

Grolier
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▽ PHOENICIAN
 ▽ EARLY HEBREW
 ▲ EARLY ARAMAIC
 ▲ EARLY GREEK
 ▲ CLASSICAL GREEK

Dd

MODERN LATIN

ETRUSCAN ▽
 EARLY LATIN D
 CLASSICAL LATIN D
 RUSSIAN-CYRILLIC П
 GERMAN-GOTHIC Þ

D

D/d is the fourth letter of the English alphabet and holds the same position in all modern alphabets derived from the Latin. The position and form of the letter in the Latin alphabet were in turn derived from the Greek by way of the Etruscan. The Greeks call the letter *delta*. The name, form, and position of the letter were taken by the Greeks, along with the rest of the alphabet, from a Semitic writing system—probably Phoenician but possibly Aramaic. The Semitic name of the sign is *daleth*.

The letter *D/d* represents a consonant sound produced in English speech by placing the tongue against the ridge behind the teeth. In English, the *-ed* of the past tense and past participle is often pronounced as *t* when it follows a voiceless consonant. Thus *stopped* is pronounced as if it were spelled *stopt*, and *passed* has the same pronunciation as *past*. Otherwise, final *d* and *t* are distinct, as in *send*, *sent* and *fad*, *fat*. The sound is often much reduced or completely silent when preceded by *n* or *l* and followed by most other consonants, as in *handsome*. Because of a consonant shift (GRIMM'S LAW), English *d* normally corresponds to German *t* (English *garden*; German *Garten*), while English *th* normally corresponds to German *d* (English *thick*; German *dick*).

I. J. GELB AND R. M. WHITING

D Day: see NORMANDY INVASION; WORLD WAR II.

D layer: see IONOSPHERE.

da Gama, Vasco: see GAMA, VASCO DA.

Da Nang

Da Nang (called by its French name, Tourane, before 1954) is a municipality in Quang Nam-Da Nang province in the densely settled central coastal lowlands of Vietnam. It has a population of 492,200 (1973 est.). Located on the main railroad and highway of Vietnam, it is also a major seaport with

a fine harbor situated on the Bay of Da Nang, an arm of the South China Sea. It is about 80 km (50 mi) southeast of Hue. In 1787 the city was ceded to the French. During the Vietnam War, Da Nang was the site of a huge U.S. military base (built 1965), and it fell to North Vietnamese forces on Mar. 30, 1975. In 1979 Soviet naval vessels began refueling at the base. Da Nang has an important textile industry and it is also the site of the Cham Museum.

WILLIAM A. WITHINGTON

Da Ponte, Lorenzo [dah-pawn'-tay, lor-ent'-soh]

Lorenzo Da Ponte, born Emanuele Conegliano on Mar. 10, 1749, d. Aug. 17, 1838, was an Italian poet and librettist who collaborated with Mozart on three of the greatest operas of the 18th century. Da Ponte, whose name was changed at baptism, studied for the priesthood, but after becoming involved in a scandal in Venice in 1779 he moved to Vienna, where he was appointed court poet to Emperor Joseph II. After writing other opera librettos, he collaborated with Mozart on *The Marriage of Figaro* (1786), *Don Giovanni* (1787), and *Così fan tutte* (1790). At the emperor's death, Da Ponte was forced to leave Vienna. He worked for a while at the Drury Lane Theatre in London and in 1805 left England secretly and fled to the United States. From 1825 to 1837, Da Ponte was a professor of Italian literature at Columbia University. In 1825 he and Manuel Garcia were among the first to present Italian opera in America; in 1833 he was involved in the construction of the Italian Opera House in New York. STEPHANIE VON BUCHAU

Bibliography: Da Ponte, Lorenzo, *Memoirs*, trans. by Arthur Livingston (1929); Russo, Joseph L., *Lorenzo Da Ponte* (1922; repr. 1966).

See also: DON GIOVANNI; MARRIAGE OF FIGARO, THE.

Da Vinci, Leonardo: see LEONARDO DA VINCI.

Dacca [dak'-uh]



Dacca, located in the Ganges deltaic area, is the capital and largest city of Bangladesh. The city grew in importance during the 17th century as an administrative center of the Moghul Empire. Upon entering Dacca in 1757, the British military leader Robert Clive claimed that it was "as extensive, populous, and rich as the city of London."

4 DACE

Dacca is the capital and largest city of BANGLADESH. It is located in the geographic center of the country in the great deltaic region of the Ganges and Brahmaputra rivers. The population, which is largely Muslim, numbers 1,679,600 (1974). Dacca is served by the port of Narayanganj, located 16 km (10 mi) to the southeast. The city is within the monsoon climate zone, with an annual average temperature of 25° C (77° F) and monthly means varying between 18° C (64° F) in January and 29° C (84° F) in August. Nearly 80% of the annual average rainfall of 1,854 mm (73 in) occurs between May and September.

Dacca is located in one of the world's leading rice- and jute-growing regions. Its industries include textiles (jute, muslin, cotton) and food processing, especially rice milling. A variety of other consumer goods are also manufactured here. The Muslim influence is reflected in the more than 700 mosques and historic buildings found throughout the city. Dacca is divided into an old city, a modern section called Ramne, and many residential and industrial communities. The University of Dacca (1921) and several technical schools and museums are located here.

Dacca was founded during the 10th century. It served as the Mogul capital of BENGAL from 1608 to 1704 and was a trading center for British, French, and Dutch interests before coming under British rule in 1765. In 1905 it was again named the capital of Bengal, and in 1956 it became the capital of East Pakistan. The city suffered heavy damage during the Bangladesh war of independence (1971).

RICHARD ULACK

dace [days]



The European dace, *L. leuciscus*, inhabits lowland waters throughout northern Europe and into Siberia. The spawning period lasts from March to May, and the female lays her eggs on aquatic plants.

Dace is a common name for several species of minnow that inhabit clear, rapid streams throughout Europe and North America. These small, slender fish live in schools and feed on underwater plants, water insects, and small crustaceans. The common European dace, *Leuciscus leuciscus*, is a small-headed, silvery minnow that can grow up to 30 cm (12 in) in length.

North American dace are much smaller and consist of some species of *Phoxinus*, including the redbelly dace, redbelly and rosyside dace of the genus *Clinostomus*, and several species of *Rhinichthys*. Although the dace is not tasty, fishers consider angling for the European dace a challenging sport, because the fish is quick and difficult to catch.

Dachau [dahk'-ow]

Dachau (1976 est. pop., 33,700) is a town in Bavaria, southern West Germany, that from 1933 to 1945 was the site of a Nazi CONCENTRATION CAMP. Located on the Amper River about 18 km (11 mi) northwest of Munich, it has several industries, including machine shops, paper mills, printing shops, breweries, textile mills, and ceramics factories.

An old market town that dates back to about 800, Dachau was chartered in 1391. Notable landmarks include the 16th-century castle and a 17th-century town hall and church. The first Nazi concentration camp was established on the outskirts of the town in March 1933. From that time until the camp was liberated by U.S. troops on Apr. 29, 1945, more than

200,000 people from numerous countries were detained here, and perhaps 70,000 were killed or died of starvation or disease. Chapels and a museum commemorate the victims.

Bibliography: Smith, Marcus J., *The Harrowing of Hell: Dachau* (1972).

dachshund [dahks'-hund]



The dachshund (German for "badger dog") is a short-legged breed originally used to hunt badgers by following them into their burrows.

The dachshund is a long-bodied, short-legged dog with hanging ears, a slightly arched muzzle, and a tapering tail. The breed is recognized in two sizes: miniature, under 4.5 kg (10 lb), and standard, up to about 11 kg (25 lb). Heights range from 13 to 23 cm (5 to 9 in) at the shoulder. Three coat types exist: longhaired, shorthaired, and wirehaired. Coat colors and patterns vary from dark solids to light and dappled.

The dachshund was developed in Germany several hundred years ago to hunt badger and other animals that retreated into underground burrows; *dachshund* means "badger dog" in German. The breed's long, low-slung body enabled it to follow small game into a burrow and either keep it at bay or drive it out.

JOHN MANDEVILLE

Bibliography: Adler, Lenore, *This Is the Dachshund* (1966); Meistrell, Lois, and Nixon, G. William, *The New Dachshund* (1976).

dacite [day'-site]

Dacite is a fine-grained, light-colored volcanic rock commonly composed of the minerals plagioclase (a type of FELDSPAR) and QUARTZ, with sanidine (also a feldspar) and various iron-magnesium minerals, such as biotite and hornblende, in lesser abundance. In terms of chemical composition, dacite is often defined as rocks with more than 66 percent silicon dioxide by weight and more sodium monoxide than potassium monoxide.

JAMES A. WHITNEY

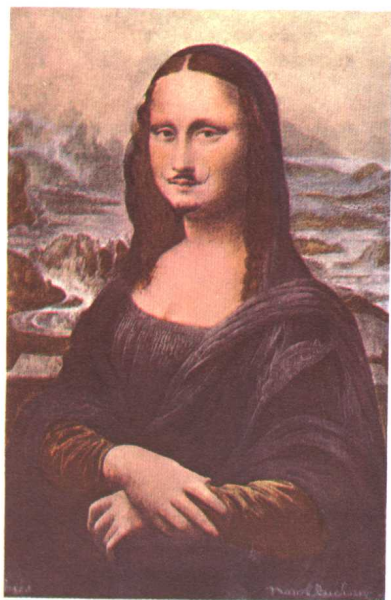
Dacron: see SYNTHETIC FIBERS.

dactyl: see VERSIFICATION.

Dada

Dada was an international, avant-garde art and literary movement that flourished between 1915 and 1922. The Dadaists' declared purpose was to protest the senseless violence of World War I, which they believed had made all established moral and aesthetic values meaningless. The term itself means "hobbyhorse" in French and was supposedly chosen at random from the dictionary. Dada promulgated antiart and nonsense, declaring that art did not depend in any way on established rules or on craftsmanship; the only law was that of chance, and the only reality that of the imagination. Dada is often viewed as nihilistic (see NIHILISM), but it can also be seen as a kind of thoughtful irrationality, a way toward liberation achieved by penetrating into the unknown regions of the mind. Dada appeared nearly simultaneously in Zurich, New York City, and Paris, and soon took hold in Germany. It finally concentrated in Paris.

Dada Art. In Zurich, where political exiles of all kinds took refuge during World War I, Dada was initiated by Hugo Ball, a German actor and playwright; Jean ARP, an Alsatian painter and poet; Richard Huelsenbeck, a German poet; Marcel Janco, a Romanian artist; and Tristan TZARA, a Romanian poet.



L.H.O.O.Q. (1919), Marcel Duchamp's desecration of Leonardo da Vinci's masterpiece, has become a symbol of Dada's rejection of the European artistic tradition. Onto a color reproduction of the Mona Lisa the artist has penciled in a mustache and goatee. The work's seemingly enigmatic title, when pronounced in French, forms the sentence *Elle a chaud au cul* ("She has hot pants"). (Collection of Mrs. Mary Sisler, New York City.)

Together they founded the Cabaret Voltaire—a theater, literary gathering place, and exhibition center. They offered scandalous and mysterious entertainments, lectured, and exhibited together a variety of such artists as Arp, Giorgio de CHIRICO, Max ERNST, Wassily KANDINSKY, Paul KLEE, and Pablo PICASSO. Arp illustrated the works of Huelsenbeck and Tzara and created a new type of COLLAGE by tearing pieces of colored paper and arranging them according to chance. In 1918, Tzara wrote the manifesto for the movement.

Marcel DUCHAMP, who in 1915 had moved to New York City and in the same year coined the term "ready-made," was the chief anticipator of Dada. For his ready-mades, Duchamp took such mundane objects as snow shovels, urinals, and bottle racks, gave them titles, and signed them, thus turning their context from utility to aesthetics. Duchamp also invented word games, made an abstract film, and edited several reviews in the United States from 1913. His friend Francis PICABIA worked with him and with Man RAY in New York on the Dada review 291; Picabia founded the 391 review in Barcelona in 1917.

In 1919, Max Ernst launched Dadaism in Cologne with his friend Arp. Ernst's type of collage technique was an important contribution to the Dada cause, as was the collage-painting of Kurt SCHWITTERS, the chief figure of Dada in Hanover, Germany, who called Dada *Merz*, "something cast-off, junk."

Dada emerged as a group activity in Paris when a Dada salon opened at the Montaigne Gallery in 1922. Dada has had a long and significant influence in art to the present.

Dada Literature. Dada found literary expression in France with the writings of Louis ARAGON, André BRETON, Paul ÉLUARD, and Philippe Soupault. They founded the review *Littérature* in Paris in 1919, and it was published until 1924. These writers, however, soon abandoned the Dada movement and turned toward SURREALISM. The literary application of Dada, moreover, principally took the form of nonsense poems consisting of meaningless, random combinations of words.

BARBARA CAVALIERE

Bibliography: Lippard, Lucy, ed., *Dadas On Art* (1971); Matthews, J. H., *The Theatre in Dada and Surrealism* (1974); Motherwell, Robert, ed., *The Dada Painters and Poets* (1951); Richter, Hans, *Dada Art and Anti-Art* (1965); Rubin, William, *Dada and Surrealist Art* (1969); Verkauf, Willy, *Dada: Monograph of a Movement* (1957).

Dadd, Richard

The English painter Richard Dadd, b. Aug. 1, 1817, d. Jan. 8, 1886, was trained at London's Royal Academy. A victim of demonic hallucinations, he murdered his father in 1843 and was

institutionalized for the rest of his life. Encouraged by enlightened doctors, Dadd continued to paint remarkable scenes crowded with bizarre, microscopic details, such as *Oberon and Titania* (c.1850-54; Tate Gallery, London).

Bibliography: Alderidge, Patricia, *The Late Richard Dadd* (1974).

Daddah, Moktar Ould [dah'-dah mohk'-tahr oold]

Moktar Ould Daddah, b. Dec. 20, 1924, was the first president (1961-78) of the Republic of Mauritania. He studied law in Paris and practiced in Dakar. After holding various government posts in Mauritania, Daddah became premier in 1958; when Mauritania gained its independence from France, he became president. In 1978 he was overthrown in a coup.

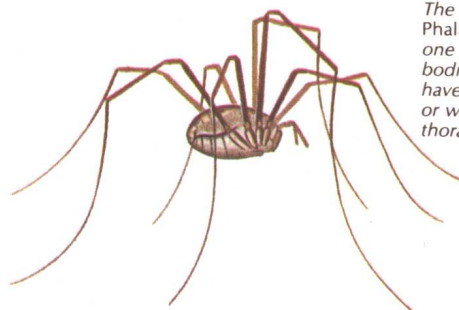
Daddi, Bernardo

Bernardo Daddi, c.1290-c.1348, was one of the most gifted pupils of GIOTTO DI BONDONE and the leading painter in Florence during the 1340s. His earliest dated work is the majestic triptych *Madonna* (1328; Uffizi, Florence). Daddi's graceful and light mature style, illustrated by the *Enthroned Madonna* (c.1340, Uffizi), reflects the influence of the Siennese painters Ambrogio and Pietro Lorenzetti (see LORENZETTI family) and Simone MARTINI, as well as his training with Giotto. Daddi's skill as a colorist is evident in such smaller works as *The Story of Saint Cecelia* (Museo Civico, Pisa). His influence persisted through the 14th century.

ALAN P. DARR

Bibliography: Oertel, Robert, *Early Italian Painting to 1400* (1968); Offner, Richard, *A Corpus of Florentine Painting*, 10 vols. (1930-69); White, John, *Art and Architecture in Italy 1250-1400* (1966).

daddy longlegs



The daddy longlegs *Phalangium opilio* is one of several oval-bodied arachnids that have no constriction, or waist, between thorax and abdomen.

Daddy longlegs, or harvestman, is the common name for members of the arachnid order Phalangida (in some classifications, Opiliones). Daddy longlegs are related to spiders but have only two eyes, located toward the rear of the head (cephalothorax). The daddy longlegs has a segmented, oval body, up to 2 cm (0.8 in) long, that is supported on eight very slender legs, up to 16 cm (6.3 in) long. The second pair of legs carry sense organs and may be waved in the air to detect vibrations. Most daddy longlegs are omnivorous, feeding on plant juices and insects, and none spin webs. Adults live through the winter only in warmer climates.

STEPHEN C. REINGOLD

Bibliography: Savory, T. H., *Introduction to Arachnology* (1974).

Daedalus (journal) [ded'-uh-luhs]

Daedalus, a publication of the American Academy of Arts and Sciences, is designed for restricted circulation among an intellectual audience. Each issue concentrates on one social, political, artistic, or literary topic. Established in 1955, *Daedalus* had a circulation of 40,000 in 1980.

CALDER M. PICKETT

Daedalus (mythology)

In Greek mythology, Daedalus was a sculptor, architect, and inventor revered as the personification of arts and crafts. Credited with many inventions, Daedalus feared that his

nephew Talus would surpass him in originality. He threw Talus from the Acropolis in Athens and then fled to Crete where he built a LABYRINTH to house the MINOTAUR for King MINOS. Later imprisoned by Minos, Daedalus escaped with his son, Icarus, on wings of waxed feathers. Icarus, however, flew too close to the sun; his wings melted, and he fell into the sea. Daedalus settled alone in Sicily.

daffodil



The daffodil, N. pseudonarcissus, a springtime narcissus of temperate climates, produces long-bladed leaves and large, yellow flowers. It is closely related to the jonquil and to the tazetta narcissus.

Daffodil is the common name for any plant of the genus *Narcissus*, but correctly refers to larger, hardy, single-flowered, trumpet types of *Narcissus*. The jonquil, *N. jonquilla*, is similar to the daffodil and often mistaken for it. The Peruvian daffodil is a species of a bulbous spider-lily plant, *Hymenocallis callithina*. It has white flowers with a funnel-shaped crown and green stripes.

CHARLES L. WILSON

Dafydd ap Gwilym [dah'-vith ahp gwil'-im]

Dafydd ap Gwilym, c.1320–c.1380, generally regarded as the greatest of the 14th-century Welsh poets, was a master of technique and the first to exploit the *cywdd* form. This form consists of rhyming couplets with 7-syllable lines and an uneven stress pattern. Dafydd embellished most of his lines with the *cynganedd*, a scheme of sound correspondences that involved alliteration, shifting accents, and internal rhyme. For future centuries his influence on Welsh poetry was so great that Gerard Manley Hopkins described the *cynganedd* as having a major impact upon his own experiments. Dafydd employed this form in lyrics of love and nature, using vivid imagery.

ROBIN BUSS

Bibliography: Bromwich, Rachel, *Tradition and Innovation in the Poetry of Dafydd ap Gwilym* (1967).

Daghestan [dah-guh-stahn']

Daghestan (also Dagestan) is a region in eastern CAUCASIA, on the Caspian Sea, constituted politically as the Daghestan Autonomous Soviet Socialist Republic, 1 of the 16 autonomous republics in the Russian republic of the USSR. Its area is 50,250 km² (19,400 mi²), and its population is 1,627,000 (1979). The capital is Makhachkala (1979 pop., 250,000).

The name, which means "land of mountains" in Turkish, reflects the region's topography, in which isolated mountain valleys separated by outliers of the Caucasus Mountains shelter a wide variety of distinctive peoples. Daghestan has more than a dozen indigenous ethnic groups, including the Lezghians, a Caucasian language group, and the Kumyks, a Turkic language group. The region is one of the least urbanized in the USSR, with 61% of the population classified as rural. The widespread vineyards and orchards are the basis for wine-making and fruit-canning industries. Some petroleum and natural gas is mined along the Caspian coast. Handicrafts are common in mountain villages.

THEODORE SHABAD

Dagon [day'-gahn]

Dagon was the chief god of the ancient Philistines, a god of agriculture and fertility. He was also worshiped by the Phoenicians and is probably identical with the Babylonian and Assyrian Dagan. In the Old Testament, when the Philistines captured the ark of the covenant and placed it in the temple of Dagon, the image of Dagon was miraculously toppled and broken (1 Sam. 5).

Daguerre, Louis J. M. [dah-gair']

Louis Jacques Mandé Daguerre, b. Corneilles, France, Nov. 18, 1787, d. July 10, 1851, is the most famous of the several men who invented photography in the 1830s. His process, the DAGUERRETYPE, which produced a permanent image on silver-coated copper plate treated with iodine vapor, was bought by the French government and announced publicly on Aug. 19, 1839.



Louis Daguerre helped develop modern photography when he perfected (1837) his daguerreotype, the first permanent photographic image. This process, the result of his collaboration with Joseph Niépce, produced an original image on a silver-coated copper plate that was exposed to iodine vapor.

Trained as a painter, Daguerre occasionally exhibited publicly; but he was primarily a showman. His elaborate stage designs won him initial fame during the 1820s. He expanded his reputation with the Diorama (opened 1822), a theater for the display of large panoramic views; the impressive illusions of the Diorama were enhanced by dramatic changes in lighting.

In 1824, Daguerre began attempts to fix chemically the image of the CAMERA OBSCURA, which was already widely used as an aid to sketching. He made only minor progress until, in 1826, he heard of similar research by Joseph Nicéphore NIÉPCE and, in 1829, joined him in a partnership. Niépce had achieved a crude photograph in 1822. Daguerre, however, did not succeed in perfecting a daguerreotype until 1837, four years after Niépce's death. The invention was received with surprise and acclaim and was soon being used widely. Because Daguerre's process could not produce copies, it was soon replaced by William Henry TALBOT's CALOTYPE, which could produce many prints from a single negative.

PETER GALASSI

Bibliography: Gernsheim, Helmut and Alison, *L. J. M. Daguerre*, 2d rev. ed. (1968); Newhall, Beaumont, *Latent Image* (1967).

daguerreotype [duh-gair'-oh-tipe]

The daguerreotype, invented in 1837 by the French artist Louis DAGUERRE, was the first practical form of reproduction in PHOTOGRAPHY. A daguerreotype was made on a silver-plated sheet of copper made light-sensitive by prior exposure to vapors that produced silver iodide. The plate was next exposed in a modified CAMERA OBSCURA, then treated with mercury va-

por. Since the portions of the plate exposed to the light had changed back to silver, the mercury joined with the silver to form an amalgam, which was the image. The remaining silver iodide was removed by washing, originally with a salt solution but later with sodium hyposulfite. Costly and time-consuming, daguerreotypes were, nevertheless, superbly detailed. The process, although popular, was soon replaced.

Bibliography: Coe, Brian, *The Birth of Photography* (1977); Gernsheim, Helmut and Alison, L. J. M. *Daguerre: The History of the Diorama and the Daguerreotype*, 2d ed. (1968).

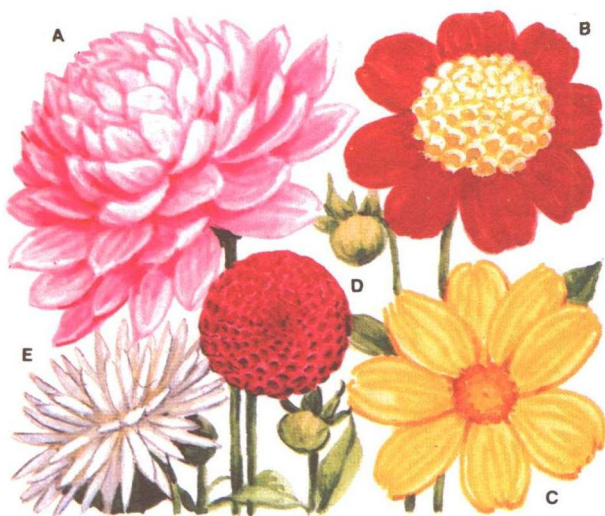
Dahlberg, Edward

Edward Dahlberg, b. Boston, July 22, 1900, d. Feb. 27, 1977, was acclaimed as a pioneer of proletarian fiction following publication of his autobiographical novels *Bottom Dogs* (1929), *From Flushing to Calvary* (1932), and *Those Who Perish* (1934). After breaking with Theodore Dreiser and other naturalists, however, he fell into obscurity. He reemerged in the 1960s to produce his finest work, *Because I Was Flesh* (1964), the story of his youthful tribulations, and to become celebrated as "the curmudgeon of American letters" for his unremitting, quirkish attacks on the decline of Western literature and American culture. His autobiography *The Confessions of Edward Dahlberg* appeared in 1971.

WARREN FRENCH

Bibliography: Billings, Harold, ed., *Edward Dahlberg, American Ishmael of Letters* (1968); DeFanti, Charles L., Jr., *The Wages of Expectation: A Biography of Edward Dahlberg* (1978); Moramarco, Fred, *Edward Dahlberg* (1972).

dahlia



Dahlia hybrids, genus *Dahlia*, are widely different in appearance. Among several varieties are (A) formal decorative; (B) single petaled; (C) anemone petaled; (D) pompon miniature; and (E) cactus.

Dahlias, *Dahlia*, are any of several perennial, tuberous, flowering plants that belong to the composite family, Compositae. The large flowers appear in most colors except blue. Dahlias were first discovered in the mountains of Mexico in the 16th century by a Spanish expedition and were later named in honor of Andreas Dahl, a Swedish botanist, because of his interest in the plant. In colder climates, the tubers are dug up and stored over the winter.

CHARLES L. WILSON

Dahomey: see BENIN.

Daiches, David [day'-cheez]

The Scottish literary critic David Daiches, b. Sept. 2, 1912, is best known as the author of *Critical Approaches to Literature* (1956) and *A Critical History of British Literature* (1960). He

has also produced studies of Virginia Woolf (1942), Robert Burns (1950, 1971), and John Milton (1957). After teaching at the University of Chicago, Cornell University, and Cambridge University, he became dean of English studies (1961-67) at Sussex University.

ROBIN BUSS

Bibliography: Daiches, David, *Scotch Whiskey: Its Past and Present* (1970) and *Two Worlds: An Edinburgh Jewish Childhood* (1956).

Daily Worker

The Daily Worker, long the most important newspaper of the Communist party in the United States, was known in its time of influence as the place to find the party line. It began in 1924 in Chicago, but was soon moved to New York City. Its most troubled period was the time of the Nazi-Soviet Pact (1939-41).

CALDER M. PICKETT

Daimler, Gottlieb [dime'-lur]

Gottlieb Wilhelm Daimler, b. Mar. 17, 1834, d. Mar. 6, 1900, was a German inventor and engineer who made significant contributions to the AUTOMOTIVE INDUSTRY. In 1885 he constructed and patented the first high-speed INTERNAL-COMBUSTION ENGINE, which was lighter and more efficient than the low-speed engines of that time. He also devised a CARBURETOR so that the engine could run on liquid gasoline instead of gas. He fitted his engine onto a bicycle (1885), making what was probably the first MOTORCYCLE; and powered a carriage with his engine (1886), creating one of the first AUTOMOBILES powered by an internal-combustion engine. (Karl BENZ is generally credited with being first the year before.) In 1890 Daimler founded the Daimler Motor Company, which later became Daimler-Benz and Company (1926).

Bibliography: Bird, Anthony, *Gottlieb Daimler, Inventor of the Motor Engine*, ed. by E. Royston Pike (1962; repr. 1968).

Dairen: see TA-LIEN.

dairying

Dairying is the business of producing MILK, butter, cheese, and other milk products. Dairy cows are the primary producers of milk, although dairy BUFFALO, GOATS, and SHEEP supply about 8% of the world total. The major breeds of dairy CATTLE in North America are, in order of numbers, Holstein-Friesian, Jersey, Guernsey, Brown Swiss, and Ayrshire. In addition, the dual-purpose breed, Milking Shorthorn, is popular with farmers who want good quantities of both milk and meat. Red Danish cattle are prevalent in northern Europe.

Holstein-Friesians (called Holsteins in the United States and Friesians in Europe) usually produce from 5,400 to 13,000 kg (12,000 to 28,660 lb) of milk a year. The Holstein, Breezewood Patty Bar Pontiac, produced 24,621 kg (54,280 lb) in 1 year, the world record for all breeds. More than 500 Holsteins have each produced over 90,000 kg (200,000 lb) in a lifetime.

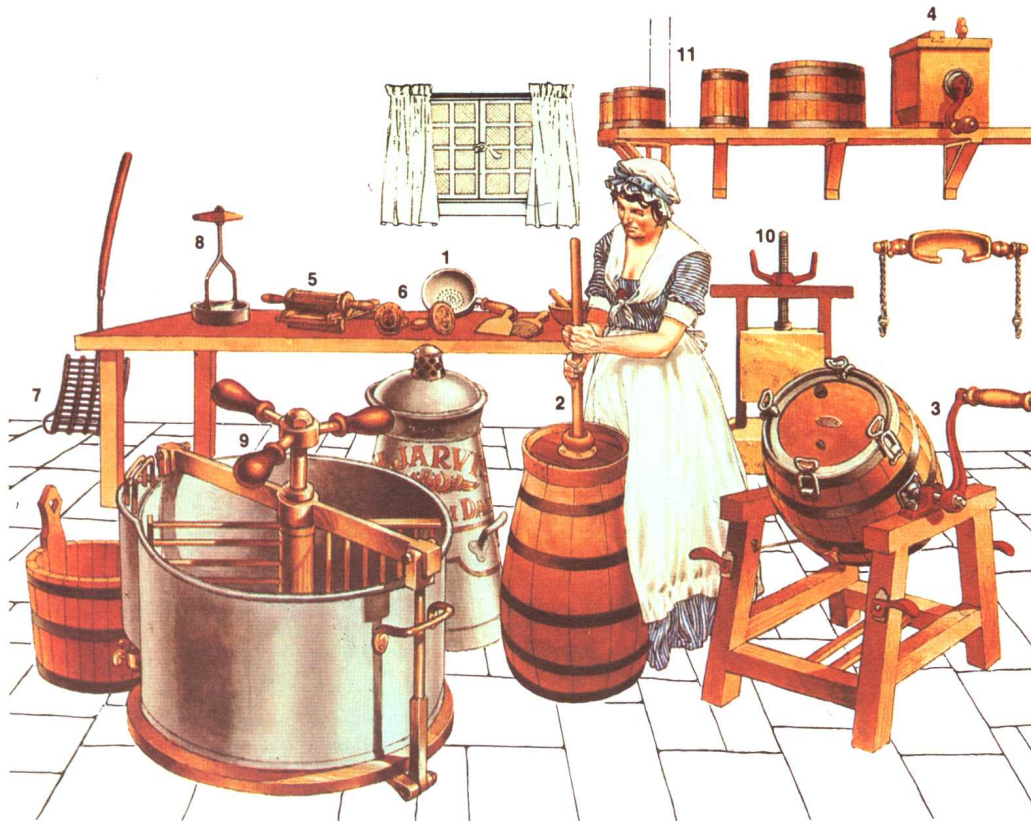
Among dairy breeds, fat- and nonfat-solids content of milk is characteristically highest with Jerseys and lowest with Holsteins. The fat-solids content averages 5.0% for Jerseys and 3.6% for Holsteins. The nonfat-solids content averages 9.4% for Jerseys and 8.6% for Holsteins.

THE DAIRYING PROCESS

Lactation. Lactation begins at freshening, when a calf is born, and usually lasts 305 days. Milk production peaks about 2 months after freshening, then drops by about 5% per month. (Cows are rebred 60 to 90 days after freshening and have a gestation period of about 280 days.)

Milk is produced in the mammary glands (see BREAST; MAMMAL)—the cow has four, the goat two. Dairy cattle have been selected and bred for their large mammary glands. Within the alveoli, which are the specialized cells of the mammary glands, some constituents of milk filter in from the bloodstream as others are synthesized from nutrients removed from the blood. About 400 volumes of blood must pass through the cow's udder for each volume of milk produced. A cow that produces 40 lb of milk daily pumps 16,000 lb (8 tons) of blood through her udder in 24 hours.

Milking. Milk is removed through the teats, elongated nipples



Dairying implements were used on farms and in households until the mid-19th century, when dairy products were first processed in commercial plants in the United States. Cream for butter making was skimmed from the milk with a perforated scoop (1) and agitated in hand-operated churns, such as the plunger (2), barrel (3), or box (4) churn. The butter was kneaded with butter workers (5), and decorative designs were imprinted with butter stamps (6). By 1850 the curd agitator (7) and cutter (8), which separated liquid whey from the solids used for cheese, had been replaced by a larger, more efficient apparatus (9). The cheese press (10) was used to remove excess moisture from the ripening cheese. The product was stored in small barrels (11).

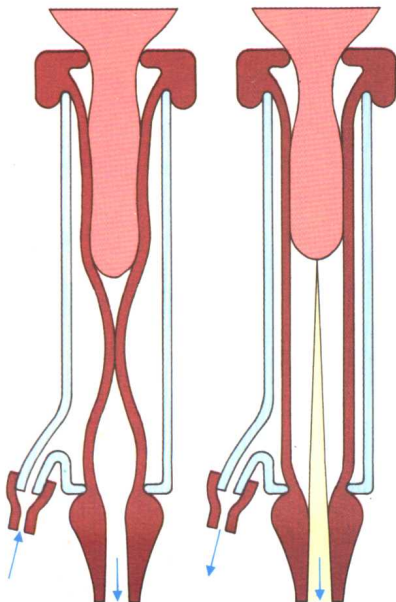
at the end of each mammary gland. Both calves and milking machines remove milk by suction. It can also be removed by hand, by squeezing the teat. Milking machines have flexible tubes inside rigid shells, and these are placed on the cow's teats. Each tube is connected by means of a common chamber to a vacuum source, and a constant vacuum is applied to the end of each teat. Air is intermittently allowed to enter the area between the milking tube and its shell. This interrupts the vacuum at the teat end and massages the teat, improving circulation of blood. Most milking machines have 3-cm pipes (1.2 in) that carry milk to a storage and cooling tank. Volumetric (weigh) jars are generally used to measure the quantity

of milk from each cow. Cows must be milked at regular intervals, twice a day.

Record Keeping. Records of milk production are vital in determining which animals are profitable and what quantities of grain to feed. In addition, records are kept of breeding and calving dates and of disease and consequent veterinary services. The National Cooperative Dairy Herd Improvement Association Program (DHIA) is designed to help with testing and record keeping. Its objective is to improve efficiency in milk production. Local and state DHIA organizations are cooperatively supported by the Extension Service of land-grant colleges and by the U.S. Department of Agriculture.

Pasturage and Forage. Cattle and goats, as well as sheep, deer, and camels, have four stomach cavities. The largest cavity, the rumen, contains billions of bacteria and protozoa. These specially adapted microorganisms are able to digest cellulose and to synthesize proteins from nonprotein nitrogen sources such as urea. Thus, they supply a means of digesting forages that are not digestible by humans and other animals with simple stomachs. These ruminants, therefore, provide a vital means of harvesting vast quantities of pasture from land that cannot be cultivated. Because pastures are seldom available year-round, and because land values are too high in some locations to allow for pastures, farmers use hay and silage as forages for cattle. Hay is made by cutting and drying succulent grasses and legumes; silage is made by chopping corn, sorghum, grass, or clover and fermenting it in a silo.

A large amount of energy is needed to produce milk. For example, a mature cow weighing 600 kg (1,300 lb) and producing daily 20 kg (44 lb) of milk containing 4% fat requires 25.1 megacalories (Mcal) of energy. This can be supplied by about 30 kg (66 lb) of alfalfa hay or by 15 kg (33 lb) of corn. If this cow, however, is producing 40 kg (88 lb) of milk, it will need another 15 Mcal of energy. It is difficult to provide a balanced ration containing sufficient energy, protein, and minerals with forages alone. Therefore, concentrates (high-protein grain supplements fortified with soybean or cottonseed meal and added minerals) are fed with forages. As the nutrient requirements of any cow depend on its body weight



An automatic milking machine consists of a rubber-lined stainless steel cup that fits around the cow's teat and two connecting hoses, one applying a constant vacuum to the teat and the other causing a pulsating action that forces the milk to flow. (Left) Air at atmospheric pressure enters the cup and causes the vacuum to collapse the liner about the teat. (Right) A slight vacuum equalizes the pressure, allowing milk to flow into the vacuum hose.

and milk production, animals are fed as individuals. Dairy farmers and researchers have devised ingenious ways to keep animals in a group and yet feed them as individuals.

There are two major systems of feeding dairy cattle: allowing them to forage freely on pastures, or confining them in dry lots. The method is determined by the availability of economical pasturage. In such states as Arizona and California, where land is unavailable for pasture, dairy cows are kept in pens and are fed hay and concentrates.

Cow Barns. Climate dictates the kind of facility necessary for handling dairy cattle. In northern states cows are kept in large barns during the winter. These barns usually have stanchions in which each cow is fed and milked. In areas farther south than Iowa, the prevailing type of milking barn is the walk-through parlor, which contains elevated milking stalls. In the popular herringbone design, several cows are admitted together and face away from the milker at a 45-degree angle. This arrangement places their udders close together for convenience in milking. Sheds, called loafing barns, which are open to the south, are used for shelter, and many have built-in free stalls for each cow. These stalls are designed so that they can be cleaned by tractors with scrapers.

Forages are fed in mangers or bunks in paved lots. Concentrates may be fed with the forage or in the milking barn during milking. Feeding is often done mechanically with silo unloaders, augers, and chutes. On some farms cows wear identifying necklaces that signal the amount of grain to be delivered as their heads enter an automated feeder.

In the South and Southwest the only shelter required for cows is shade trees, although an enclosed milking barn is still needed to maintain the required cleanliness for producing safe, high-quality milk.

Breeding. Dairy cows are mature enough to bear calves at about 2 years of age. Thereafter, they are gradually culled, or removed from the herd, for insufficient production (33%), fail-

ure to breed (27%), or mastitis, an inflammation of the udder caused by bruising or bacterial infection (23%).

The average expected milking life in commercial herds is slightly more than three lactations, but some cows produce well for eight or ten lactations. This means that about one-fourth of the herd must be replaced each year. Reproduction, superior breeding, and efficient calf-rearing are vital.

Cows can conceive only during an estrous period that occurs about every 21 days. Since bulls are seldom kept with cows, dairy operators must detect the estrous period and either artificially inseminate, or provide a bull for mating.

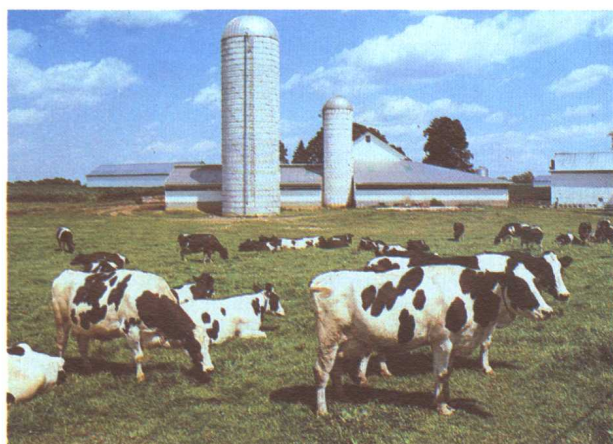
Artificial Insemination. By means of artificial insemination a cow can be impregnated with the semen of a superior bull that is not kept at the same dairy. Since semen can be diluted 100 times or more and can be frozen and stored for long periods in liquid nitrogen, genetic improvements can be made rapidly. Large bull studs have been developed, and progeny testing, a DHIA program, helps to identify superior sires. The DHIA published sire summaries that contain estimates of the ability of tested bulls to transmit to their female offspring the desirable traits of high yield of milk and milk fat.

WORLD MILK PRODUCTION

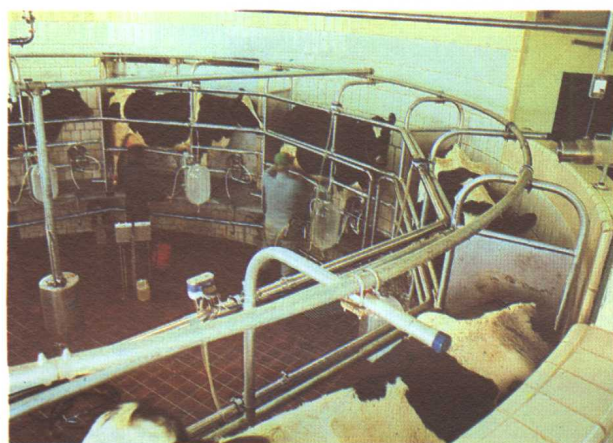
Yearly world milk production approximates 88,700,000 metric tons (97,774,000 U.S. tons). About 85% of it is produced in countries in the temperate zones. The USSR is the leading producer, followed by the United States. In quantity of milk produced, other major milk-producing countries rank in the following order: France, West Germany, Poland, Great Britain, Brazil, the Netherlands, Italy, India, East Germany, Canada, New Zealand, and Australia.

U.S. MILK MARKETING

In the United States, Wisconsin's yearly production of 9.21 million kg (20.2 million lb) of milk is almost double California's 5.25 million kg (11.5 million lb). New York (4.65 million kg/10.2 million lb), Minnesota (4.19 million kg/9.2



(Upper left) *Holsteins are the most productive dairy breed in the United States. (Lower left) The milking parlor provides efficiency and a sanitary environment. (Upper right) Strict regulations govern the processing of milk. It is tested upon its arrival at the plant and at various points throughout the process. (Lower right) Milk is conveyed by steel pipelines to packaging machines, where milk containers are filled and sealed.*



million lb), and Pennsylvania (3.41 million kg/7.5 million lb) are the other leading dairy states. Because the major area of surplus milk production in the United States is in the north-central states, milk tends to be transported toward the South. Tank trucks used to pick up milk at farms can carry approximately 10,000 kg (22,000 lb); those used for intermarket shipment may hold more than 22,000 kg (48,500 lb). Their insulated, stainless-steel tanks restrict temperature increases to 1°–2° C (1°–3° F) during a normal trip in hot weather.

Dairy owners may sell raw milk directly to private firms. More frequently, they market milk through their own cooperative organizations, which sell it to private firms for processing, or manufacture the finished products themselves. Dairy cooperatives are usually multistate in coverage and provide a strong voice for dairy owners through the Washington, D.C.-based National Milk Producers Federation, which represents a majority of milk producers and cooperatives in dealing with federal agencies on issues relating to the production, processing, importing, marketing, and pricing of milk.

Milk Pricing. The federal government, through the Department of Agriculture (USDA), seeks to assure the orderly marketing of raw milk. It purchases cheese, butter, and nonfat dry milk when necessary to increase prices of raw milk to the minimum values established by Congress in its price-support decisions. The USDA also works with local regulatory agencies and producer groups to write milk-marketing orders—regional prices to be paid to farmers for grade A raw milk. Milk to be sold to consumers in fluid form is priced higher than that to be made into butter, cheese, and less perishable products. The orders establish classes of milk, formulas for pricing, and a system for assuring proper testing procedures. Milk-marketing orders must be approved by dairy owners, but processors and consumers have a voice in their provisions through public hearings.

The level of federally established milk-price supports has been a sensitive political issue for some years and seems to be particularly vulnerable to lobbying pressures and payoffs. Prior to the 1972 election, a large milk cooperative is alleged to have given more than \$500,000 to Richard Nixon's campaign committee. Some leading politicians—among them, Hubert Humphrey and John Connally—were accused of accepting illegal campaign contributions from dairy associations. (Connally was indicted for accepting bribes, and he was acquitted in 1975). The dairy industry ranked second in the amount of campaign contributions given to fund the 1976 campaign: \$1.4 million. The industry's recorded donations to 1978 congressional campaigns, through their political action committee, the Associated Milk Producers Committee, totaled \$715,000, making the milk industry the ninth largest campaign contributor in that election year (see CAMPAIGN, POLITICAL).

ROBERT T. MARSHALL

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The name daisy is derived from an English corruption of "day's eye." Illustrated are the Dahlberg daisy, *Dyssodia tenuiloba* (left), and the true English daisy, *Bellis perennis* (right).

daisy

Daisy is the common name for many different members of the composite family, Compositae. The name originally referred to the English daisy, *Bellis perennis*, a Eurasian perennial seldom exceeding 15 cm (6 in) in height. Its flowers have yellow centers and white or rose outer petals. In the United States, daisy more often refers to *Chrysanthemum leucanthemum*, another Eurasian perennial that grows to 1 m (3 ft) high and bears flowers with yellow centers and white outer petals. Both species now grow wild in North America. Several other daisies are the prairie daisy, *Aphanostephus skirrhobasis*; Shasta daisy, *Chrysanthemum maximum*; and Spanish daisy, *Bellis rotundifolia*.

CHARLES L. WILSON

Daisy Miller

Daisy Miller (1878), a novelette by Henry JAMES, concerns a young American woman who intrigues and shocks the stuffy narrator of the story, Frederick Winterbourne. Winterbourne, an American, has become so Europeanized that he mistakes Daisy's naive social indiscretions and sweet coquetry for a lack of innocence. Daisy retains her innocence—until Roman fever (malaria) kills her. Had it not been for his conventionality and double standard, Winterbourne realizes, he might have returned her love.

ROBERT L. GALE

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Dakar [dah-kar']



Dakar, on the Cape Verde peninsula, is the westernmost city on the African mainland. The capital of French West Africa from 1902 to 1958, Dakar has been the capital of Senegal since 1960, when the country became independent.

Dakar (1975 est. pop., 667,000) is the capital city of SENEGAL in West Africa. It is located on the southern tip of the Cape Verde Peninsula, near the continent's westernmost point. Because of its location and good harbor (partly artificial), Dakar is an important African port, and its airport handles a large amount of intercontinental traffic. As capital of the former French West Africa, Dakar retains its French heritage in its pleasant physical layout. The city's name is derived from the Wolof word *dakhar*, meaning "tamarind tree."

Dakar has a tropical climate moderated by ocean winds. The average annual temperature is 25° C (77° F), and the average annual rainfall is 535 mm (21 in), most of which occurs from May to October.

The city's industries produce peanut products, textiles, fish products, leather goods, flour, and petroleum products. Because of its role as a transportation and industrial center (and former colonial administration center), Dakar is, for Africa, a wealthy city, with fine neighborhoods and impressive public buildings. The city also boasts several fine museums and the University of Dakar (1949). Dakar's African population is predominantly Muslim.

In 1677, the French occupied Gorée, an island near Dakar, but the mainland was not settled until the mid-19th century. In 1885 the first railroad in West Africa linked Dakar with the interior, and shipping (primarily peanuts) increased greatly. Dakar became the capital of French West Africa in 1904, of the Mali Federation in 1959, and of newly independent Senegal in 1961. Growth has been rapid since World War II.

Dakota: see SIOUX.

Daladier, Édouard [dah-lahd-yay', ay-dwar']

As leader of the dominant Radical party and premier three times during the 1930s, Édouard Daladier, b. June 18, 1884, d. Oct. 10, 1970, exercised a critical influence over French politics and international relations in the prewar and early World War II periods. His role at the MUNICH CONFERENCE reflected France's military weakness and presaged France's defeat in 1940.

Daladier, a school teacher, entered parliament in 1919 and served in French cabinets from 1924 on. Premier from January to October 1933, he assumed power again in January 1934, but resigned almost immediately, following right-wing riots in Paris that nearly toppled democracy in France. In 1936 Daladier was instrumental in bringing the middle-of-the-road Radical party into a coalition with the Socialists and Communists, although he later turned against Léon BLUM's Popular Front policies.

As premier again after April 1938, Daladier, under British pressure but perhaps grateful for Neville CHAMBERLAIN's lead, signed the Munich Pact on Sept. 30, 1938; he thus broke France's commitment to support the territorial integrity of Czechoslovakia. After the outbreak of war with Germany, Daladier proved increasingly autocratic, vacillating, and remote. Brought down (March 1940) by his failure to aid Finland effectively against Soviet attack, he was replaced by his rival Paul Reynaud. Arrested by the VICHY GOVERNMENT in September 1940, Daladier brilliantly defended his policies at the 1942 Riom trials. When he returned from imprisonment (1943-45) in Germany, he again led his party and served as a deputy (1946-58).

ELEANOR M. GATES

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Dalai Lama [dah'-ly lah'-muh]

Dalai Lama is the title of the religious leader of TIBETAN BUDDHISM, who was also, until 1959, temporal ruler of TIBET. Each Dalai Lama is believed to be the reincarnation of his predecessor. When one dies, the new incarnation is sought among newly born boys; the child is identified by his ability to pick out possessions of the former Dalai Lama from a group of similar objects. The Dalai Lama is also regarded as an emanation of the BODHISATTVA Avalokitesvara.

The first Dalai Lama was Gan-den Trup-pa (1391-1474), head of the dominant Ge-luk-pa (Yellow Hat) monastic sect and founder of the Tashi Lhunpo monastery. He and his successor, however, did not actually bear the title *Dalai*, which was first bestowed on the third Dalai Lama (1543-88) by a Mongol prince in 1578 and applied retroactively. The 14th Dalai Lama was installed in 1940. In 1959, following an abortive Tibetan revolt against Chinese Communist rule, he fled Tibet for India. The Panchen Lama, traditionally the secondary spiritual leader, then served as nominal ruler of Tibet until 1964.

Bibliography: Berber, Noël, *From the Land of the Lost Continent* (1969); Dalai Lama, *My Land and My People* (1962); Richardson, Hugh, *A Short History of Tibet* (1962).

Dalcroze, Émile Jaques [dahl-krohzh']

Émile Jaques Dalcroze (or Émile Jaques-Dalcroze), b. July 6, 1865, d. July 1, 1950, was a Swiss composer, music teacher, and originator of the system of rhythmic education known as EURHYTHMICS. He studied composition with Anton Bruckner in Vienna and with Léo Delibes and Gabriel Fauré in Paris and in 1892 joined the faculty at the Conservatory of Music in Geneva. Dissatisfaction with current teaching methods prompted his experiments based on the theory that the source of musical rhythm is in the body.

In 1910 Dalcroze established his own school at Hellerau, Germany, dedicated to the expression of rhythm in music, dance, and theater. Other centers soon opened in London, Paris, Vienna, Stockholm, and New York City. Dalcroze continued his work at Hellerau until World War I; he moved (1914) to Geneva where he taught until his death. Although Dalcroze was primarily a musician, his theories combining movement and music have had great influence on theater, MODERN DANCE, BALLET, and physical therapy.

BARBARA BARKER

Bibliography: Jaques-Dalcroze, Émile, *Eurhythmics, Art and Education*, trans. by Frederick Rothwell (1930), and *Rhythm, Music and Education*, rev. ed., trans. by Harold F. Rubinstein (1967).

Dale, Sir Henry Hallett

Sir Henry Hallett Dale, b. June 9, 1875, d. July 22, 1968, was a British pharmacologist who helped establish the role of ACETYLCHOLINE in the transmission of nerve impulses. Dale isolated (1914) acetylcholine from the rye fungus ERGOT. He later recognized that acetylcholine was the chemical that researcher Otto Loewi had shown to be released by the vagus nerve. Dale subsequently demonstrated that acetylcholine is released from some nerve endings and is, in fact, one of the chemical messengers that carries an impulse from one nerve to another. For their work Dale and Loewi shared the 1936 Nobel Prize for physiology or medicine.

Bibliography: Singer, Charles, and Underwood, E. A., *A Short History of Medicine* (1962); Feldberg, W. S., "Henry Hallett Dale" in *Biographical Memoirs of Fellows of the Royal Society*, vol. 16 (1970).

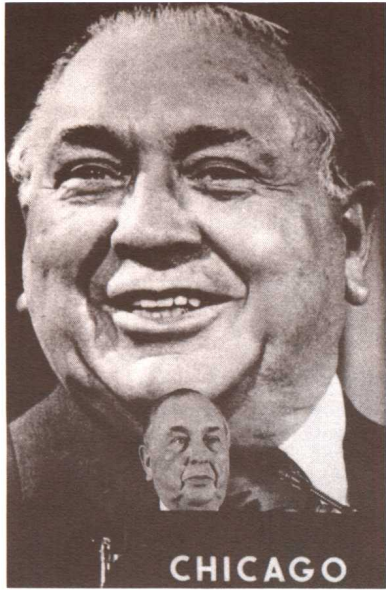
Daley, Arthur

Arthur John Daley, b. July 31, 1904, d. Jan 3, 1974, was, from 1942 until his death, author of the "Sports of the Times" column in *The New York Times*, for which he won a 1956 Pulitzer Prize. His other awards include the 1961 Grantland Rice Memorial Award for outstanding sportswriting. Daley joined the *Times* as a sports reporter in 1926 and wrote six books, including *Sports of the Times* (1959) and *Pro Football's Hall of Fame* (1963).

MICHAEL EMERY

Daley, Richard J.

The American politician Richard Joseph Daley, b. May 15, 1902, d. Dec. 20, 1976, served as Democratic mayor of Chicago from 1955 to 1976. He was considered the last of the old-time big city political bosses. Daley was admitted to the



Richard Daley, an American public official, served continuously as mayor of Chicago from 1955 until his death in 1976. His machine-based administration was noted for its efficiency. Daley became the focus of national attention during the 1968 Democratic party convention, held in Chicago, when his city's police battled with antiwar demonstrators.

Dalhousie, James Andrew Broun Ramsay, 1st Marquess of [dal-how'-zee]

Lord Dalhousie, b. Apr. 22, 1812, d. Dec. 19, 1860, governor-general of India from 1847 to 1856, laid the foundations for direct British rule. He served as president of the Board of Trade (1845-46) before going to India in 1848.

Dalhousie instituted a policy of expansion of British control in India. He annexed Punjab (1849) by force and lower Burma (1852) through aggressive diplomacy. He also practiced the "doctrine of lapse," annexing several states including Satara, (1848), Jaipur and Sambalpur (1849), and Nagpur (1854), whose rulers had died without heirs.

In 1856 Dalhousie took over Oudh on the ground that it had been misgoverned, thus helping to precipitate the INDIAN MUTINY of 1857. Dalhousie's changes, which in effect dismantled the system of government developed by the British East India Company, were preserved under the system of direct rule by the British crown instituted in 1858. Dalhousie was also responsible for social reforms and the construction of India's first railroad.

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See also: INDIA, HISTORY OF.

Dalhousie University

Established in 1818, Dalhousie University (enrollment: 10,550; library: 840,000 volumes) is a private institution in Halifax, Nova Scotia, Canada, with a wide range of undergraduate, graduate, and professional programs. It shares facilities with, and awards degrees to, certain graduates of three schools in Halifax: University of King's College (1789), Mount Saint Vincent University (1925), and Nova Scotia Technical College (1909).

Dalí, Salvador [dah-lee']



Salvador Dalí's surrealist Chromosome of a Highly Colored Fish's Eye Starting the Harmonious Disintegration of the Persistence of Memory (1952-54) uses illusionistic techniques and takes ordinary objects out of their expected settings, distorting them and combining them in unusual juxtapositions. The melting watches in this painting are taken from Dalí's 1931 surrealist masterpiece The Persistence of Memory.

bar in 1933 and rose through the ranks of the Cook County (Chicago) Democratic club, serving in the state legislature from 1936 to 1946. After being elected mayor, he quickly consolidated his power and ruled Illinois Democratic politics virtually single-handedly for the rest of his life. His support was avidly sought by Democrats aspiring to the presidential nomination. In 1968 he was widely criticized for his use of the police in brutally putting down the anti-Vietnam War protesters at the Democratic National Convention, held in Chicago.

Bibliography: Kennedy, Eugene, *Himself: The Life and Times of Mayor Richard J. Daley* (1978); Royko, Mike, *Boss* (1971).

The Spanish painter Salvador Dalí, b. May 11, 1904, was a leader of SURREALISM. He studied (1921-26) at the San Fernando Academy of Fine Arts in Madrid and associated with such future Spanish modernists as Federico GARCÍA LORCA and Luis BUÑUEL; his early work was influenced by the Italian futurists, particularly Carlo CARRÀ, and later by the metaphysical paintings of Giorgio de CHIRICO. Dalí, however, has pointed to his inbred Catalan sense of fantasy and his megalomania as the true motivating forces in his work.

Moving to Paris, he frequented the Café Cyrano, the headquarters of the Parisian surrealists, and in 1929 first exhibited his own surrealist paintings. He studied the writings of Sigmund Freud and subsequently declared an ambition to "systemize confusion." Such paintings as *Persistence of Memory*, popularly known as *Soft Watches* (1931; Museum of Modern Art, New York City), and *The Sacrament of the Last Supper* (1955; National Gallery, Washington, D.C.) have become widely known and part of the definitive record of 20th century art. Displaying an early technical virtuosity, Dalí has worked in several media, including jewelry, advertisements, beer-bottle design, and ballet sets and costumes, and, in collaboration with Buñuel, the famous surrealist films *Un Chien andalou* (An Andalusian Dog, 1928) and *L'Age d'or* (The Age of Gold, 1931). His personal eccentricities—flowing capes, handlebar mustache, and popping eyes—have made him recognized around the world.

Bibliography: Dalí, Salvador, *Diary of a Genius*, trans. by Richard Howard (1965); Descharnes, Robert, *Dalí*, trans. by Eleanor Morse (1976); Morse, A. Reynolds, *Salvador Dalí* (1966).

Dalín, Olof von [dah-leen']

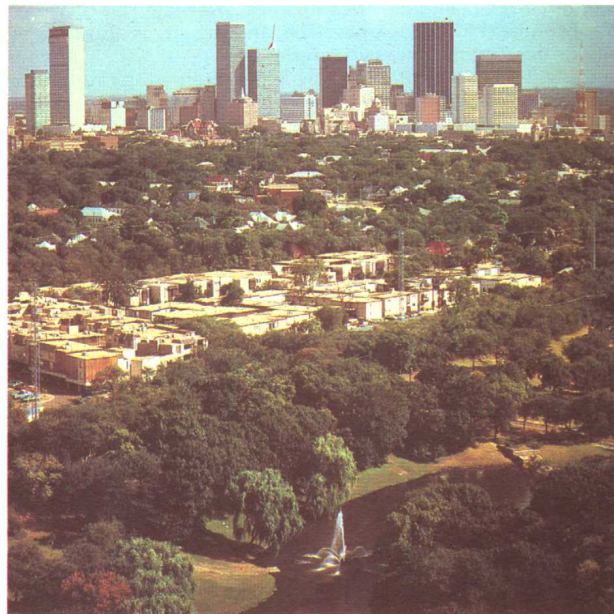
Olof von Dalin, b. Aug. 29, 1708, d. Aug. 12, 1763, a journalist, historian, and poet, is known as the chief exponent of the Swedish Enlightenment. His first literary effort—a satirical weekly called *Then Swänska Argus* (The Swedish Argus, 1732-34) whose style reflected the casual approach taken by Joseph Addison and Sir Richard Steele in England—introduced a new, less stilted form of Swedish prose. He also contributed to popularizing the French classical style in Sweden. Dalin's most successful work, *Tale of the Horse* (1740), was a satirical allegory dealing with the Swedish monarchy and people. He became royal librarian in 1737 and tutor to the crown prince in 1750. Greatly favored by Queen Lovisa Ulrika, he ended his career as royal chancellor in 1763. The author of indifferent plays and the patriotic poem *Swenska friheten* (Swedish Liberty, 1742), Dalin also produced a large volume of incidental poetry and an iconoclastic history of Sweden (3 vols., 1747-62).

Dallapiccola, Luigi [dahl-lah-pik'-koh-lah]

Luigi Dallapiccola, b. Feb. 3, 1904, d. Feb. 19, 1975, was one of Italy's most significant avant-garde composers. During World War II he was persecuted by the Italian government because, although he was a devout Catholic, his wife was Jewish. This experience profoundly influenced his life and music. In 1939 he adopted the TWELVE-TONE SYSTEM of composing, using it, however, in his own way. Dallapiccola's music is imbued with humane values, particularly when it deals with the subjects of freedom and human suffering, as in the choral works *Songs of Captivity* (1938-41) and *Songs of Liberation* (1955) and the opera *The Prisoner* (1944-48). His style is a compound of Italianate lyricism and deep expressiveness and is characterized by clarity of texture and formal lucidity. His writing for voices and instrumental ensemble in a difficult modern idiom is masterly. Dallapiccola gave master classes at the Berkshire Music Center in Massachusetts (1951-52) and taught at Queens College in New York (1956-57, 1959-60) and at the University of California, Berkeley (1962-63). His other works include *Variations for Orchestra* (1954), *Christmas Cantata* (1957), the opera *Ulysses* (1969), and *Sicut umbra* for mezzo-soprano and 12 instruments (1970).

DAVID EWEN

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The skyscrapers of downtown Dallas, the second largest city in Texas after Houston, provide an impressive contrast to the forested area of nearby Turtle Creek Park. The city's rapid expansion since World War II is largely a result of its status as an important center of the electronics, aerospace, and other high-technology industries.

Dallas

Dallas is the seat of Dallas County and the second largest city in Texas. Located on the flat prairies in the northeastern part of the state, it sprawls on both sides of the Trinity River. Dallas has an area exceeding 775 km² (300 mi²) and a population of 904,078 (1980). Although the topography of the area is gentle, the original site of the city was chosen primarily for its proximity to good spots for crossing the river and the adjacent low cuesta (ridge). The area has generally mild winters—with occasional intrusions of cold, continental air from the northern plains—and long, hot summers. The January average temperature is 8° C (46° F); the July average, 29° C (85° F). The annual precipitation of about 915 mm (36 in) is distributed through the year.

One of the fastest-growing cities in the country, Dallas has experienced a great deal of urban sprawl in recent years. The population of the 11-county combined metropolitan area of Dallas and nearby FORT WORTH is 2,974,878 (1980). Nearly 30% of the population of Dallas are black, and 12% are of Hispanic origin.

Dallas is a good example of a gateway city, serving as a funnel through which goods, services, people, and, ultimately, ideas are channeled to its hinterland and through which regional goods flow outward to the nation. Its gateway function is indicated by the quantity of wholesale business, the concentration of insurance companies and financial institutions, the large number of national and regional corporate headquarters and state and U.S. government departmental offices, and the daily passenger flow through the Dallas-Fort Worth Regional Airport. Although commerce and finance dominate the Dallas economy, manufacturing has rapidly increased in recent years, particularly in the aerospace, petroleum, electronics, food-processing, and apparel industries.

Dallas is also a center of the region's cultural and educational activities. Educational institutions include Southern Methodist University (1911), University of Dallas (1955), Bishop College (1881), Baylor University School of Dentistry (1905), and University of Texas Health Science Center (1943). Prominent cultural institutions include the Museum of Fine Arts, Margo Jones Memorial Theater, Dallas Theater Center (1959), Dallas Symphony (1900), Dallas Civic Opera (1957),

and other opera and ballet companies. The State Fair of Texas has been held in Dallas since 1886, and the city is also the site of the Cotton Bowl stadium.

Dallas's first settler, John Neely Bryan, built a log cabin near the Trinity River in 1841. Five years later a village was laid out and a county organized; both were named for George Mifflin Dallas, then vice-president of the United States. The town was incorporated in 1856 and a city charter granted in 1871. Dallas was a supply center for Southern troops during the Civil War. Most of its pre-World War II development was a result of its position as a commercial center for a succession of businesses—railroads in the 1870s; cotton; oil after the east Texas oilfield was discovered in 1930; and insurance. President John F. Kennedy was assassinated in Dallas on Nov. 22, 1963.

TOM MCKNIGHT

Dallas, George Mifflin

George Mifflin Dallas, b. July 10, 1792, d. Dec. 31, 1864, was U.S. vice-president (1945-49) under James K. POLK. He was the son of Alexander J. Dallas (1759-1817), who had been secretary of the treasury (1814-16). A Democrat, Dallas held various local offices in Pennsylvania before serving in the U.S. Senate (1831-33) and as minister to Russia (1837-39). As vice-president he presided over the Senate debates on the Mexican War and the Wilmot Proviso. Dallas was later minister to Great Britain (1856-61). He secured an agreement clarifying Britain's role in Central America and a disavowal of Britain's traditional claim to the right of searching at sea the ships of other nations.

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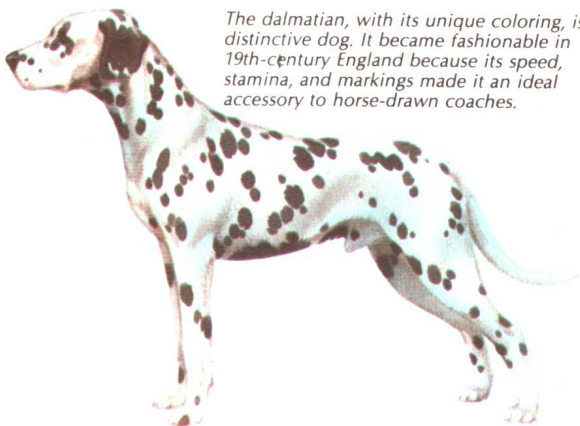
Dalmatia [dal-may'-shuh]

Dalmatia, a coastal region along the Adriatic Sea, is a province of CROATIA, one of the constituent republics of Yugoslavia. It extends from the Albanian border on the south to ZADAR on the north and includes many offshore islands.

Mountains rise abruptly from the sea, and the coast is dotted with inlets and bays. The Dinaric Alps separate Dalmatia from Bosnia and Hercegovina to the east. The mean annual temperature ranges from 10° to 16° C (50° to 60° F), and the annual precipitation ranges from 500 to 1,020 mm (20 to 40 in).

Dalmatia has a population of 500,000 (1971 est.). DUBROVNIK, SPLIT, and Zadar are the principal cities. Tourism has grown rapidly and is now of major economic importance. Wine is the major produce, and some olives and vegetables are also grown. Much hydroelectric power is produced from the swift rivers flowing down from the mountains.

dalmatian



The dalmatian, with its unique coloring, is a distinctive dog. It became fashionable in 19th-century England because its speed, stamina, and markings made it an ideal accessory to horse-drawn coaches.

The dalmatian is a shorthaired dog with distinctive black or deep-brown (liver-colored) spots on a white coat. It ranges in size from 48 to 58.5 cm (19 to 23 in) high at the shoulders and weighs about 25 kg (55 lb). The breed is believed to have

originated in Dalmatia, now a part of Yugoslavia, where it was used as a general-purpose hunting dog. In the mid-1800s the breed was brought to England, where it became known as a carriage dog because it was trained to trot alongside a horse and carriage or sit beside the driver. This association led to its fame as a firehouse dog in the United States, where it accompanied the firemen and their horse-drawn fire engines.

JOHN MANDEVILLE

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Dalou, Aimé Jules [dah-loo']

Aimé Jules Dalou, b. Dec. 31, 1838, d. Apr. 15, 1902, was a French sculptor best known for his *Triumph of the Republic* in the Place de la Nation, Paris. On the advice of Jean Baptiste CARPEAUX, Dalou studied (1852) drawing at the Petite École (the future École Nationale des Arts Décoratifs) and later entered the École des Beaux-Arts (1854-57). Although Dalou began exhibiting at the Salon in 1861, he earned his living by creating ornamental and decorative sculpture for the large private houses built during the Second Empire. A participant in the Commune of Paris, Dalou fled to England after the Commune's defeat (1871) and found there an appreciative audience in London for his portraits and genre pieces. After his return (1879) to Paris, Dalou worked for 20 years on the *Triumph of the Republic*, which was unveiled in 1899.

PHILIP GOULD

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Dalton, John



John Dalton, a British chemist and physicist, developed the atomic theory, which postulates that all elements are composed of particles, or atoms, identical in size and weight. Among Dalton's other achievements was the publication in 1794 of a paper containing the first description of color blindness, an optical condition he suffered from, which is sometimes called Daltonism.

The English teacher, chemist, and physicist John Dalton, b. Sept. 6, 1766, d. July 27, 1844, is best known for developing the ancient concept of ATOMS into a scientific theory that has become a foundation of modern chemistry. He considered himself primarily a teacher and earned his living by teaching and lecturing until 1833, when he was awarded an annual civil pension. A self-taught experimenter, he devised simple but effective apparatus for his well-planned tests. Although authors have emphasized the crudeness of his results, many of his data are remarkably accurate.

Throughout his life Dalton was interested in the Earth's atmosphere, and he recorded more than 200,000 atmospheric observations in his notebooks. These observations led Dalton to study gases, and from the results of his experiments he was able to formulate his atomic theory. In a book on meteorology, he concluded that the aurora borealis is a magnetic phenomenon; he also explained the condensation of dew and gave a table of vapor pressures of water at various temperatures. Dalton was the first to publish the generalization that all gases initially at the same temperature expand equally on going to the same higher temperature. His law of partial pressures was included in a paper (1803) on gas solubilities.

Dalton's atomic theory was expressed in public lectures in 1803, and later in his *New System of Chemical Philosophy* (1808). Many scientists, including William HIGGINS, had considered matter to be made of atoms, but Dalton provided a model from which definite predictions could be made. This theory incorporated additional features that have since been discarded, but the realization that each atom has a characteristic mass and that atoms of elements are unchanged in chemical processes has served chemists to the present day.

RALPH GABLE

Bibliography: Cardwell, D. S. L., ed., *John Dalton and the Progress of Science* (1968); Greenaway, F., *John Dalton and the Atom* (1966); Paterson, E., *John Dalton and the Atomic Theory* (1970).

See also: CHEMISTRY, HISTORY OF.

Dalton Plan

The Dalton Plan is an educational system in which students accept as individualized contracts the work assigned to them. These contracts are actually monthly assignments. Students work at their own rates and do not depend on close guidance from their teachers, although they confer individually with the teachers. The plan is named for the Dalton, Mass., high school where Helen Parkhurst devised and, from 1913, perfected it.

Dalton's law

Dalton's law, named for the English chemist John DALTON (1766-1844), states that the pressure exerted by a gaseous mixture is equal to the sum of the partial pressures of its components. The partial pressure of a gas is the pressure it would exert if it alone occupied the entire volume of a mixture. Dalton's law applies only to ideal gases, but it holds closely enough for real gases. For example, if water is introduced into a closed container of dry air, some water will evaporate, and the pressure within the container will increase by an amount approximately equal to the partial pressure of the water vapor. Dalton's law is used in chemistry and thermodynamics to study the properties of gaseous mixtures. A practical application is the selection of artificial breathing mixtures for divers and astronauts.

GERALD C. ROPER

See also: GAS LAWS.

Daly, Augustin

John Augustin Daly, b. Plymouth, N.C., July 20, 1838, d. June 7, 1899, was an American playwright and theater manager who wrote and adapted about 90 plays. These include *Leah the Forsaken* (1862), about anti-Semitism; *Under the Gaslight* (1867), a melodrama; and *Horizon* (1871), a frontier drama. Many of the great stars of the age appeared in theaters that Daly managed after 1869 in New York and London. He disapproved, however, of the star system and emphasized ensemble performances and stage realism. Premieres of his productions were considered major social events.

MYRON MATLAW

Bibliography: Felheim, Marvin, *The Theater of Augustin Daly* (1956).

Daly, Marcus

Marcus Daly, b. Dec. 5, 1841, d. Nov. 12, 1900, founded the Anaconda Copper Mining Company. While prospecting in the West he discovered (1876) what he believed to be a silver mine at Butte, Mont. He formed a company to work the mine, but the silver gave out. When the site proved to be rich in copper, he bought out neighboring silver mines, built a smelter, and soon became a multimillionaire. He founded the city of Anaconda, Mont., and acquired banks, power plants, irrigation systems, railroads, and timberlands. Powerful in the Democratic party, he supported William Jennings Bryan in the 1896 presidential election.

dam

A dam is a barrier built across a water course to hold back or control the water flow. Dams may be classified according to the functions they serve, and in general terms, a dam is either

a storage, diversion, or detention dam. Storage dams are constructed to impound water in periods of surplus supply for use in periods of deficient supply. For example, many small dams impound the spring runoff for later use in the summer dry season. In addition, storage dams may provide a WATER SUPPLY, or an improved habitat for fish and wildlife; they may store water for use in HYDROELECTRIC POWER generation, or for IRRIGATION; or they may be units in a flood control project (see FLOODS AND FLOOD CONTROL).

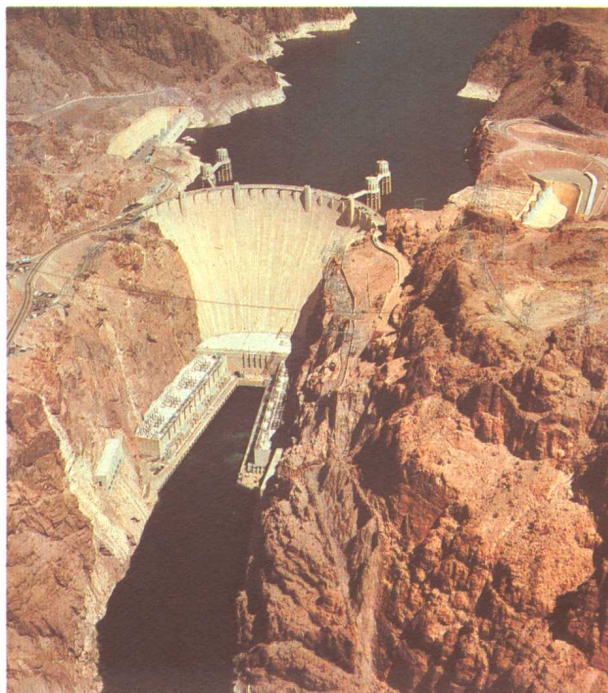
The specific purpose to be served by a storage dam will influence its design and determine the amount of reservoir storage needed. Where multiple purposes are involved—where, for instance, a dam stores water both for power and for irrigation—a reservoir allocation is usually made for each of the separate uses. The volume of storage, in turn, establishes the height and width of the dam.

Diversion dams are ordinarily constructed to provide sufficient water pressure for carrying water into ditches, canals, or other conveyance systems. Such dams, which are generally shorter than storage dams, are used for irrigation developments, and for diversion from a stream to a distant storage reservoir. Detention dams are constructed to minimize the effect of sudden floods and to trap sediment.

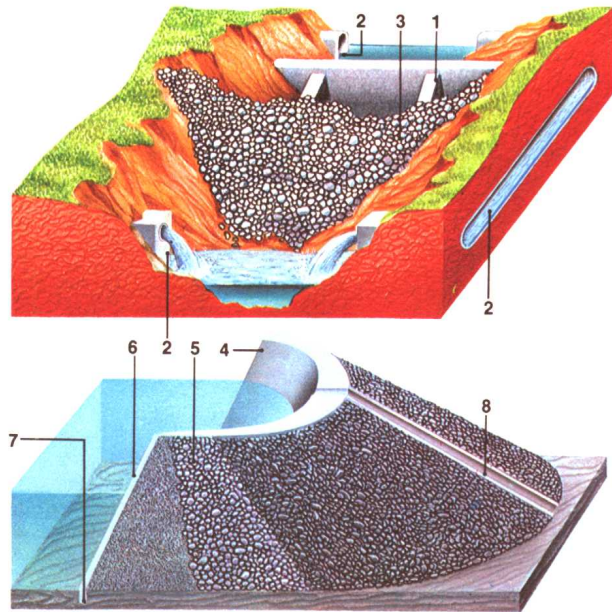
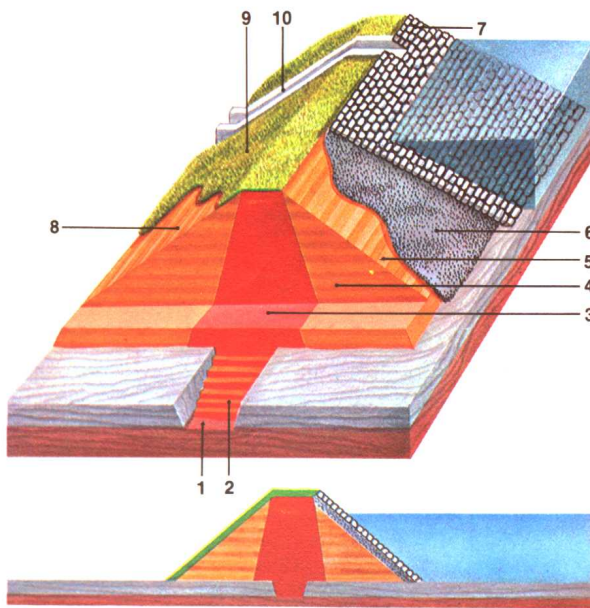
OVERFLOW AND NONOVERFLOW DAMS

Overflow dams are designed to carry water discharge over their crests, and they must be made of materials that will not be eroded by such discharges. Nonoverflow dams are those designed not to be overtopped, and they may include earth and rock in their structure. Often the two types are combined to form a composite structure consisting of, for example, an overflow concrete gravity dam with dikes of earthfill construction.

Spillways. In order to prevent a dam from being overtopped, spillway structures are designed to carry off excess water. In earthfill dams, with crests that cannot survive overtopping, spillways are essential and are usually built as separate structures—often a shaft or tunnel adjacent to the dam. With concrete gravity dams, the downstream side of the structure acts as the spillway.

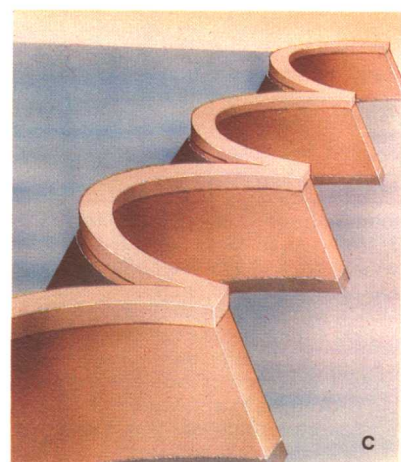
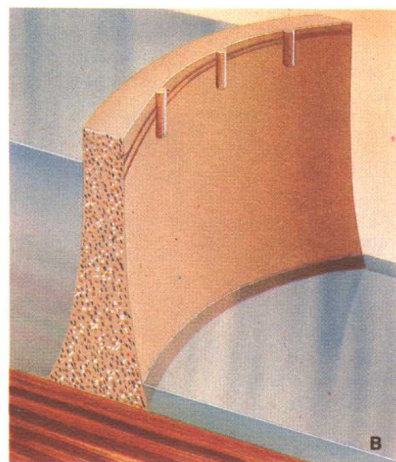
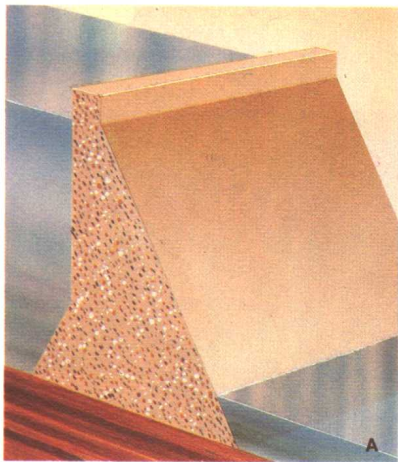


Hoover, or Boulder, Dam on the U.S. Arizona-Nevada border is the tallest (221 m/725 ft) arch-gravity dam in the Western Hemisphere. A major hydroelectric power producer, it backs up the Colorado River to form Lake Mead, one of the largest artificial lakes in the world.



(Above) An earth-filled dam is begun by digging a trench (1) in a firm bedrock foundation and laying down an initial waterproof layer of compressed clay. Successive layers of compacted clay are laid until the trench is filled (2). A broad-based core (3) of compressed clay is built on this foundation to above high-water level and is supported on both sides with earth (4). The upstream slope (5) is covered with gravel (6) and surfaced with rock slabs (7). The downstream slope (8) is turfed (9), and a spillway (10) is added to handle overflow during a flood.

In building a rock-filled or any other dam, a temporary, or coffer, dam is constructed (1), and the river is diverted around the dam site through tunnels (2) in the riverbank. The area behind the coffer dam is then filled with an inclined layer of thoroughly compacted rocks (3). The steep, concave upstream face (4) is covered with carefully graded crushed rock (5) and then with a layer of impervious material (6), which is grouted into the bedrock (7) to prevent seepage under the dam. Finally, a spillway (8) is added to the downstream slope.



The three basic types of concrete dams are gravity, arch, and buttress dams. The gravity dam (A) is the most commonly built, and relies primarily on its great weight to withstand the tremendous pressure of the water that it holds back. The arch dam (B) is usually built in a narrow canyon and is curved into the flow of water, so that the water pressure is transferred to the canyon walls. The buttress dam (C) usually consists of a series of 45° sloping arches on the upstream side and supporting concrete buttresses on the downstream side. The slanting arches and buttresses transmit the water pressure to the foundations. Sometimes, flat concrete slabs are used instead of arches.

DAM DESIGN AND STRUCTURE

The most common classification of dams is based on the materials used in their structure and on their basic design.

Earthfill Dams. The development of modern excavating, hauling, and compacting equipment for earth materials has made massive earthfill dams economical. The Nurek Dam in the USSR, the world's highest dam, is an earthfill structure. Pakistan's Tarbela Dam, the world's largest dam, by volume of water held, is also an earthfill structure.

Earthfill dams typically have a water-impermeable clay core, and a water cut-off wall from their base to bedrock to prevent underground seepage. During construction, the stream or river must be diverted either through the damsite by

means of a conduit, or around it by means of a tunnel.

Earthfill dams require supplementary structures to serve as spillways for discharging water from behind the dam. If sufficient spillway capacity is not provided, an earthfill dam may be damaged or even destroyed by the erosive action of water flowing over its crest. Unless special precautions are taken, such dams are also subject to serious damage or even failure, due to water seepage through or under the dam (see TETON DAM). The rockfill dam, essentially an embankment like the earthfill dam, uses rock instead of earth to provide stability. It has an impervious, watertight membrane, usually an upstream facing of impervious soil, concrete paving, or steel plates; or it may have a thin interior core of impervious soil.