practices of Islām. Islāmic celibacy was a matter of personal spiritual advancement or enthusiasm rather than of sacerdotal purity or institutional control, and most of the famous saints were married. In various places, bands of Ṣūfī mystics, such as the dervishes, developed out of a need for rigorous training or practice. Celibacy was exceptional even among members of these mystical orders, however.

Celibacy has had little part in normative Judaism. There were, however, prescribed periods of sexual abstinence in connection with rituals and sacrifices, and while engaging in holy wars. In post-Old Testament times, some members of the Essene sect rejected marriage.

Celibacy first appears in Christianity out of apocalyptic expectations. It was believed among the original Christians that the present age was ending and that the Kingdom of God was at hand, and that in the new age there would be no marriage, since all would be like angels. Some of the followers of Jesus gave up family life in order to devote themselves to proclaiming the Kingdom. St. Paul commended celibacy but insisted that he, like the other Apostles, had the right to be married if he so desired.

In the subapostolic period (late 1st and early 2nd centuries) some took the extreme view that all Christians should renounce marriage. Middle positions were developed to defend marriage in opposition to views that the flesh and all matter were evil and to defend celibacy in opposition to the widespread sexual license and chaos of the times. Many writers held that marriage was good, but that celibacy was better.

The pre-Christian idea that sexual activity was particularly wrong for those who officiated at the altar was assimilated by Christians, and it became common for ordained men to give up sexual relations with their wives. The regional Council of Elvira in Spain (*c.* AD 306) decreed that all priests and bishops, married or not, should abstain from sexual relations. On the other hand, the ecumenical Council of Nicaea (AD 325) declined to make such a prohibition.

The position of the Eastern churches was made clear by the decrees of the Quinisext Council in 692: bishops must be celibate, but ordained priests, deacons, and subdeacons could continue already-established marriages.

The social chaos caused by the breakup of the Roman Empire had the effect of extending the practice of celibacy among the laity. Lay persons fleeing the cities to live as hermits or to form monastic communities sought safety as well as purity.

In the 10th and 11th centuries a crisis in the practice of clerical celibacy resulted from the decline of the Carolingian Empire and the Norse (Viking) invasions. Churches were destroyed, church lands secularized, and many priests married or lived in concubinage. Not only the practice but also the principles of clerical celibacy were challenged.

The first and second Lateran Councils (1123 and 1139) put an end to the legality of theoretically continent clerical marriages. They declared priestly orders an impediment to valid marriage and vice versa. This is still the official position of the Roman Catholic Church, although occasionally exceptions are made.

The churches of the Reformation (Lutheran, Anglican, Reformed, and others) discontinued the requirement of clerical celibacy. Lay celibacy was also discontinued, but about 1845 monastic orders began to reappear in the Church of England. About the time of World War II, small Protestant monastic groups were founded on the continent of Europe.

In connection with the second Vatican Council (1962–65) clerical celibacy once again became a cause of ferment in the Roman Church. The council permitted a married diaconate. After the council, the number of priests seeking to leave the priesthood and marry vastly increased. A substantial number of European and American Catholics began to urge that celibacy be made optional for priests.

Pope Paul VI, however, issued an encyclical, *Sacerdotalis Caelibatus* (June 23, 1967), reaffirming the traditional law on celibacy. The pope returns to the New Testament texts: for the sake of Christ and the coming Kingdom of Heaven, the priest must be totally available and free of domestic responsibilities; he must witness by his way of life to the transcendent reality that fills and grips him.

Céline, Louis-Ferdinand, pseudonym of LOUIS-FERDINAND DESTOUCHES (b. May 27, 1894, Courbevoie, near Paris—d. July 1, 1961, Meudon, Fr.), French writer and physician. Céline received his medical degree in 1924 and travelled extensively on medical missions for the League of Nations. In 1928 he opened a practice in a suburb of Paris, writing in his spare time. He became famous with his first novel, *Voyage au bout de la nuit* (1932; *Journey to the End of Night,* 1934), the story of a man's tortured and hopeless search for mean-

ing, written in a vehement and disjointed style that marked its author as a major innovator of 20th-century French literature. There followed *Mort à crédit* (1936; *Death on the Installment Plan*), a similarly bleak portrayal of a world bereft of value, beauty, and decency.

Though a favourite of the left wing, Céline was disenchanted by a visit to the Soviet Union and said so in *Mea Culpa* (1937). He later developed fanatically anti-Semitic sentiments, expressed in three notorious pamphlets: *Bagatelles pour un massacre* (1937; "Trifles for a Massacre"), *L'École des cadavres* (1938; "School for Corpses"), and *Les Beaux Draps* (1941; "The Fine Mess"). These works also excoriated the French.

At the outbreak of World War II, Céline enlisted in the ambulance service, but after the fall of France in 1940 he rejected both collaboration and resistance and returned instead to work at a dispensary at Bezons. Threatened by the Resistance as a collaborator during the Allied liberation of France, he fled to Denmark via Germany, which was then undergoing the height of the Allied bombing campaigns. In Denmark he was imprisoned for more than a year because of suspicions of his having collaborated with the Nazis, but he was permitted to return to France after his homeland exonerated him in 1951. On his return, he resumed the practice of medicine and continued to write. His last works, a trilogy composed of *D'un Château l'autre* (1957; *Castle to Castle*), *Nord* (1960; *North*), and *Rigodon* (1969; *Rigadoon*), depict World War II as seen from within Germany; they are seen by some critics as equal in power and style to his two celebrated early novels. Other works include *Guignol's Band* (1944), *Casse Pipe* (1949; "Shooting Gallery"), and *Entretiens avec le Professeur Y* (1955; "Conversations with Professor Y").

During the 1930s Céline enjoyed a high reputation, but it diminished during and after the war years because of his increasingly vicious and hysterical misanthropy. The relentless despair, amorality, rage, and pornography of his works continue to disturb some contemporary critics, who object to his underlying weltanschauung even when they praise his apocalyptic lyricism. Other contemporary critics find a paradoxical humanism in Céline's agonized rhetoric and interpret his ravings as a revolt against the world's intolerable evil.

Celinograd (Kazakhstan): *see* Tselinograd.

cell, in biology, the basic unit of life. All cells are similar in composition, form, and function. The evolution of specialized cell features is responsible for the great diversity of life forms.

A brief treatment of the cell follows. For full treatment, *see* MACROPAEDIA: Cells: Their Structures and Functions.

Cells were first observed in the 17th century, shortly after the discovery of the microscope. Their significance, however, was not understood until the early 19th century, when improvements in microscopy permitted closer observation.

Cells are made up of macromolecules (giant molecules) and various smaller molecules. The chief macromolecules are nucleic acids (DNA [deoxyribonucleic acid] and RNA [ribonucleic acid]), proteins, and polysaccharides. DNA comprises the genetic code that carries the essential character of the organism from generation to generation. RNA translates the genetic information into proteins, which carry out vital cell functions. Proteins, for example, recognize and transport specific molecules into and out of the cell and catalyze all chemical reactions within the cell. Polysaccharides are a prominent component of the outer surface of cells—the hard cell wall of bacterial and plant cells and the soft cell coat of animal cells.

Important among the smaller molecular components of cells are lipids, ATP (adenosine triphosphate), cyclic AMP (adenosine monophosphate), porphyrins, and water. Lipids are fatty substances that are a major component of cell membranes. ATP is the energy currency of the cell; this energy-rich molecule is formed when the cell needs to store energy and is broken down when the cell requires energy. Cyclic AMP functions as a regulator of cell activities; porphyrins are pigments essential for oxidation and photosynthesis. About 70 to 80 percent of a cell is water, which is vital to the chemistry of life. If the water content falls below 50 percent, a cell's life processes cease.

There are two distinct types of cells: procaryotic cells, found only in blue-green algae and in bacteria, and eucaryotic cells, composing all other life forms. A eucaryotic cell consists of an outer membrane, cytoplasm that contains various membrane-bound structures (organelles), and a membrane-bound nucleus that encloses the gene-bearing chromosomes. Procaryotic cells have a cell membrane and cytoplasm, but they have no nucleus (their genetic material is organized into a single chromosome) and they lack membrane-bound cytoplasmic organelles. The molecular composition and activities of the two types of cells, however, are very similar.

A cell is bound by a semipermeable membrane that enables it to exchange certain materials with its surroundings. One widely accepted model proposes a membrane made up of a double layer of lipids studded with proteins. Some of the proteins extend completely through the lipid layer, others only partially penetrate it, and still others are thought to be completely embedded within the lipid layer. In plants the membrane is enclosed in a rigid cellulose cell wall.

The space between cells is filled with the extracellular matrix, a gel of polysaccharides swollen with water molecules in which are suspended protein fibres that hold cells together to form tissues.

Within the cytoplasm of both procaryotic and eucaryotic cells are ribosomes, small bodies that are the sites of protein synthesis. In addition, eucaryotic cells have a variety of separate membrane-bound cytoplasmic organelles with special functions. These organelles include the endoplasmic reticulum, Golgi apparatus, lysosomes, mitochondria, and plastids. The endoplasmic reticulum is a network of channels that apparently functions in the movement of materials within the cell. Associated with these channels is the Golgi apparatus, which is composed of sacs that seem to bud off from the endoplasmic reticulum. These sacs apparently transport cell products from the endoplasmic reticulum to the outside of the cell. Lysosomes are sacs filled with digestive enzymes; they are capable of digesting worn-out cell parts or noncellular structures that have entered the cell. Mitochondria serve as the power plants of the cell; it is within these organelles that ATP releases its energy. Plastids are found in the cells of most plants but are absent from animal cells. Of immense importance are the plastids known as chloroplasts; they contain the machinery for photosynthesis, the process by which the energy of sunlight is captured to produce carbohydrates.

The nucleus is the control centre of eucaryotic cells. Within this membrane-bound structure lie the chromosomes, which carry the hereditary material. The DNA of the chromosomes directs protein synthesis in the cell; the DNA instructions are carried from the nucleus to the cytoplasm by messenger RNA (mRNA). Procaryotic cells have no membrane-enclosed nucleus. They do, however, have nuclear matter consisting of a single chromosome.

When a eucaryotic cell has doubled in size, it divides, or reproduces—a process called mitosis (*q.v.*)—to form two genetically identical daughter cells. Prior to mitosis, the chromosomes replicate, so that there will be a complete set of hereditary instructions for each daughter cell. During mitosis, the doubled chromosomes are separated, with one copy of each going to each daughter cell. Among sexually reproducing eucaryotes, another type of cell division occurs in the formation of sex cells called gametes (*i.e.*, eggs and sperm). This process is known as meiosis (*q.v.*). It produces four gametes, each of which contains half the number of chromosomes of the parent cell. When a male gamete and a female gamete unite, they form a new individual in which the full number of chromosomes is restored.

Procaryotic cells reproduce in various ways, the most common being binary fission. This process involves replication of the cell's lone chromosome and the subsequent splitting of the parent cell into two daughters. It thus resembles mitosis in eucaryotes, but it lacks the special apparatus involved in true mitotic division.

cell, in electricity, unit structure used to generate an electrical current by some means other than the motion of a conductor in a magnetic field. A solar cell, for example, consists of a semiconductor junction that converts sunlight directly into electricity. A dry cell is a chemical battery in which no free liquid is present, the electrolyte being soaked up by some absorbent material such as cardboard. A primary, or voltaic, cell produces electricity by means of a chemical reaction but is not rechargeable to any great extent. The conventional dry cell (*e.g.*, flashlight or transistor-radio battery) is a primary cell, sometimes referred to as a Leclanché cell after its inventor, Georges Leclanché. A secondary cell, such as a lead-acid storage battery, is rechargeable, as are some primary cells, such as the nickel–cadmium cell. A fuel cell produces an electrical current by constantly changing the chemical energy of a fuel and an oxidizing agent, separately stored and supplied to a chamber containing electrodes, to electrical energy. Two or more cells connected together are a battery, although in common usage "battery" is also used to designate a single cell.

cell, electrolytic: *see* electrolytic cell.

cell culture, the maintenance and growth of cells of multicellular organisms outside the body in specially designed containers and under precise conditions of temperature, humidity, nutrition, and freedom from contamination. In a broad sense, cells, tissues, and organs that are isolated and maintained in the laboratory are considered the objects of tissue culture. The techniques of cell culture have made it possible for scientists to use cultures of cells for experimental studies and for biological assays of many types. *See* tissue culture.

cell division, the process by which cells reproduce. *See* meiosis; mitosis.

cella, Greek NAOS, in Classical architecture, the body of a temple (as distinct from the portico) in which the image of the deity is housed. In early Greek and Roman architecture it was a simple room, usually rectangular, with the entrance at one end and with the side walls often being extended to form a porch. In larger temples, where the cella is open to the sky, a small temple was sometimes placed within.

In the Byzantine architectural tradition the naos was preserved as the area of a centrally planned church, including the core and the sanctuary, where the liturgy is performed.

cellar, room beneath ground level, especially one for storing fruits and vegetables, both raw and canned, on a farm. A typical cellar may be beneath the house or located outdoors, partly underground, with the upper part mounded