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G—Gyro

pages 1-328

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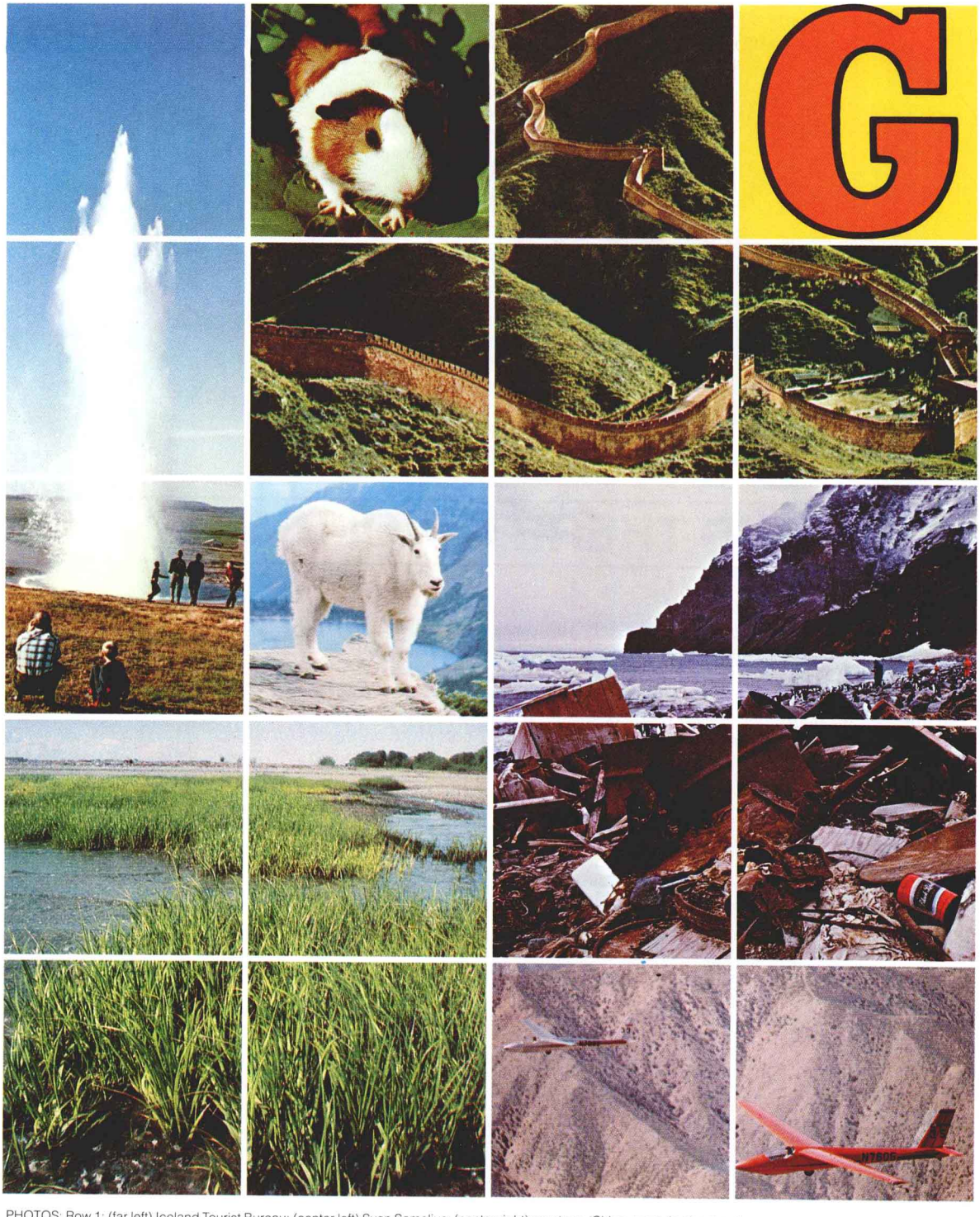
"Let knowledge grow from more to more and thus be human life enriched"



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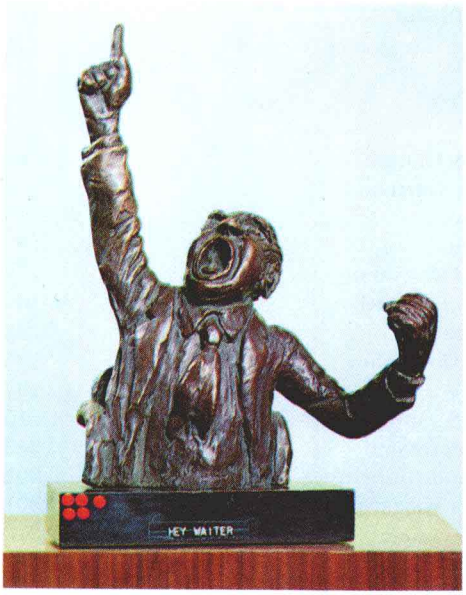
EXPLORING VOLUME 9

TWA Ambassador



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Art Resource/EB Inc.

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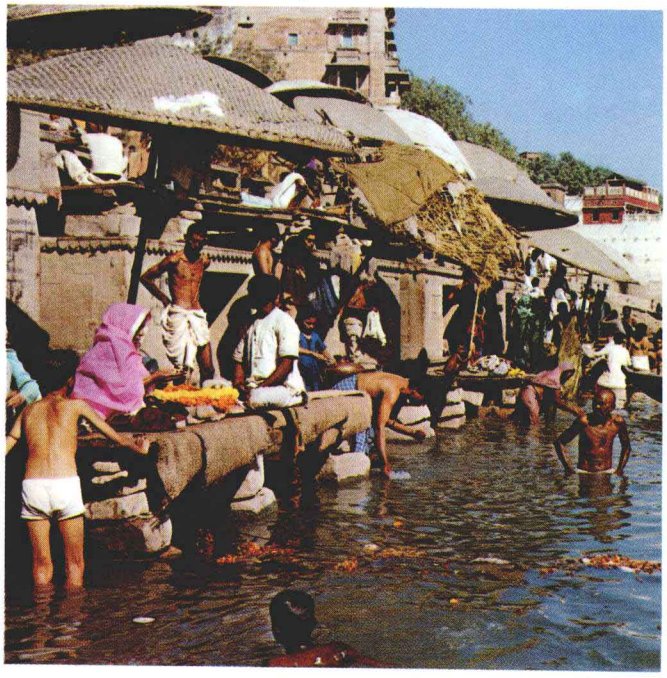

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Jerome Wyckoff

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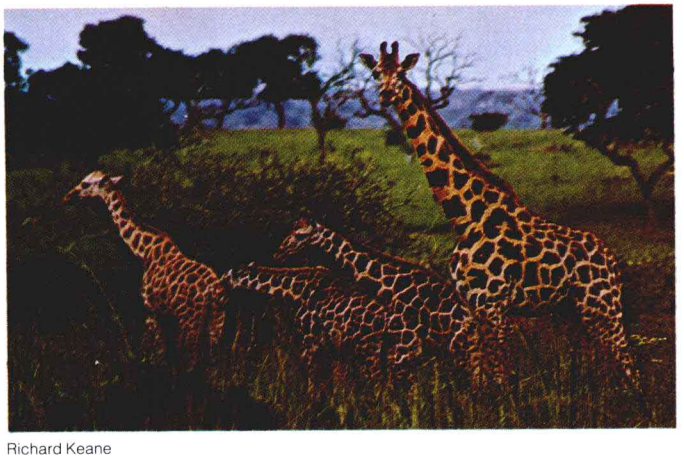

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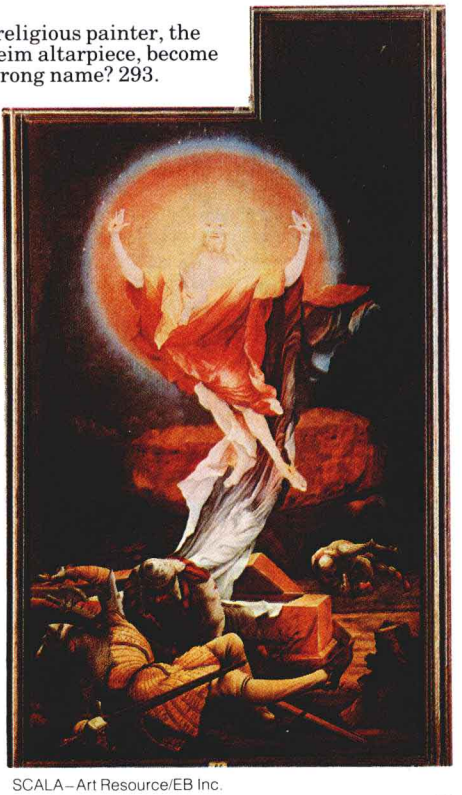
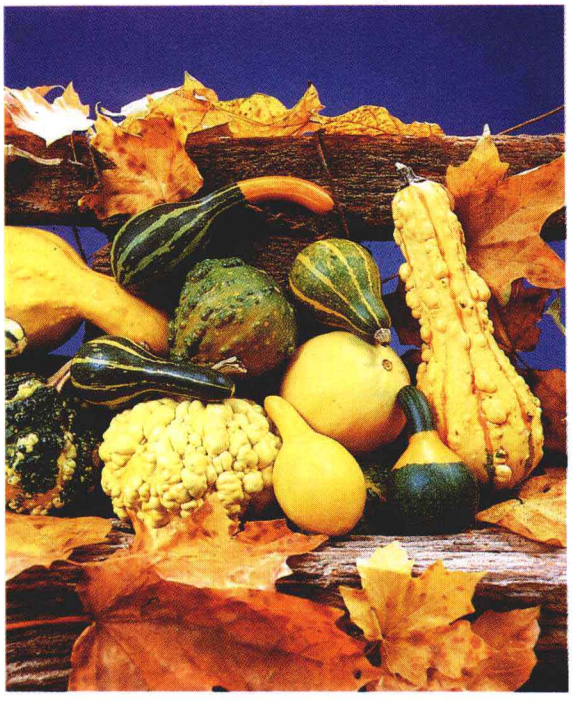


SCALA – Art Resource/EB Inc.

Barry L. Runk—Grant Heilman



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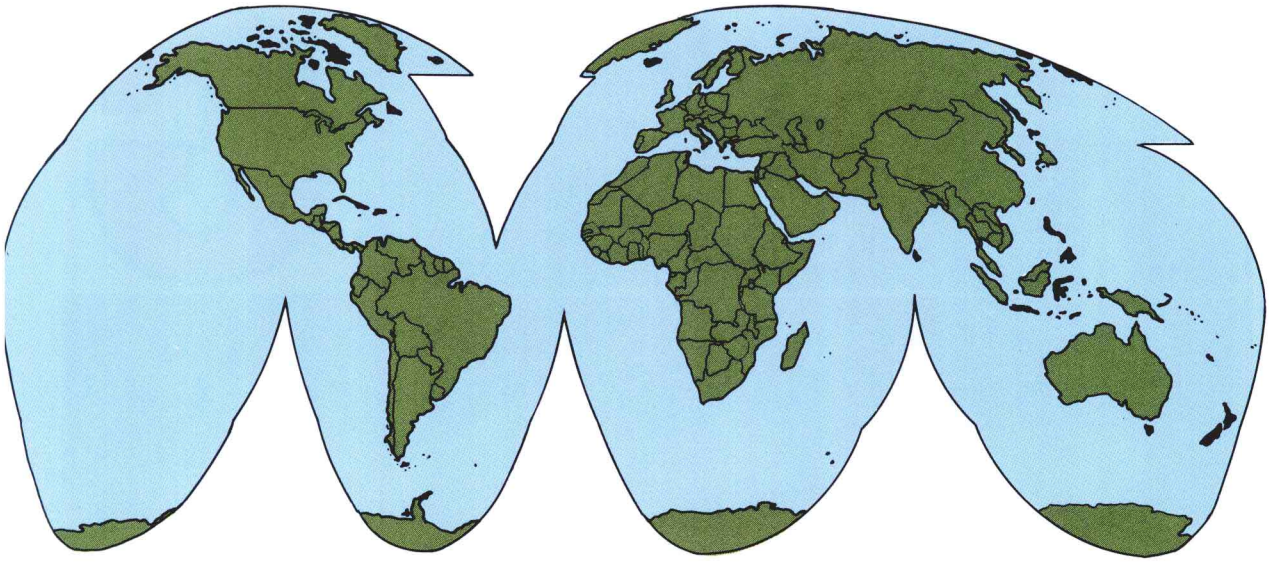


HERE AND THERE IN VOLUME 9

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.

Arts

Physical Science

Living Things

Medicine

Technology and Business

Geography

History

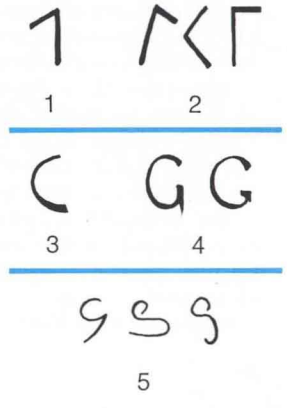
Social and Political Science

Potpourri

The letter G

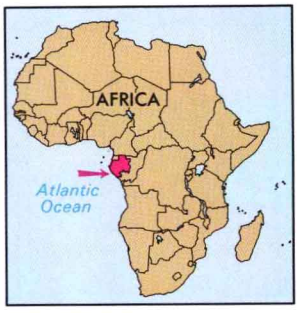
is a descendant of the letter C, which is discussed at the beginning of the Fact-Index for Volume 4. About 1000 B.C., in Byblos and in other Phoenician and Canaanite centers, the sign was given a linear form (1), the source of all later forms. In the Semitic languages the sign was called *gimel* or *gaml,* meaning "throwing stick." The Greeks changed the Semitic name to *gamma.* Later, when the Greeks began to write from left to right, they reversed the letter (2). As among the Semites, the sign *gamma* was used for the sound "g."

The Romans took this sign over into Latin, but they rounded it (3). Originally they used the sign for the sound "g." They also used it for the sound "k." In time they learned to differentiate the two sounds in writing. The original form of C was used for the sound "k," and a new form of G—C plus a bar (4)—was used for the sound "g." The two sign forms passed unchanged into English. The handwritten small "g" developed from the capital by using a loop at the bottom (5).



Erich Lessing—Magnum

The town of Lambaréné on the Ogooué River is in one of the few industrialized areas of Gabon.



GABON. The nation of Gabon straddles the equator on the west coast of Africa. It covers an area of 103,347 square miles (267,667 square kilometers). It is bordered by Equatorial Guinea and Cameroon to the north, Congo to the south and east, and the Atlantic Ocean to the west. Libreville, the capital city, has a population of 340,000 (1980 estimate) and is located near the coast on the Gabon Estuary.

A plateau that ranges from about 1,000 to 2,000 feet (300 to 600 meters) high spreads over most of the country. Several mountain ranges rise above the plateau. The highest peak is Mount Ibounzi at 5,165 feet (1,574 meters). Coastal lowlands extend inland from 20 to 120 miles (30 to 190 kilometers). Much of Gabon is covered by a dense rain forest. The largest river, the Ogooué, flows in an arc through the center of the country and empties into the ocean in a great delta near Port-Gentil. Temperatures are warm and humid year-round. Rainfall varies from an annual average of 120 inches (305 centimeters) at Libreville to 150 inches (380 centimeters) on the northwestern coast.

There are more than 40 ethnic groups or tribes in Gabon, including the large Fang tribe and the Pygmy Babinga. Many Bantu languages are spoken, but French is the official language because the country was for many decades a colony of France.

The economy of Gabon is based primarily on its minerals and lumber. Forestry was the main industry until mineral exploitation began in the 1960s. The chief timber export is okoume, or Gabon mahogany, a hardwood that long was the major factor in the economy. Other valuable woods include ebony and kevazingo. Food crops include coffee, cacao, rice, cassavas, yams, corn, bananas, and sugarcane. Coffee and cacao are raised for export.

Gabon's mineral resources are few, but they exist in large quantities. Its reserves of manganese were ranked fourth in the world in the early 1980s. There are also large reserves of iron ore, petroleum, natural gas, and uranium. In the 1970s petroleum became the major mineral for export, but, after oil prices began dropping in the 1980s, it became a less reliable source of national income.

Manufacturing accounts for less than 10 percent of Gabon's gross national product, though light industry has been expanding since the opening in 1967 of an oil refinery near the capital. A great increase in the annual production of electricity resulted from the construction of the country's first hydroelectric plant at Kinguélé near the capital.

Gabon has a one-party political system. Supreme authority is in the Gabon Democratic party's 33-member political bureau. The constitution of 1961, revised in 1981, gives executive power to a president elected on an unopposed ballot. The National Assembly has 93 members, 84 elected by the population and 9 appointed by the president. From 1967 through the 1980s, the country's leading political figure was President Omar Bongo.

Like most of tropical Africa, Gabon is plagued by poor health conditions. Provision of adequate health care has been a top government priority. This probably stems from the example set by Albert Schweitzer, the 20th century's most famous medical missionary, who established his hospital at Lambaréné in Gabon (*see* Schweitzer).

The coast of Gabon was explored by Portuguese traders in the 15th century. Gabon became part of the colony of the French Congo in 1886. In 1910 it was made a territory of French Equatorial Africa. It gained full independence on Aug. 17, 1960. Population (1981 estimate), 1,409,000.

GADOLINIUM *see* CHEMICAL ELEMENTS; PERIODIC TABLE.

GAGARIN, Yuri (1934–68). The world's first astronaut was a 27-year-old Russian aviator named Yuri Gagarin. On April 12, 1961, the 4¾-ton spacecraft Vostok 1 was launched at 9:07 in the morning, Moscow time, from a location in Baikonur, a wasteland in the south-central region of the Soviet Union. The spacecraft orbited the Earth once in 1 hour and 29 minutes at a maximum speed of 17,000 miles (27,000 kilometers) per hour. It followed an elliptical orbit that carried Gagarin as far as 187 miles (301 kilometers) from Earth. Vostok I landed at 10:55 AM and made the young Soviet cosmonaut a worldwide celebrity.

Yuri Alekseyevich Gagarin was born on March 9, 1934, on a collective farm near Gzhatsk, about 100 miles (160 kilometers) west of Moscow. His early education was interrupted by World War II. After his

early schooling, he attended a vocational school at Lyubertsy, a Moscow suburb. It was here that he first became interested in flight. Following graduation in 1951, Gagarin attended the industrial college at Saratov, where he learned to fly. After graduation in 1955 he became a Soviet Air Force cadet. He completed his flight training in 1957 and joined the air force. After two years as a test pilot he was admitted to the astronaut training program.

Gagarin's flight in Vostok 1 was hailed around the world as an astounding achievement that began mankind's entry into space. It was also recognized that the Soviet Union had a definite advantage in space technology over the United States. It was his achievement that prompted the United States to launch its program to get a man on the moon by the end of the 1960s.

Gagarin was celebrated as a hero in the Soviet Union. Monuments were raised to him and streets named in his honor. He never went into space again. He resumed his test flight career and was killed on March 27, 1968, on a routine mission near Moscow.

Courtesy of the National Gallery of Art, Washington, D.C.; Andrew Mellon Collection

'Mrs. Sheridan', an oil painting by Gainsborough in about 1785, measures 2.2 by 1.5 meters.

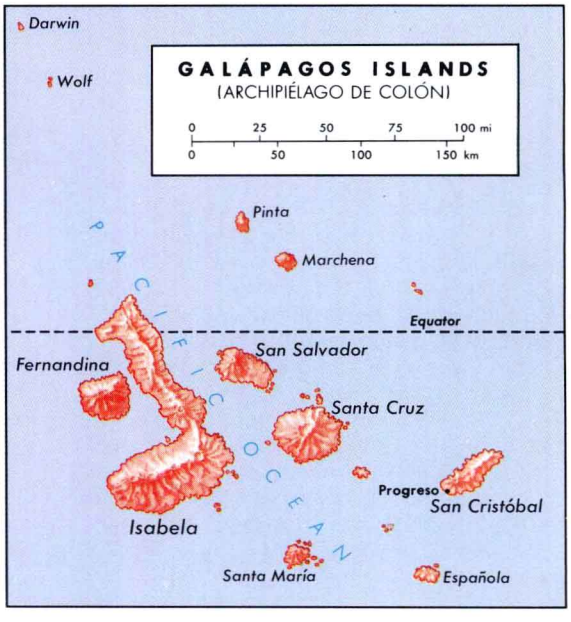
GAINSBOROUGH, Thomas (1727–88). As a boy Thomas Gainsborough drew pictures of the English countryside near his home. Throughout his career he continued to enjoy landscape painting. Yet he won his greatest popularity as a portrait painter.

Thomas Gainsborough was born in Sudbury, Suffolk County, England. When he was 14 his parents sent him to London as assistant to Hubert Gravelot, an illustrator and engraver. Two years later he entered Saint Martin's Lane Academy. There he studied under Francis Hayman, a skillful painter of portraits and historic scenes. Gainsborough married at 19. For 14 years he lived quietly at Sudbury and Ipswich. Then he moved to Bath and began to do more portrait painting. He had immediate success. Some years later he moved to London and became a favorite painter of the royal family. He was one of the original members of the Royal Academy, which was founded in 1768, but left in 1784 after disagreements over the hanging of his paintings.

Among Gainsborough's famous landscapes are 'Cornard Wood', 'The Market Cart', 'The Watering Place', and 'The Bridge'. His portraits include 'Mrs. Sheridan', 'The Honourable Mrs. Graham', 'David Garrick', 'Mrs. Siddons', 'Mrs. Robinson (Perdita)', 'The Morning Walk', and 'The Duchess of Devonshire'. His full-length portrait of Jonathan Buttall is world famous as 'The Blue Boy'.

GALÁPAGOS ISLANDS. Several hundred miles to the west of Ecuador, the Galápagos Islands lift their gaunt lava ridges and peaks out of the Pacific Ocean. Nine islands and about 50 islets and reefs are scattered over an area of about 200 miles (320 kilometers) in diameter. They are directly on the equator. The tropical heat is cooled by the moist southeast trade winds and by the cool Humboldt, or Peru, Current, whose northern limit is nearby.

Many of the islands have both Spanish and English names. The largest is Isabela (Albemarle), about 75 miles (120 kilometers) long. Here at the southern end a volcanic cone rises about 5,500 feet (1,700 meters), the highest point in the group. The other chief islands in order of size are Santa Cruz (Indefatigable), Fernandina (Narborough), San Cristóbal (Chatham), San Salvador (James), Santa María (Charles), Marchena (Bindloe), Española (Hood), and Pinta (Abingdon). About 100



miles (160 kilometers) northwest of the main group are the islets Wolf (Wenman) and Darwin (Culpepper).

The Galápagos are so desolate that they have been called "world's end." From the shore, the land rises in a series of volcanic craters. Perhaps as many as 2,000 cones dot the islands. Some of the coasts, drenched by mists, are tangles of mangrove swamps. On other coasts gray lava cliffs rear stark out of the sea, or thin beaches of white sand recede to desert growth of cactus, thorn trees, and barbed grass. The older islands have a less dramatic appearance because they are worn down. The uplands are covered with lush, moist vegetation, such as ferns and mosses. Here rain falls in the winter, filling rocky pools, but flowing springs are rare. Flies plague the explorer by day, and mosquitoes by night. The harsh lava cinders cut shoes to ribbons.

When Charles Darwin, the first of several scientists to visit the Galápagos, came here in 1835 he found that half the birds and plants were different from species in other parts of the world. About a third of the shorefish and nearly all the reptiles also differed. These variations helped to suggest to Darwin the theory of evolution set forth in his 'Origin of Species' (*see* Darwin).

As few attempts have been made to settle the Galápagos, the animals display little fear of humans. Giant land iguanas, 3 feet (1 meter) or more in length, bask under cactus. Sea iguanas swarm the coastal rocks, which are frequented also by herds of sea lions and fur seals. Among the birds peculiar to the islands are species of pelican, penguin, flightless cormorant, heron, dove, finch, mockingbird, hawk, and albatross.

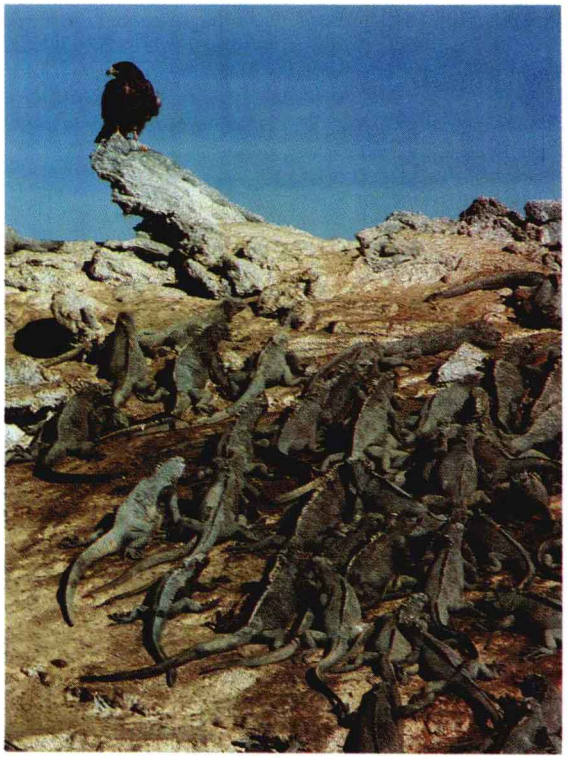
The sighting of an occasional giant tortoise brings to mind the days when these monsters were so abundant that Spanish explorers named the islands for them, from the Spanish word *galápago,* meaning "tortoise." Some weighed 600 pounds (270 kilograms) and were strong enough to carry a man. Early in the 20th century enormous numbers were slaughtered for oil.

On some of the larger islands roam wild dogs, cats, goats, burros, and even some cattle—descendants of animals abandoned by passing vessels. In 1964 a field party of the Galápagos International Scientific Project discovered lichens growing on the giant tortoises. It was the first time a land animal was found to host a lichen.

The Galápagos were discovered in 1535 by the Spanish bishop of Panama, but no attempt was made to settle them. Late in the 17th century the islands became hideouts for buccaneers and sea rovers, including the famed William Dampier. Alexander Selkirk (Robinson Crusoe) came here in 1709 after his rescue from the Juan Fernández Islands (*see* Defoe).

After being unclaimed by any nation for nearly 300 years, the Galápagos were annexed by Ecuador in 1832. Ecuador's first few attempts to colonize the islands ended in bloody revolts by the settlers. They

A Galápagos hawk (below, left) basks in the sun above a group of sea iguanas. The red-footed boobies (below, right) perched in a Bursera tree are tame and nonaggressive tropical seabirds. Most famous of the Galápagos animals is the giant tortoise (bottom, right).



Photos, Tui De Roy

disliked the hard living and iron rule. In 1892 Ecuador officially named the islands Archipiélago de Colón.

San Cristóbal is the center of government. Its only town, Puerto Baquerizo Moreno, is built back in the hills, and its few hundred people, mostly Ecuadorians, grow coffee, fruit, and sugarcane. Wreck Bay, on San Cristóbal, is the chief port of the islands. Tuna fishing vessels also anchor at Isabela and Santa Cruz.

The Galápagos Islands are a national park and wildlife sanctuary. Visitors are allowed only by official permission. In 1985 the exotic plant and animal life on Isabela was threatened by a fire that spread over some 100,000 acres (40,000 hectares). Area, 3,000 square miles (8,000 square kilometers); population (1982 census), 6,119.

GALAXY *see* ASTRONOMY.

GALBRAITH, John Kenneth (born 1908). When the noted American economist John Kenneth Galbraith published his book 'The Affluent Society' in 1958, he gave a name to the remarkable prosperity the United States had been enjoying since the end of World War II. He also criticized economic policies that did not pay enough attention to public services.

Galbraith was born in Canada, in Iona Station, Ont., on Oct. 15, 1908. After graduating from the University of Toronto in 1931, he went on to earn a doctorate at the University of California at Berkeley in 1934. He taught successively at Harvard and Princeton universities for the next several years. During the war he worked in the federal government's Office of Price Administration, and in the years 1943 to 1948 he was an editor of *Fortune* magazine. He taught at Harvard from 1949 until 1961, when President John F. Kennedy appointed him ambassador to India. He returned to Harvard in 1963.

In addition to his teaching, Galbraith was continuously involved in public affairs. In 1945 he served as director of the United States Strategic Bombing Survey, studying the effects of bombing on Japan and Germany. He aided in the postwar reconstruction of both countries as well. As a proponent of liberal politics, Galbraith was involved in the presidential campaigns of Adlai Stevenson, John F. Kennedy, Eugene McCarthy, and George McGovern. Among his other publications are 'American Capitalism' (1951), 'New Industrial State' (1967), 'Ambassador's Journal' (1969), and 'The Age of Uncertainty' (1977).

GALEN (129–199?). The most significant physician of the ancient world after Hippocrates, Galen achieved great fame throughout the Roman Empire. He was both physician and philosopher and the founder of experimental physiology. His many writings influenced the development of medicine for 1,400 years and were partly responsible for the emergence of science in Europe during the Renaissance.

Galen was born in 129 in Pergamum (now Bergama) in Asia Minor. In that city was the chief shrine of Aesculapius, the god of healing. Attached to the shrine was a school of medicine, where the young Galen met many of the famous teachers and philosophers of his time. There was also a troupe of gladiators maintained by the school's director. These provided Galen and other students of medicine the chance to study wounds and the effects of medical treatment. Galen continued his studies in Smyrna and for a time wandered about the Middle East, taking time to visit the great medical school at Alexandria in Egypt. In 157 he returned home and became chief physician to the gladiators.

In 161 Galen traveled to Rome, where he soon earned a reputation as an outstanding healer. About 168 the Emperor Marcus Aurelius appointed Galen physician to his son Commodus, who later became emperor. This afforded Galen the opportunity to study and to write. His more than 400 treatises were on many subjects, including philosophy and drama. His many medical writings showed penetrating and often accurate observations on the human anatomy, including heart, liver, kidney, bladder, and nerve functions. Late in the Middle Ages many of his texts were translated by Muslim Arab scholars and eventually found their way into Latin versions. Galen died about 199, probably in Rome.

GALILEE, SEA OF. Located in northern Israel, the Sea of Galilee is really a lake. It is pear-shaped, 13 miles (21 kilometers) from north to south, and 7 miles (11 kilometers) east to west. Situated 686 feet (209 meters) below the level of the Mediterranean Sea, its surface area is 64 square miles (166 square kilometers), and the maximum depth is 157 feet (48 meters). The Jordan River flows into the Sea of Galilee from Syria and continues south out of it. The lake would be an inconsequential one but for two reasons: powerful historical associations and current economic value. (For map, *see* Israel.)

Over the centuries the Sea of Galilee has been called by other names: Lake Kinneret, Lake of Gennesaret, and Sea of Tiberias. Christians around the world associate the lake with several events in the life of Jesus Christ. There were at least nine cities on its shores in ancient times. Capernaum (or Kefar Nahum) to the northwest has preserved one of the most beautiful Jewish synagogues in the area, dating back to the 2nd and 3rd centuries. In the 20th century the region was the site of the first Jewish kibbutz (a communal farm), Deganya, founded in 1909. The city of Tiberias, on the lake's western shore, is the principal community surviving from ancient times. The city is one of Israel's chief winter resorts because of nearby thermal baths and the area's moderate climate.

The area around the Sea of Galilee has been systematically developed over the centuries by irrigation and, more recently, through modern agricultural techniques. In the 1960s the lake became the starting point for the National Water Carrier, a large canal that conveys water to the coastal areas as well as to the Negev Desert in the south. Several hundred tons of fishes are netted annually from the lake itself.

GALILEO (1564–1642). Modern physics owes its beginning to Galileo, who was the first astronomer to use a telescope. By discovering four satellites of the planet Jupiter, he gave visual evidence that supported the Copernican theory (*see* Astronomy). Galileo thus helped overcome much of the medieval thinking in science.

Galileo Galilei, who is generally known only by his first name, was born in Pisa, Italy. His family belonged to the nobility but was not rich. His father sent him to study medicine at the local university. Galileo, however, soon turned to a career in science.

In 1583 Galileo discovered the law of the pendulum by watching a chandelier swing in the cathedral at Pisa. He timed it with his pulse and found that, whether it swung in a wide or a narrow arc, it always took the same time. He confirmed this with careful experiments and gave society the first reliable means of keeping time.

A lecture on geometry kindled his interest in mathematics, and he got his father's consent to change his studies. Lack of money forced him to drop out of school in 1585, and he became a lecturer at the Academy of Florence. The next year he attracted attention with discoveries in hydrostatics. His work in dynamics won him an appointment as lecturer on mathematics at the University of Pisa in 1589.

He soon made enemies with his arguments against what he considered mistakes in the science of the day. According to a popular story, he dropped weights from the leaning tower of Pisa to prove his views concerning falling bodies (*see* Gravitation). His writings, however, do not mention such an experiment. In any case, resentment against his views drove him out of Pisa in 1591.

In 1592 the University of Padua offered Galileo a professorship in mathematics. About 1609, after word from Holland of Hans Lippershey's newly invented telescope reached him, he built his own version of the instrument (*see* Telescope). He developed magnifying power until on Jan. 7, 1610, he saw four satellites of Jupiter. He also saw the mountains and craters on the moon and found the Milky Way to be a dense collection of stars.

The grand duke of Tuscany offered him a well-paid post in Florence as a philosopher and mathematician. Galileo moved to Florence in September 1610 and held the post for many years.

In 1609 Johannes Kepler published his laws of planetary motion based upon the Copernican theory (*see* Kepler). Galileo supported this view strongly. In 1616 he received a formal warning that the theory was contrary to the teachings of the church. Nevertheless, he again supported the Copernican view in a dialogue, 'The Great Systems of the Universe'.

During his last eight years Galileo lived in retirement near Florence. He became blind in 1637 but continued to work until his death on Jan. 8, 1642.

Galileo's contributions to mechanics include the law of falling bodies, the fact that the path of a projectile is a parabola, the demonstration of the laws of equilibrium, and the principle of flotation. He devised a simple thermometer and inspired a pupil, Evangelista Torricelli, to invent the barometer.

His great contribution to scientific thinking was the principle of inertia. Before his time everyone followed Aristotle's theory that, when an object moved, something had to act continuously to keep it moving. Galileo countered this with the theory that, if a body is moving freely, something must happen to stop it or to make it change direction.

In 1609 Galileo demonstrated the use of his telescope to the Senate of Venice.

Alinari—Art Resource

GALLIUM *see* CHEMICAL ELEMENTS; PERIODIC TABLE.

GALLUP, George (1901–84). The term Gallup Poll has, since the 1930s, come to mean public opinion survey. For nearly 50 years George Gallup surveyed the trends in public opinion on every significant issue of the day.

Gallup was born on Nov. 18, 1901, in Jefferson, Iowa. He earned a doctorate in journalism at the University of Iowa and taught the subject at Drake University in Des Moines and Northwestern University in Evanston, Ill. In 1932 a New York City advertising firm hired him to conduct public opinion surveys—at that time simply a form of market research. He founded the American Institute of Public Opinion in 1935, the British Institute of Public Opinion in 1936, and the Audience Research Institute, Inc., in 1939. Popular faith in polls was established in 1936, when Gallup, Elmo Roper, and Archibald Crossley—acting independently—correctly predicted the victory of President Franklin D. Roosevelt over Alf Landon.

Gallup, who was fascinated by statistics, devised a sampling technique that incorporated a wide variety of possible respondents. The poll featured a representative mixture that included all races in the population and a proportionate number ranging from rich to poor and professionals to factory workers.

In 1958 he formed the Gallup Organization Inc., which encompassed a wide range of activities, including market research. Gallup died at Tschingel, Switzerland, on July 26, 1984.

Courtesy of Rudolf Sauter

A portrait of John Galsworthy, now in the University of Birmingham Library, was painted by Rudolf Sauter in 1923.

GALSWORTHY, John (1867–1933). To prepare for practicing marine law, John Galsworthy took a trip around the world in 1890. During the voyage he met a ship's officer who shyly showed him a half-finished novel. He and the officer, who later became famous as the author Joseph Conrad, became lifelong friends. And Galsworthy decided he would rather be a writer than a lawyer.

John Galsworthy was born at Kingston, Surrey, England, on Aug. 14, 1867, the son of a successful attorney. He grew up not far from London. He was not a very good student. At New College, Oxford, he was described as "lazy, dressy, and sporting." Later, however, he took honors in his law studies and became a member of the bar. Instead of practicing law, he traveled to Egypt, Fiji, Australia, and America.

Back in England, Galsworthy settled down to write. He published four novels under the name John Sinjohn. The stories were weak, but they were good practice for him. In 'Man of Property', published under his own name in 1906, he first showed his greatness. The story grew into a series of three novels, now called 'The Forsyte Saga'. It deals with Soames Forsyte, who thinks of his wife as a piece of property. In these books Galsworthy criticizes the selfishness of the English property-owning class. He portrays the people of this class as being more interested in property than in human beings. Three later novels about the Forsytes were collected as 'A Modern Comedy'.

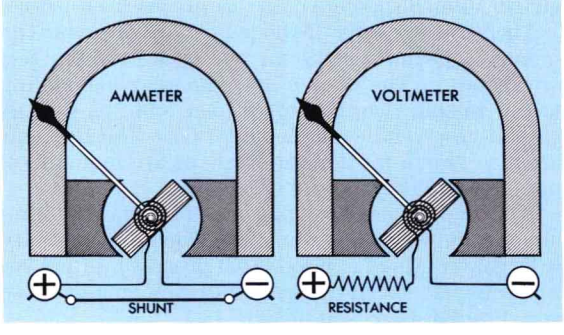
Galsworthy also became famous as a serious playwright. 'Strife', 'Justice', and 'Loyalties' are his best-known plays. In 1932 he was awarded the Nobel prize for literature. He died at Grove Lodge, Hampstead, on Jan. 31, 1933.

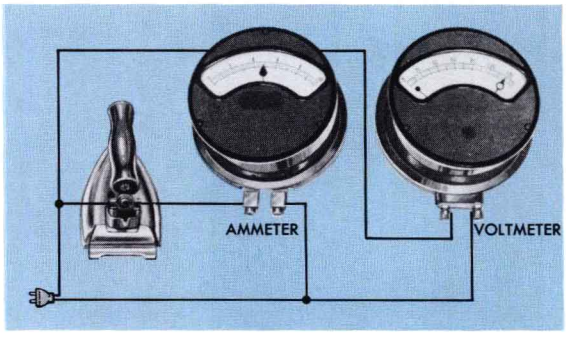
GALVANOMETER. Devices that measure the flow of electricity in a circuit are called galvanometers. Galvanometers for use with direct current operate on the D'Arsonval principle. A small coil of fine wire, held by two springs, is pivoted between the poles of a permanent magnet. When current passes through the coil, it becomes an electromagnet with north and south poles. The poles are repelled by like poles of the permanent magnet, and the coil turns against the pull of the springs. (If it turns far enough, its poles are attracted by unlike poles of the permanent magnet.) The amount of turn depends on the amount of current indicated by a pointer on a scale. In fine instruments a mirror mounted on the coil throws light along a scale to magnify the motion.

The ordinary ammeter is a galvanometer connected in series with the circuit to be measured. Most of the current passes through a strip of metal called a shunt, but the small part that goes through the moving coil is always the same fraction of the main current. The voltmeter is a galvanometer of very high resistance. It is connected across (in parallel with) the circuit so that the current it allows to pass is proportional to the voltage.

For use with alternating current, the permanent magnet may be replaced by a fixed coil that takes

The first galvanometer (left) has a shunt. This makes it an ammeter for measuring current. The second has a high resistance for use as a voltmeter. The ammeter, connected in series, and voltmeter, connected in parallel, test the current used by an electric iron (right).





current from the same circuit as the moving coil. Since the polarity of the fixed coil alternates at the same instant as that of the moving coil, the direction of the magnetic action remains constant.

In a wattmeter a fixed coil is connected to the circuit in series, and a moving coil is connected in parallel. The needle, therefore, responds to both amperage and voltage and gives a reading in watts.

Electromechanical galvanometers have been largely replaced by solid-state electronic devices such as the digital multimeter. They are used to make a variety of different measurements.

GAMA, Vasco da (1460?–1524). During the 15th century Portuguese navigators pressed farther and farther down the uncharted west coast of Africa. They were searching for a sea route to India, whose highly valued spices promised wealth to European traders. By 1488 a Portuguese expedition under Bartholomew Diaz had reached the Cape of Good Hope (*see* Diaz, Bartholomew). Then in 1492 Spain sent Christopher Columbus sailing westward to find India. Soon afterward King Emanuel I of Portugal selected Vasco da Gama to head a new expedition charged with sailing around the cape and on to India.

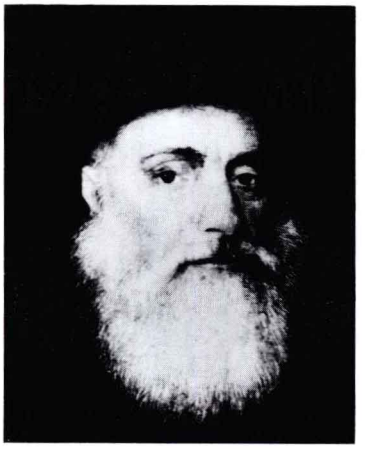
A nobleman of the king's household, Vasco da Gama was born at Sines, Portugal. At the time of his appointment, he was a veteran soldier and a skilled mariner. To Da Gama was entrusted a fleet of four vessels. His brother Paulo was placed in command of one of them. On July 8, 1497, they set sail from Lisbon.

After months of sailing, the crew sighted the southwest coast of Africa on November 1. On November 22 they rounded the Cape of Good Hope. In May 1498 Da Gama landed at Calicut (now Kozhikode) on the southwest coast of India.

Influenced by Muslim traders who feared competition, the Hindu ruler of the city was suspicious of the Europeans. Da Gama secured samples of spices and precious stones, however, and began the homeward journey. When the expedition returned to Lisbon in the summer of 1499, ending a voyage that had lasted for more than two years, only 55 of the original crew of 170 remained. Scurvy had killed most of the others. Da Gama arrived in Lisbon a little later after he stopped at the Azores to bury his brother Paulo. For his achievement the king granted Da Gama the coveted title *dom,* generous pensions, and permission to carry on trade with India.

In February 1502 Da Gama set sail a second time for India. He returned in September 1503 with the first tribute of gold from the East. Again he received money and honors. Da Gama also enjoyed favor as an adviser to his king and was made count of Vidigueira in 1519. Five years later he was sent to India as viceroy, charged with the task of reforming abuses in the colonial government. He died within a few months at Cochin, India, on Dec. 24, 1524.

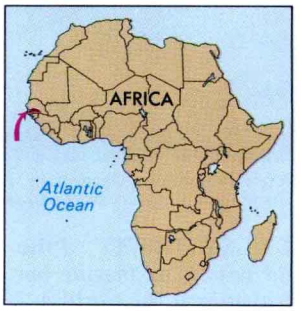
Da Gama's voyages had brought his country immense wealth. As a result of his exploration, Portugal had become one of the foremost powers of Europe because it controlled the route to the Indies.



Vasco da Gama in a painting from the early 16th century

Courtesy of the Museu Nacional de Arte Antiga, Lisbon

GAMBIA, THE. When Gambia obtained its independence from Great Britain in 1965, it became Africa's smallest self-governing nation. Gambia occupies a narrow strip of territory cut in two by the Gambia River. The nation extends inland for about 295 miles (475 kilometers) and ranges from 15 to 30 miles (24 to 48 kilometers) in width. Its total area is 4,017 square miles (10,403 square kilometers). Except for its short coastline on the Atlantic Ocean, Gambia is completely surrounded by Senegal. The capital city is Banjul.



The country is mostly flat. Along the winding river are swamps where rice is grown and cattle graze. Farther away from the river the soil is sandy and is used for raising peanuts, the chief crop and main export of the nation. Gambia's climate is tropical. The country has a hot, wet season and a cool, dry season that lasts from November to May.

The largest tribal group in the population is the Mandingo. Others are the Fulani, Wolof, Dyola, and Soninke. The most widely spoken languages are Mandingo and Wolof, but English is the official language. About 85 percent of the Gambians are Muslims.

The great majority of the people are farmers. The men grow peanuts, sorghum, and millet and practice crop rotation. The women have the more demanding job of raising rice, the chief food crop, as well as garden crops and some peanuts. Corn and cassavas are also grown for domestic use, as are mangroves, oranges, other fruits, and vegetables.

Next to peanuts, Gambia's most important exports are peanut oil, palm kernels, and dried fish. Industry is largely confined to plants that process peanuts. No minerals have been discovered to supplement these very limited sources of income.