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E—Eye

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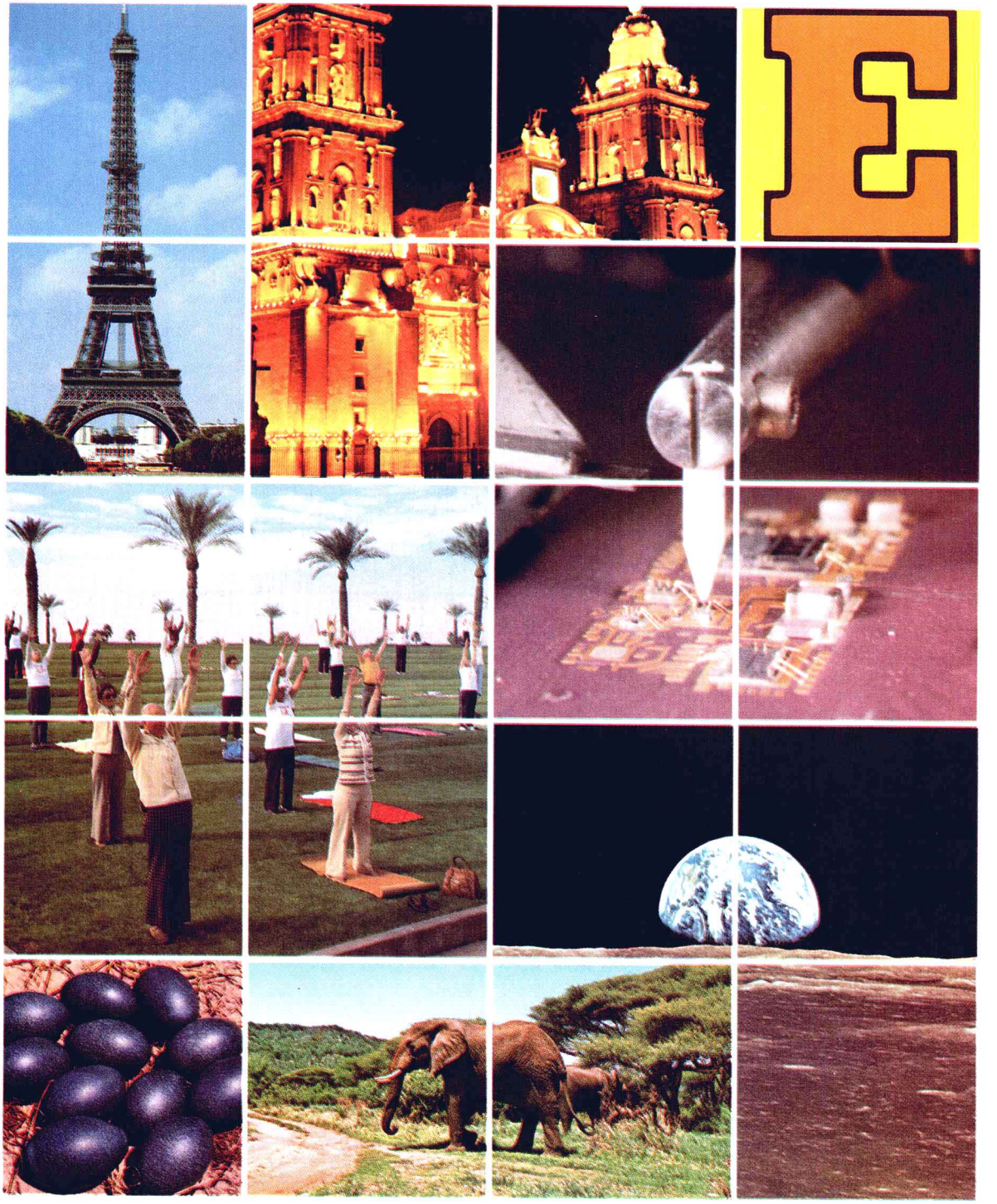

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EXPLORING VOLUME 7

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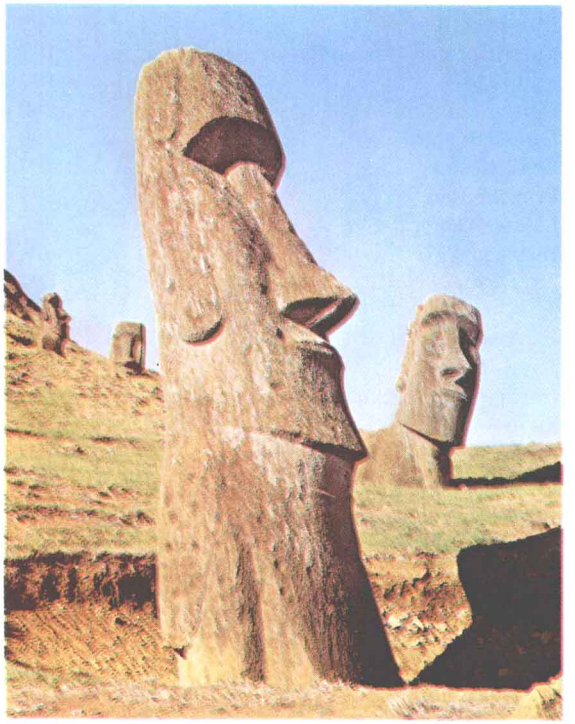

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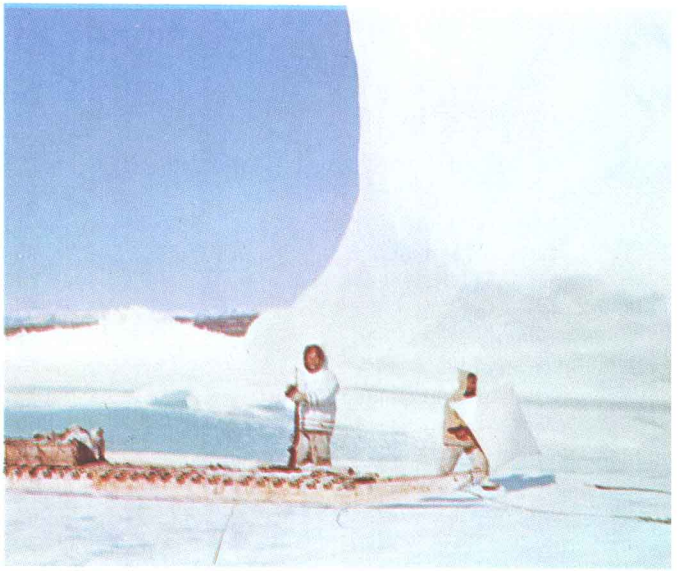
Canadian Government Travel Bureau



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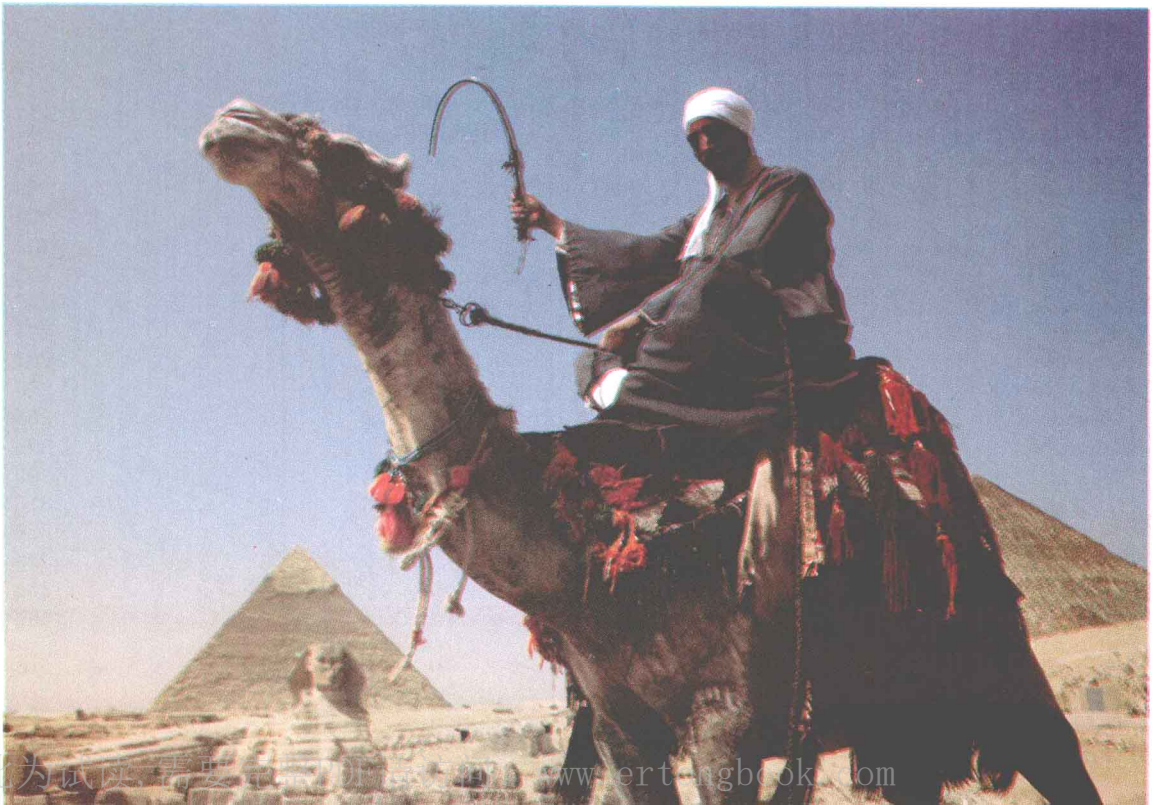

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By courtesy of the trustees of the British Museum

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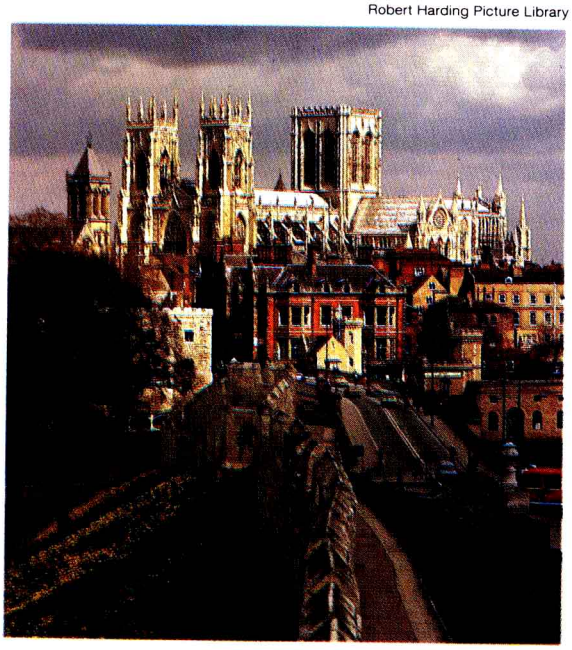
A. C. Cooper Ltd.

Robert Harding Picture Library



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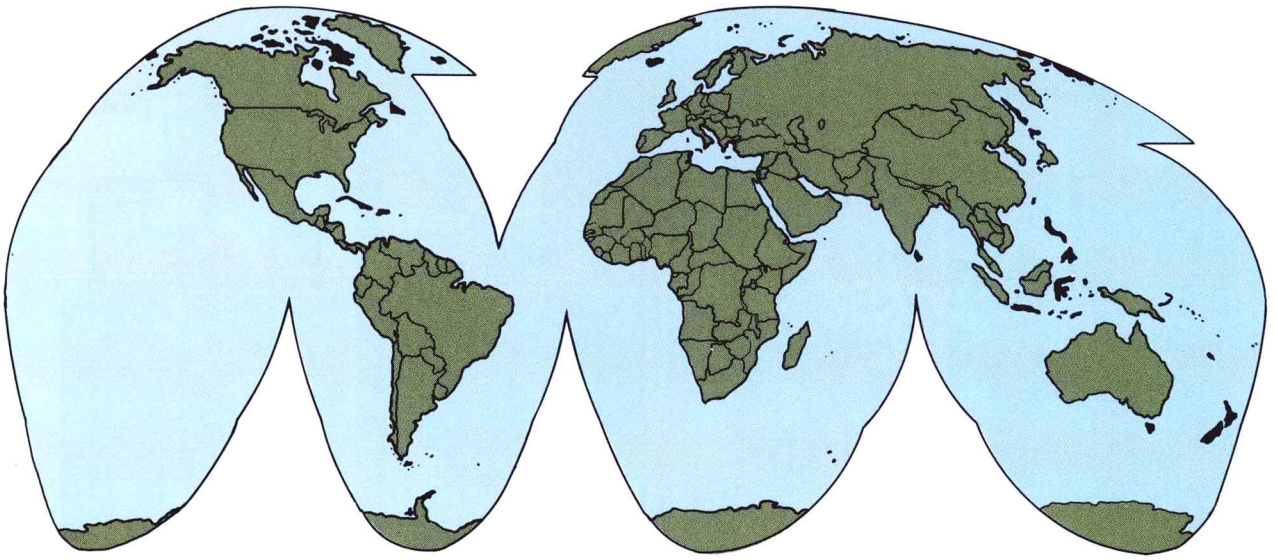

HERE AND THERE IN VOLUME 7

From the A-1 satellite to the zygote cell, thousands of subjects are gathered together in Compton's Encyclopedia and Fact-Index. Organized alphabetically, they are drawn from every field of knowledge. Readers who want to explore their favorite fields in this volume can use this subject-area outline. While it may serve as a study guide, a specialized learning experience, or simply a key for browsing, it is not a complete table of contents.

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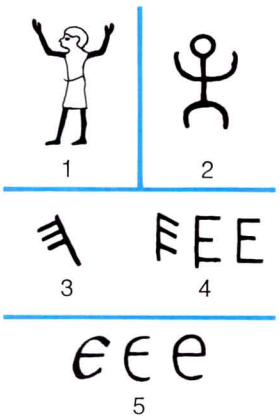
The letter E

may have started as a picture sign of a man with arms upraised, as in Egyptian hieroglyphic writing (1) and in a very early Semitic writing used about 1500 B.C. on the Sinai Peninsula (2). The sign meant "joy" or "rejoice" to the Egyptians. About 1000 B.C., in Byblos and in other Phoenician and Canaanite centers, the sign was given a linear form (3), the source of all later forms. The sign was called *he* in the Semitic languages and stood for the sound "h" in English.

The Greeks reversed the sign for greater ease in writing from left to right (4). They rejected the Semitic value "h" and gave it the value of the vowel "e." They called the sign *epsilon,* which means "short e."

The Romans adopted this sign for the Latin capital E. From Latin this form came unchanged into English. The handwriting of Graeco-Roman times changed the letter to a more quickly written form (5). From this is derived the English handwritten and printed small "e."



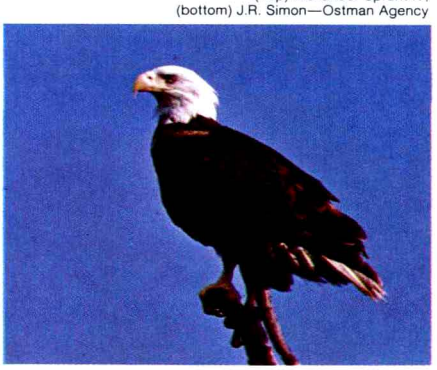
EADS, James B. (1820–87). The best-known achievement of James B. Eads was the construction of the steel triple-arch bridge in Saint Louis, Mo. The Eads Bridge was the largest bridge of any type built up to that time, and it was considered a landmark in engineering. Eads pioneered the use of structural steel, planted the foundations of the bridge at record depths, and used a cantilevering technique of his own design to raise the arches. (*See also* Bridge, "Modern Arch Bridges.")

James Buchanan Eads was born in Lawrenceburg, Ind., on May 23, 1820. He was named for a cousin of his mother, the Pennsylvania Congressman who later became the 15th president of the United States. Eads had little formal education. He taught himself through reading books. At 18 he went to work on a Mississippi riverboat. His interest in the river led him to devise a means of salvaging cargoes from riverboat disasters. From age 22 he worked at this task and made a fortune. He left the river 12 years later and started a glass factory. This enterprise eventually failed, and Eads went back into the salvage business.

When the Civil War began, he built for the North a fleet of steam-powered ironclad ships that could navigate in the shallow waters of the Mississippi River. These significantly aided the North in keeping control of the river. After the war Eads was given the contract to build the St. Louis bridge. Work began on Aug. 20, 1867. The bridge was to be in three spans, 502, 520, and 502 feet (153, 158, and 153 meters) long. Steel, subject to his rigorous standards, was bought from Andrew Carnegie's steel company. The bridge was officially opened on July 4, 1874.

Eads's other major project was to provide a year-round shipping channel in the Mississippi at New Orleans. He finished it in 1879. He also proposed building a railway across the isthmus of Tehuantepec in Mexico as an alternative to the Panama Canal. This project was rejected, however. While at Nassau in the Bahamas, Eads died on March 8, 1887.

(Top) Alexander Sprunt IV; (bottom) J.R. Simon—Ostman Agency



The bald eagle (top) serves as a United States symbol and is protected in all states. The golden eagle (bottom) is the national bird of Mexico.

EAGLE. Because of the eagle's majestic appearance and power of flight, it has been called the "king of birds." Since ancient times it has been a symbol of strength and courage. The Sumerians chose the "spread eagle" as their emblem of power 5,000 years ago. So did imperial Rome many centuries later.

The American bald eagle was chosen by Congress in 1782 as the emblem of the United States. On the national seal the bird is shown with its wings spread, holding an olive branch in one claw and arrows in the other. On coins, military insignia, and other devices, the eagle appears in a variety of postures.

Only two species of eagles are found in North America—the bald and the golden. The more common bald eagle has white tail feathers and white plumes on the head and neck. Early colonists, used to the gray sea eagle of Europe, called these birds "bald-headed." (Bald originally meant "white.") The female is fiercer than the male and is several inches larger. A sea eagle, the bald eagle migrates only if the body of water that it normally fishes freezes. It returns each year to the same nest, called an aerie, with the same mate. The golden eagle, a magnificent bird, is more common in the Old World than in the New, but it is found in the western part of North America from Mexico to Alaska. It is somewhat larger than the bald eagle, and its plumage is darker except for tawny feathers on its head and neck that shimmer like gold. The bald eagle has bare "ankles," whereas the legs of the golden eagle are feathered to the toes. The golden eagle builds its huge nest on a high mountain crag.

Eagles are birds of prey, related to vultures, hawks, and falcons (*see* Birds of Prey). The scientific name of the bald eagle is *Haliaetus leucocephalus;* the golden eagle, *Aquila chrysaetos.* The common eagle of Europe is the white-tailed sea eagle, *Haliaetus albicilla.*

EAKINS, Thomas (1844–1916). As has been true for so many great artists, the work of Thomas Eakins was not appreciated in his lifetime. No museum bought one of his paintings until 1916, the year he died. Nor was there a major exhibition of his work until a year later. Today he is considered one of the masters of American realism.

Thomas Eakins was born on July 25, 1844, in Philadelphia, the city where he would spend most of his life. He studied at the Pennsylvania Academy of Fine Arts, and, because of his special interest in painting the human figure, he attended lectures in anatomy at Jefferson Medical College. From 1866 to 1869 he

studied in Paris at the École des Beaux-Arts (School of Fine Arts), where he gained a solid background in traditional art. He ignored all of the experimental, avant-garde work of the French impressionists and pursued his own interest in realism. After a brief visit to Spain, he returned to Philadelphia in 1870.

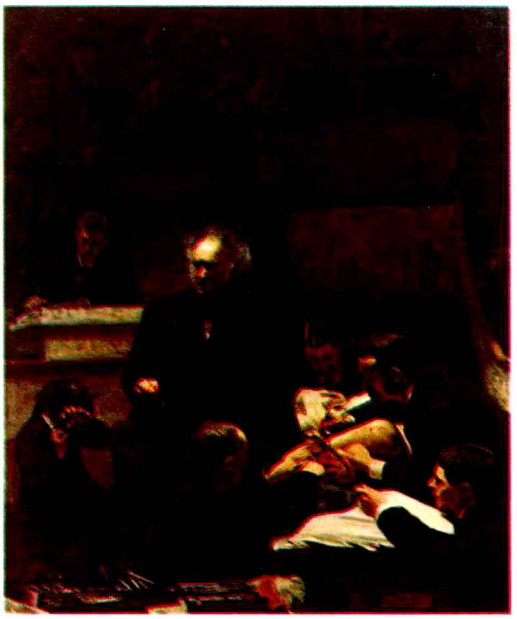
Eakins was a man of varied interests: painting, sculpture, anatomy, music, photography, and the study of locomotion. In the 1880s he experimented with multiple-image photography of moving animals and athletes. His interest in motion also led him to paint an impressive series of boxing scenes.

Nearly all of his work was portraiture—depictions of people he knew. His paintings demonstrated his technical expertise with external and anatomical details, combined with representations of inner character and situation. His first subjects were members of his family and an assortment of friends. Among his outdoor scenes were 'Max Schmitt in a Single Scull' and 'The Swimming Hole'.

Eakins was invited to provide a painting for the Philadelphia Centennial Exposition of 1876. He painted a work entitled 'The Gross Clinic', showing the physician Samuel Gross performing surgery before a class of medical students. Now generally considered Eakins' masterpiece, it was rejected for the exposition.

From the late 1870s until 1886 he taught at the Pennsylvania Academy of Fine Arts. Eventually he was forced to resign, mostly over the notoriety caused by his insistence on using live, nude models in classes of both men and women. He continued to teach from time to time at the new Art Students League and at the National Academy of Design in New York City. He died on June 25, 1916.

'The Gross Clinic', painted by Thomas Eakins for the Philadelphia Centennial Exposition of 1876, is considered his masterpiece. It measures 2 by 2.5 meters.



The Jefferson Medical College, Thomas Jefferson University, Philadelphia

EAR. Vibrations of air molecules moving through the air are received and translated into messages that the brain recognizes as sound by a complex organ—the ear. The ear has two important, but different, functions: hearing and sensing the body's equilibrium, or balance. The mechanisms for these processes are located within a hollow space in the skull's temporal bone (*see* Skeleton; Sound).

Parts of the Ear and Hearing

The ear has three separate sections—the outer ear, the middle ear, and the inner ear. Each section performs a specific function, related to either hearing or balance. The three parts of the outer ear are the auricle (also called the pinna), the external auditory meatus (or ear canal), and the tympanic membrane (or eardrum).

The pinna collects sound waves from the air. It funnels them into a channellike tube, the external auditory meatus. This is a curved corridor that leads to the tympanic membrane.

The eardrum separates the external ear from the middle ear. The middle ear is an irregular-shaped, air-filled space, about 0.75 inch (1.9 centimeters) high and 0.2 inch (0.5 centimeter) wide. A chainlike link of three tiny bones, the ossicles, spans the middle ear.

When sound waves strike the outer surface of the eardrum, it vibrates. These vibrations are mechanically transmitted through the middle ear by the ossicles. The malleus, or hammer, is the first ossicle to receive vibrations from the eardrum. It passes them to the second ossicle—the incus, or anvil. The third ossicle—the stapes, or stirrup—relays the vibrations to a membrane that covers the opening into the inner ear. This opening is the round window.

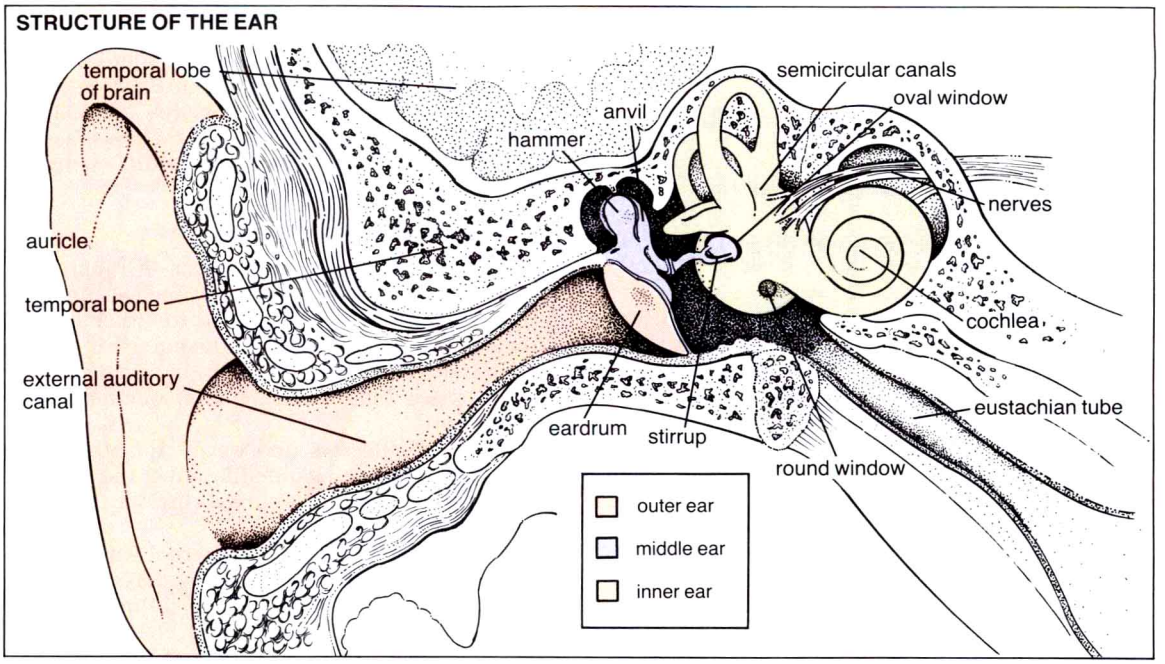
Like the eardrum, the round window's membrane transmits vibrations. It directs vibrations into the inner ear, where they enter a fluid that fills a structure called the cochlea. This is a coiled tube that resembles a snail's shell. If the cochlea were straightened out, it would measure slightly more than 1 inch (2.54 centimeters).

Within the cochlea is the true mechanism of hearing—the organ of Corti. It contains tiny hairlike nerve endings anchored in a basilar membrane, which extends throughout the cochlea. The unattached tips of these nerve endings are in contact with an overhanging "roof membrane," the tectorial membrane.

When vibrations pass into the inner ear, they cause waves to form in the cochlear fluid. Receptor nerve cells in the organ of Corti are highly sensitive to these waves. Other specialized nerve cells send the electrochemical impulses produced by the wave motion into the cochlear branch of the acoustic nerve. This nerve carries the impulses to the brain, where sound is identified.

Equilibrium and the Inner Ear

The inner ear also functions, independently of hearing, as the organ of equilibrium. In addition to the cochlea, the inner ear contains special structures



that sense equilibrium. These are the utricle, the saccule, and the three semicircular canals.

The saclike utricle and saccule sense the body's relationship to gravity, or its static equilibrium. A person knows that the body is right side up because these structures relay messages about the body's position to the brain.

Both sacs are hollow. Hairlike nerve endings are anchored into the inner surface of each structure. The free ends of the nerve endings project into the hollow space. Tiny particles of limestone, known as otoliths, rest against the bottom of each sac. If the head moves, the otoliths change position. In shifting, they pass over sensitive nerve endings. These send immediate impulses to the brain. Notified of a change in body position, the brain triggers the reflex mechanisms to correct the position of the body (*see* Reflexes).

Each of the three semicircular canals of the inner ear forms about two thirds of a circular loop. This loop begins and ends in the utricle. The canals are positioned at right angles to each other, similar to the way that the front wall, side wall, and floor of a room are at right angles to each other. The semicircular canals are fluid-filled tubes. If straightened out, each tube would be from about 0.4 inch (1 centimeter) to 0.8 inch (2 centimeters) long. Each canal is also lined with hairlike nerve endings. When the head turns, the fluid flows through these canals. As it passes over the nerve endings, impulses are triggered to the brain. At this time, appropriate reflex action immediately occurs.

Examination

At the beginning of an ear examination, a physician first checks the cerumen, or earwax, that is in the external auditory meatus. Cerumen is secreted by glands lining the passage to the eardrum. The sticky, waxy substance protects the eardrum from damage by attracting such substances as dust and dirt before they can pass through the meatus to damage the eardrum.

The eardrum is examined with an instrument called an otoscope. As viewed through the otoscope, the eardrum appears as a pearly-gray, oval-shaped membrane. Its longest diameter is about 0.5 inch (1.3 centimeters). A cross section of the eardrum looks like a shallow funnel.

The drum is divided into four separate parts, or quadrants. One of these is called the cone of light. Through it can be seen the handle of the malleus, the hammerlike ossicle. If its position is normal, the ear is probably capable of hearing. If the cone of light appears cloudy or blurred, it may be a sign of a common infection of the middle ear known as acute otitis media. Bacteria causing such an infection may enter the middle ear by way of the eustachian tube, a duct that connects the middle ear to the throat.

The eustachian tube helps to insure that there is equal air pressure on both sides of the eardrum. Going down too rapidly in an elevator, for example, often causes an uncomfortable feeling of fullness in the ear. The same thing happens to passengers in a descending aircraft. This occurs because air pressure pushing in on the ear is greatly increased as the elevator descends. The pressure bends the eardrum inward, causing discomfort. When swallowing occurs, the throat muscles open the eustachian tube's outlet into the throat. Air is able to pass upward into the middle ear. Pressure inside the middle ear pushes the eardrum back to normal.

Diseases

Each of the ear's three sections can be affected by diseases that relate to the structure, tissues, and function of that particular part of the ear. Diseases of the outer ear affect the skin, cartilage, and the glands and hair follicles in the outer ear canal. The sound-transmitting function of the outer ear is damaged when the ear canal becomes filled with a tumor, earwax, or infected material. When these conditions occur, sound cannot reach the eardrum.

There are several common diseases of the outer ear. Frostbite is a condition in which the exposed part of the ear becomes frozen and numb, resulting in a temporary loss of skin sensation. An injury that causes bleeding between the cartilage and the skin may produce a hematoma, which is a smooth, rounded, non-tender, purplish swelling. External otitis is an infection of the outer ear canal caused by molds or microorganisms. It occurs most often in warm humid climates and among swimmers. A greenish or brownish, musty, foul-smelling discharge develops in the outer ear canal, and the outer ear becomes tender, red, and much thicker than usual.

A common middle ear infection is secretory otitis media, in which the middle-ear cavity becomes filled with a clear, pale-yellowish, noninfected fluid. This develops when not enough air comes into the cavity from the eustachian tube. A painless impairment of hearing results. Head colds, allergic reactions of the membranes of the eustachian tube, and an enlarged adenoid are common causes of this condition.

A common inner-ear disease is congenital nerve deafness, which is caused by a defect of the hearing nerves in the cochlea. This may be present at birth or develop during or soon after birth. Usually both inner ears are affected to a similar degree. A severe impairment of hearing generally occurs but not always (*see* Deafness).

Ototoxic, or ear-poisoning, drugs can cause temporary and even permanent damage to the hearing-nerve function. Large doses of such salicylates as aspirin may cause ringing in the ears of some persons, followed by a temporary decrease in hearing. When a person stops taking the drug, hearing returns to normal. Certain antibiotics may cause permanent damage to the hearing-nerve function.

Exposure to various degrees of noise may cause temporary or permanent hearing damage. A single exposure to such an extremely intense sound as an explosion may produce a severe and permanent loss of hearing. Repeated exposures to sounds that reach more than 80 to 90 decibels may cause gradual loss of hearing. This happens because the hair cells of the inner ear, and sometimes even the nerve fibers, may be destroyed. The levels of noise produced by rock music bands is frequently more than 110 decibels. In the United States there are laws that require workers who are exposed to sound levels higher than 90 decibels to wear some form of protection. Earplugs or earmuffs are often used. (*See also* Sound.)

EARHART, Amelia (1897–1937). One of the most intriguing mysteries of the 20th century is: What happened to Amelia Earhart? In June 1937 she and her copilot, Lieutenant Commander Fred J. Noonan, left Miami, Fla., on an around-the-world flight attempt in a twin-engine Lockheed aircraft. On July 2 the plane vanished near Howland Island in the South Pacific. The world waited with fascination as search teams from the United States Army and Navy, along with the Japanese Navy, converged on the scene. But not she, Noonan, or the plane was ever found.

As time went on, questions were raised about the flight. Was it simply an around-the-world adventure, or was she perhaps sent to spy on Japanese war preparations for the United States government? Historians have claimed that she was almost certainly forced down and killed by the Japanese.

Amelia Earhart was born on July 24, 1897, in Atchison, Kan. During World War I she worked as a military nurse in Canada, and for several years she was a social worker in Boston. She first gained fame in 1928 when she was the first woman to fly across the Atlantic Ocean—even though only as a passenger. Four years later, in May 1932, she made a solo flight across the Atlantic, followed by several solo long-distance flights in the United States. She was greatly interested in the development of commercial aviation and took an active role in opening the field to women. For a time Earhart served as an officer of the Luddington line, which operated one of the first regular passenger services between New York City and Washington, D.C. In January 1935 she made a solo flight from Hawaii to California.

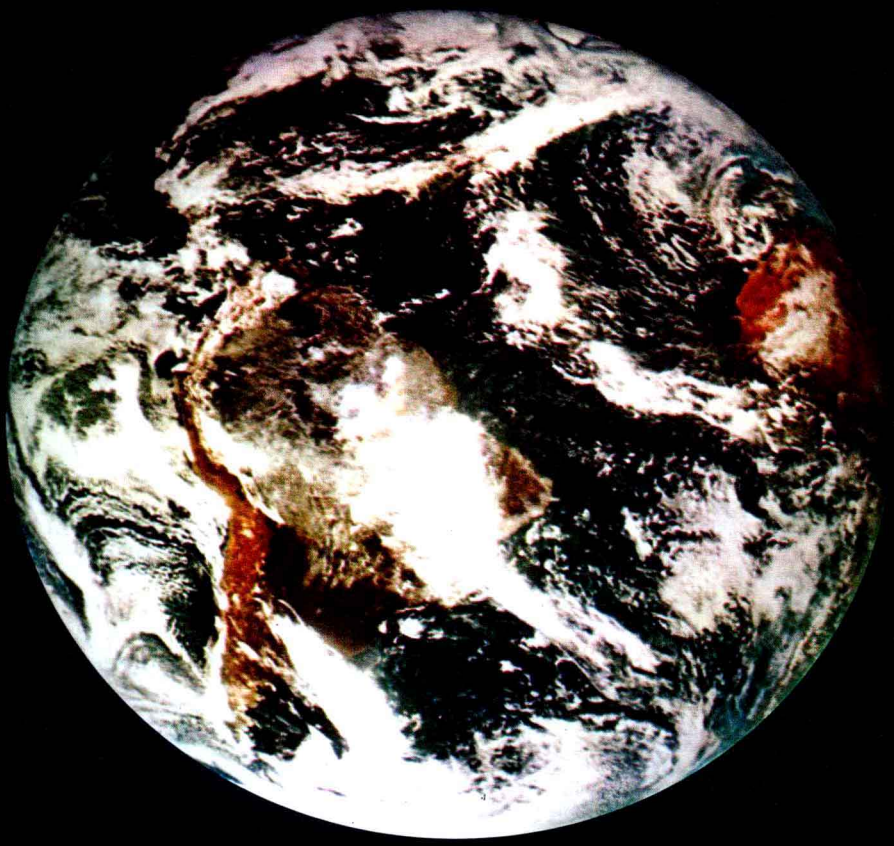
In 1931 Earhart had married publisher George P. Putnam. After her disappearance he wrote her biography, 'Soaring Wings', which was published in 1939.

EARP, Wyatt (1848–1929). He was one of many frontier lawmen whose exploits have been transformed by television and movies into heroic and legendary episodes. The reality, however, is considerably less than noble.

Wyatt Berry Stapp Earp was born in Monmouth, Ill., on March 19, 1848. By 1864 his family was living in California. He held a variety of jobs—buffalo hunter, stagecoach driver, minor peace officer—before settling temporarily in Dodge City, Kan., as assistant marshal in 1876. There he associated with Bat Masterson, a gambler, and Doc Holliday, a former dentist who was an alcoholic. Earp was also a card dealer for the game of faro at the famous Long Branch Saloon.

In the late 1870s Earp and some of his associates moved to Tombstone, Ariz. His brother Virgil became the town marshal. It was here that three Earp brothers—Wyatt, Virgil, and Morgan—and Doc Holliday fought the Ike Clanton gang in what is known as the gunfight at the O.K. Corral on Oct. 26, 1881. The Clanton gang lost, ending what was really a bitter feud, not a triumph of justice. Wyatt spent his last years in California, living off real estate and mining income. He died in Los Angeles on Jan. 13, 1929.

EARTH



EARTH. The earth, man's home, is a planet. It moves around the sun in a regular orbit, as do the eight other planets in the *solar system.* Each of the solar planets has special characteristics, some of which are well known. Saturn, for example, is surrounded by a set of rings, and Jupiter is famous as the largest planet. The earth also has special characteristics, and these are important to man. It is the only planet known to have the right temperature and the right atmosphere to support the kind of life man knows. *(See also* Planets.)

The earth's special characteristics make possible the kinds of environments and natural resources in which plants and man and other animals can survive. This fact is so important to man that he has developed a special science called *ecology,* which deals with the dependence of all living things upon one another and upon their environments. Ecologists try to find out how the earth's environments can be preserved so that living things will continue to survive on the planet.

Some scientists believe that millions of planets in the Milky Way, the galaxy that contains the earth, may be able to support life. But no one can predict the forms that such life might take. An indication of just how difficult such a prediction might be is illustrated by the vast variety of life forms on earth.

Many millions of kinds of plants and animals have developed on the earth. They range in size from microscopic plants and animals to giant trees and mammoth whales. Distinct types of plants or animals may be common in many parts of the world or may be limited

to a small area. Some kinds thrive under conditions that are deadly for others. So some persons suggest that forms of life quite different from those known on earth might possibly survive on planets with conditions that are far different from conditions on earth.

Many persons believe that the earth is the only planet in the solar system that can support any kind of life. Scientists have theorized that some primitive forms of life may exist on the surface of Mars, but evidence gathered in 1976 by unmanned probes sent to the Martian surface seems to indicate that this is unlikely.

Scientists at one time also believed that Venus might support life. Clouds always hide the surface of Venus, so it was thought possible that the temperature and atmosphere on the planet's surface might be suitable for living things. But it is now known that the surface of Venus is too hot—an average of 800° F (425° C)—for liquid water to exist there. The life forms man is familiar with could not possibly live on Venus.

The earth has excellent conditions for the kinds of life man knows. The temperature is cool enough so that liquid water can remain on the earth's surface. In fact, oceans cover more than two thirds of the surface. But the temperature is also warm enough so that only a small fraction of this water is permanently frozen—near the North and South Poles and on some mountaintops.

The earth's atmosphere is dense enough for animals to breathe easily and for plants to take up the carbon dioxide they need for growth. But the atmosphere is not so dense that it blocks out sunlight. Although clouds often appear in the sky, on the average enough sunlight reaches the surface of the earth so that plants flourish. Growing plants convert the energy of sunlight into the chemical energy of their own bodies. This interaction between plants and the sun is the basic source of energy for virtually all forms of life on earth. (*See also* Energy; Plants; Sun.)

Extensive exploration of the seafloor since 1977, however, has uncovered the existence of biological communities that are not based on solar energy. Active areas of seafloor spreading, such as the centers in the eastern Pacific that lie far below the limit of light penetration, have chimneylike structures known as smokers that spew mineral-laden water at temperatures of approximately 660° F (350° C).

Observations and studies of these active and inactive hydrothermal vents have radically altered many views of biological, geological, and geochemical processes that exist in the deep sea. One of the most significant discoveries is that the vents and associated chemical constituents provide the energy source for chemosynthetic bacteria. These bacteria form, in turn, the bottom of the food chain, sustaining the lush biological communities at the hydrothermal vent sites. Chemosynthetic bacteria are those that use energy obtained from the chemical oxidation of inorganic compounds, such as hydrogen sulfide, for the fixation of carbon dioxide into organic matter (*see* Deep-Sea Life).

Although the atmosphere allows sunlight to reach the earth's surface, it blocks out certain portions of solar radiation, especially X rays and ultraviolet light. Such radiation is very harmful, and, if the atmosphere did not filter it out, probably none of the life forms on earth could ever have developed. So, the necessary conditions for these life forms—water, the right kind of atmosphere, and the right amount and kind of sunlight—exist on the surface of the earth. The earth is the only planet in the solar system known to have all of these "right" conditions.

Facts About the Earth

Size: The radius at the equator is 3,963 miles (6,378 kilometers); radius at the poles is 3,950 miles (6,357 kilometers).
Mean Density: 344.7 pounds per cubic foot (5.522 grams per cubic centimeter).
Mass: 6.595×10^{21} tons (5.983×10^{24} kilograms).
Average Distance from the Sun: 92,900,000 miles (149,500,000 kilometers).
Average Distance from the Moon: 238,854 miles (384,393 kilometers).
Average Speed of the Earth in Orbit: 18.5 miles (29.78 kilometers) per second.
Average Speed of Rotation at the Equator: 0.289 miles (0.465 kilometers) per second.
Mean Surface Density of the Continents: 166.7 pounds per cubic foot (2.67 grams per cubic centimeter).
Land Area: 57.470×10^6 square miles (148.847×10^6 square kilometers).
Ocean Area: 139.480×10^6 square miles (361.254×10^6 square kilometers).
Highest Mountain: Mount Everest, 29,028 feet (8,848 meters).
Greatest Ocean Depth: Mariana Trench (explored depth), 35,800 feet (10,912 meters) below sea level.

Preview

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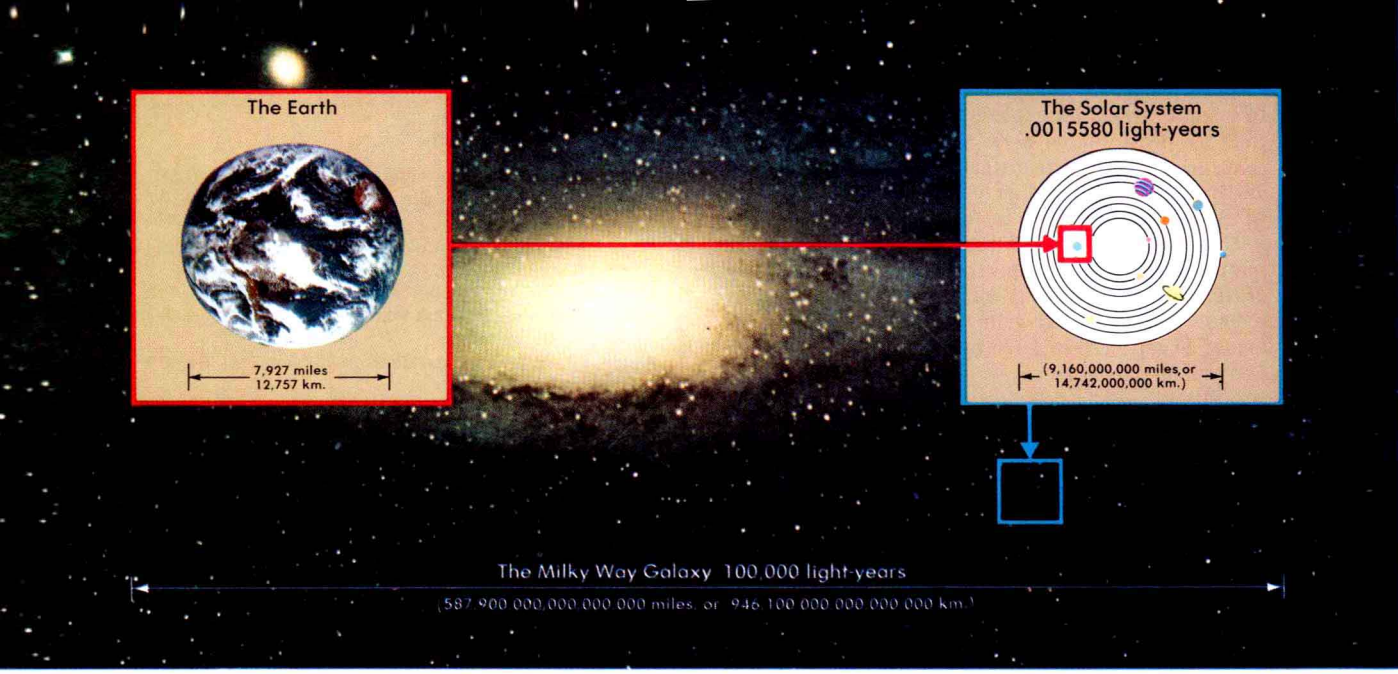

The earth looked so tiny in the heavens that there were times during the Apollo 8 mission when I had trouble finding it. If you can imagine yourself in a darkened room with only one clearly visible object, a small blue-green sphere about the size of a Christmas-tree ornament, then you can begin to grasp what the earth looks like from space. I think that all of us subconsciously think that the earth is flat or at least almost infinite. Let me assure you that, rather than a massive giant, it should be thought of as a fragile Christmas-tree ball which we should handle with considerable care.

Astronaut William A. Anders

By courtesy of (left) NASA; (background photograph) Hale Observatory—California Institute of Technology

The Earth's Place in Space

DESPITE ITS OWN special conditions, the earth is in some ways similar to the other inner planets—the group of planets nearer to the sun. Of these planets, Mercury is the closest to the sun; Venus is second; the earth is third; and Mars is fourth. All of these planets, including the earth, are basically balls of rock. Mercury is the smallest in size. Its diameter is about two thirds the greatest width of the Atlantic Ocean. Mars is larger than Mercury, but its diameter is only a little more than half that of the earth. Venus, with a diameter of roughly 7,600 miles (12,000 km.), is almost as large as the earth.

Four of the five outer planets are much bigger than any of the inner planets. The largest, Jupiter, has a diameter more than 11 times as great as that of the earth. These four outer planets are also much less dense than the inner planets. They seem to be balls of substances that are gases on earth but chiefly solids at the low temperatures and high pressures that exist on the outer planets.

The exact size or mass of Pluto, the most distant planet, is not known. Its composition is also a mystery. All that is known for sure about Pluto is its orbit. Pluto's average distance from the sun is almost 40 times that of the earth.

At the outer reaches of the solar system are the comets. A comet consists of a nucleus of frozen gases called ices, water and mineral particles; and a coma of gases and dust particles. Some comets also have tails. A comet's tail consists of gases and particles of dust from the coma. As the comet approaches the sun, light from the sun and the solar wind cause tails to form. For this reason the tails point generally away from the sun.

Movements of the Planets

Each planet, including the earth, travels around the sun in a regular orbit. Ancient astronomers thought that the orbits of the planets were circular. It is now known that the orbits are elliptical, though the orbits of most planets are almost circular. The

SOME FACTS ABOUT SPACE

Largest Planet: *Jupiter,* with an equatorial diameter of 88,670 miles (142,700 kilometers).

Smallest Planet: *Mercury,* with an equatorial diameter of 3,000 miles (4,840 kilometers).

Densest Planet: *Earth,* with an average density about 5½ times that of water.

Lightest Planet: *Saturn,* with an average density about 0.68 times that of water.

Closest Star: *Proxima Centauri,* about 4.25 light-years (2.50×10^{13} miles, or 4.02×10^{13} kilometers) from the earth.

Most Luminous Star: *Zeta¹ Scorpii,* about 170,000 times as bright as the sun.

Largest Asteroid: *Ceres,* located between Mars and Jupiter, with a diameter of about 480 miles (772 kilometers).

Farthest Object Visible to the Naked Eye: *Andromeda galaxy,* 2.2 million light-years (1.29×10^{19} miles, or 2.08×10^{19} kilometers) from the earth.