This page: A salt-encrusted lake high in the Andes of Bolivia

Title page: Brazilian gold prospectors looking for a lucky strike
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INTRODUCTION

SOME 300 MILLION PEOPLE LIVE IN SOUTH AMERICA, a continent that accounts for about one-seventh of the world's land surface. In the north it is joined by a narrow isthmus to Central America, while in the south it tapers to Tierra del Fuego (the nearest inhabited land to Antarctica). South America is dominated by two mighty geographical features – the Andes mountains and the Amazon river. Measuring over 7,000 km (4,350 mi) from north to south, the Andes is the longest unbroken mountain range in the world. Running parallel to it is a deep offshore trench, and the steep gradient along the coast from ocean depths to mountain heights produces a huge variety of habitats. These range from sea-level deserts to summit glaciers and active volcanoes. The Amazon River rises in the Andes a short distance from the Pacific coast, but runs eastward toward the Atlantic, draining an area half the size of the United States.

The lands dominated by these giant physical features encompass an extremely high level of species diversity. South America possesses between 70,000 and 80,000 plant species, a third of the world's bird species and a mixture of unusual mammals, including sloths, tamarins, llamas, capybaras and jaguars. This diversity is also very rich in the unique environment of the Galapagos Islands off Ecuador.

The human inhabitants are no less diverse. Early Spanish and Portuguese settlers brought African slaves to the coastal plantations, and by the 19th century the expanding South American economies were attracting immigrants from all over Europe. The blending of these peoples has produced a society fraught with political and cultural tensions. Throughout the region, Amerindians barely survived the process of conquest, and native populations were decimated. The influence of Portuguese and Spanish settlers is apparent in the dominant languages (Spanish is the most widely spoken throughout the region and Portuguese is still the official language in Brazil). Numerous Roman Catholic missions were established from the 16th century, and Catholicism is still the major religion throughout the continent. The architecture of South America's vast cities – Buenos Aires, São Paulo and Rio de Janeiro is also heavily influenced by the colonial era. Today, under the combined pressure of massive international debt, the effort of nation-building and competition for natural resources, much of the region experiences great poverty, civil war, and the threat of extinction to traditional ways of life.
COUNTRY PROFILES

South America

COUNTRIES IN THE REGION

COLOMBIA • VENEZUELA • GUYANA • SURINAM
ECUADOR • PERU • BOLIVIA • BRAZIL • PARAGUAY
CHILE • ARGENTINA • URUGUAY

DEPENDENCIES IN THE REGION

FALKLAND ISLANDS • FRENCH GUIANA

South American specialities Vicuna in Lanca National Park, Chile. Vicuna are the smallest of the South American members of the camel family, which includes llamas and alpacas. South America contains an enormous variety of animals and plants that are found nowhere else in the world.
Colombia

Colombia, also known as the Republic of Colombia, is a country in South America. It takes its name from the explorer Christopher Columbus, who visited the region in the 15th century. Colombia has a rich colonial heritage, but is plagued by internal strife.

**Environment**

Colombia's short frontier with Panama to the northwest divides the western (Pacific) coast from the northern (Caribbean) shoreline. Snowcapped Pico Cristóbal Colón forms part of an isolated massif overlooking the Caribbean to the north and a swampy basin to the west.

The two main rivers that flow into the basin from the south, through deep trenches separating the three main ranges of the mighty Colombian Andes, are the Magdalena and the Cauca. The ranges, which run roughly northeastward from the southeastern border with Ecuador, are the Cordillera Occidental, overlooking the narrow Pacific coastal plain, the volcanic Cordillera Central east of the Cauca river, and farther east still, beyond the broader Magdalena valley, the Cordillera Oriental. This divides at the Venezuelan border. Recent earthquakes and a devastating eruption in 1985 show that the area is geologically active.

More than half the country consists of a sparsely inhabited plain that drops gently southeast from the snowcapped Andean ranges toward the Peruvian and Brazilian borders. The northern lowlands - the llanos - are drained by the Orinoco river, which runs along the western border with Venezuela. The southern lowlands form part of the Amazon river basin.

Colombia's climate is very varied. The Caribbean lowlands are relatively dry with two short rainy seasons, though they are vulnerable to hurricanes. Rainfall is highest on the Pacific coast, in the central valleys and in the Amazonian lowlands, where tropical rainforest is characteristic. This gives way to savanna on the llanos and in the northern valleys. The vegetation changes with altitude, giving way on higher mountain slopes to cloud forests and tundra.

Human settlement and agriculture have stripped away much of the original forest cover, but the moist mountain forests contain many orchids and epiphytes, as well as balatas, from which nonelastic rubber is obtained, and ivory nuts, used for making ornaments. Animal life is extremely varied. Typical examples include tapirs, sloths, anteaters, jaguars and howler monkeys. Hummingbirds tap the nectar of innumerable flowers, while the rivers support caimans and capybaras, large, semiaquatic rodents.

**Society**

In the early 16th century Spanish invaders overcame the sophisticated farming and trading culture of the indigenous Chibcha peoples, craftsmen highly skilled at working gold and embellishing their artifacts with jewels. The colonists founded the city of Bogotá in the Cordillera Oriental, and Colombia became the heart of the Viceroyalty of New Granada. Its independence was gained after the Spanish defeat at Boyacá in 1819 and until 1830 it was part of the Republic of Gran Colombia, established by Simón Bolívar (1783-1830), which included modern Ecuador, Venezuela and Panama.

The modern history of Colombia has been one of continual unrest, beginning with a revolt in 1840 and the emergence of bitterly opposed liberal and conservative
political factions: a liberal uprising in 1899 triggered the murderous War of the Thousand Days, which lasted until 1903. In 1948 La Violencia broke out - a long struggle between the factions that led in 1958 to the creation of the National Front. In this uneasy coalition, presidents from each faction were elected in rotation. Multiparty elections since 1974 have brought some prosperity but little peace. There are several active guerrilla groups, and the growing power and violence of local drug cartels has further complicated the situation: for Colombian citizens, gunshot wounds are almost as common a cause of death as heart attacks.

Legislative power rests with a congress consisting of a senate and a house of representatives, each of which is directly elected every four years. The head of state is the president, elected for a single four-year term; he appoints the cabinet.

Despite their impressive civic architecture - a legacy from colonial days - Colombia's cities are beset by unemployment and housing shortages. The crime and violence that arise from the illegal drug trade cast a long shadow over the lives of ordinary people.

Colombia's colonial past is reflected in today's population, the majority of whom are of mixed ancestry. Most of these are mestizos of European and Amerindian descent, but mulattos (of mixed African and European origin) form the majority along the coast. There is a large white minority, and small numbers of blacks and Amerindians, the latter divided into as many as 400 different groups. Though Spanish is the official language, many Amerindian languages are also spoken. The vast majority of the population are Roman Catholic, though some traditional beliefs are also held.

**ECONOMY**

The Colombian economy is founded largely on private enterprise, and though mainly agricultural it is becoming increasingly industrialized.

Only a small portion of the land is cultivated, but the crops produced are vital to the economy. The wide range of climate and terrain gives rise to a great range of food crops, from bananas and cassava in the lowlands to maize and potatoes in the mountains. Coffee accounts for one-third of all official export revenue, but cannabis and coca, from which cocaine is derived, provide the drug cartels with twice this amount.

Nearsly half the land area is forested, and the lumber industry is growing fast. Much of the remaining available land is occupied by pasture, mostly for cattle. River fishing, once plentiful, has suffered from silting and pollution, and the potential for offshore fisheries has not yet been fully developed.

Mineral resources are under government control. They include petroleum (a major export), natural gas, coal and valuable metal ores. Hydroelectric stations supply most of the country's electricity, with thermal stations providing the rest. Government investment has helped to diversify the manufacturing sector, but it is still dominated by consumer goods for the home market. Tourism, however, is a growing source of foreign exchange.

Overland transportation is hampered by the difficult terrain, and most roads are unsurfaced. Even so, buses and trucks carry more passengers and freight than the limited railroad system. River transportation, once of major importance, has declined, though coastal ports are busy. The thriving airline network is heavily used, with six international airports.

Newspapers are the dominant news media. They are generally free of government censorship, and tend to reflect party loyalties. Radio and television broadcasting are subject to stricter controls.

Welfare provision includes a range of unemployment, maternity and disability benefits, and retirement pensions. Health facilities are limited, but there is an emphasis on health education and improving sanitation. Among the poor, however, malnutrition and inadequate housing threaten general health. Primary education is free and compulsory for five years, and literacy is relatively high.

### NATIONAL DATA

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<thead>
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<th>Land area</th>
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<tbody>
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<td><strong>Climate</strong></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>m (ft)</td>
</tr>
<tr>
<td>January</td>
<td>°C(°F)</td>
</tr>
<tr>
<td>July</td>
<td>°C(°F)</td>
</tr>
<tr>
<td>Annual</td>
<td>mm (in)</td>
</tr>
<tr>
<td>Bogota</td>
<td>2,645 (8,678)</td>
</tr>
<tr>
<td>Major physical feature</td>
<td>highest point Pico Cristobal</td>
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<tr>
<td>Population</td>
<td>(1990) 32,978,000</td>
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<td>Form of government</td>
<td>multiparty republic with two legislative houses</td>
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<td>Armed forces</td>
<td>army 115,000, navy 14,000, air force 7,000</td>
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<tr>
<td>Largest cities: Bogota (capital - 4,185,000), Medellin (1,506,000); Cali (1,397,000), Barranquilla (920,000)</td>
<td></td>
</tr>
<tr>
<td>Official language</td>
<td>Spanish</td>
</tr>
<tr>
<td>Ethnic composition</td>
<td>mestizo 59.0%, white 20.0%, mulatto 14.0%, black 4.0%, mixed black/Amerindian 3.0%, Amerindian 1.0%</td>
</tr>
<tr>
<td>Official religion</td>
<td>none</td>
</tr>
<tr>
<td>Religious affiliations</td>
<td>Roman Catholic 95.0%, others 5.0%</td>
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<tr>
<td>Currency</td>
<td>1 Colombian peso (Col $) = 100 centavos</td>
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<tr>
<td>Gross national product</td>
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<tr>
<td>Gross domestic product</td>
<td>per person (1990) US $4,950</td>
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<td>Life expectancy at birth</td>
<td>male 63.0 yr, female 67.0 yr</td>
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<td>Major resources</td>
<td>agriculture/fisheries 18.0% GNP, mining 6.4% GNP, manufacturing 20.0% GNP, trade 14.0% GNP, finance 10.5% GNP</td>
</tr>
</tbody>
</table>

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ENVIRONMENT

The landscape of northwestern Venezuela is shaped by two northern branches of the Andes. The western branch, the Sierra de Perijá, defines part of the Colombian frontier. The eastern branch, the Cordillera de Mérida, enters Venezuela from the south and swings northeast toward the island-fringed Caribbean coast; it includes Venezuela’s highest peak, Pico Bolivar. Between the two Andean ranges lie the swampy Maracaibo Lowlands, surrounding the huge, shallow Lake Maracaibo — an irregular extension of the Gulf of Venezuela.

Further mountain ranges run eastward along the coast from the Cordillera de Mérida. The basins and valleys between them shelter several important cities, including the capital, Caracas. South of the mountains are the extensive lowland plains, or llanos, of the Orinoco basin, which cross the country from Colombia to the Orinoco Delta area near the Guayaní border. Farther south is the vast, irregular granite plateau of the Guiana Highlands, where the Orinoco river rises.

The climate is generally tropical with a marked rainy season from April to October. However, the mountain areas are cooler, and rainfall varies enormously. The driest areas are in the lee of mountains, especially on the coast; the Orinoco Delta receives the highest rainfall. The llanos are flooded during the rainy season and arid for much of the rest of the year.

Forests still cover much of the country, ranging from semitropical evergreen in the northern mountains to tropical rainforest around the Orinoco Delta and in the far south. Wild grassland covers most of the rest of the land, including the extensive llanos areas, the Guiana Highlands and the high alpine meadows of the Andean mountain ranges.

The range of altitudes has created an enormous diversity in both the plant and the animal life. Human settlement has confined many animals to more sparsely populated areas, but they remain varied nonetheless, and include bears, caimans, ocelots, opossums and peccaries. Among the more remarkable bird species is the strange cave-dwelling oilbird. Manatees and dolphins are found in coastal waters. The threat to the many rare species has long been recognized, and hunting is forbidden to all except Amerindians, who depend on it for their way of life.

SOCIETY

When European explorers first arrived in the 15th century, they found a number of different Amerindian peoples in the area, including a sophisticated farming culture in the Andean highlands. In 1523 the Spaniards founded the first European settlement, situated at Cumana, and a colonial economy was established using local slave labor.

Until the beginning of the 19th century, Venezuela was effectively in the hands of Spanish colonial administrators and priests. It was in Venezuela that Francisco Miranda (1750–1816) and his successor Simón Bolívar (1783–1830) began South America’s struggle for independence. After the final defeat of the Spanish at Carabobo in 1821, Venezuela, Colombia and Ecuador were briefly united in the Republic of Gran Colombia. Venezuela left the union in 1829, and for more than a century was ruled by a succession of military dictators.

The establishment of a major petroleum industry in the 1920s initiated an era of greater prosperity and growth. Between 1945 and 1948, Romulo Betancourt (1908–81) paved the way for a short-lived democratic radical government. In 1959, after a further period of dictatorship, he established a second, more moderate administration, which laid the foundations for lasting democracy. In 1990 the government agreed to United Nations mediation regarding Venezuela’s claim to parts of neighboring Guyana.

The Guiana Highlands, Venezuela (above) This vast area of rolling savanna and sandstone outcrops — occupying nearly half the country — is largely uninhabited and unexplored. Venezuela is the most sparsely populated country in South America.

The petroleum industry (below) is the mainstay of the Venezuelan economy, producing about three-quarters of all government revenue. The country’s largest oilfields are located in Lake Maracaibo, a shallow inland sea on the northwest coast.
Venezuela is a federal republic made up of 20 states, a federal district (around Caracas), two federal territories and 10 Caribbean island dependencies. Legislative power rests with the two-chamber parliament, whose members belong to several political parties. The president, the 49 senators and the 201 deputies are each directly elected every five years.

The majority of the population are mestizos of mixed European and Amerindian origin, and there are substantial white and black minorities. Few pure Amerindians remain, but they have preserved as many as 25 native languages. Although Spanish is the official language, English and Italian are also spoken. The Venezuelan constitution guarantees freedom of religion to its citizens, but the great majority of the population belong to the Roman Catholic church.

**ECONOMY**

Venezuela's economy is heavily dependent on its petroleum and natural resources, which accounts for the majority of its export income. However, the world reduction in demand for these products has necessitated increasing diversification. Petroleum, natural gas and hydroelectricity, mostly from the Orinoco and its tributaries, provide ample resources for both industrial and domestic power needs, and manufacturing industry has benefited from an increase in foreign and government investment. The thriving petrochemical industry is based mainly around Morón, to the west of Caracas, and near the Gulf of Venezuela and Lake Maracaibo; the city of Maracaibo on its western shore produces food, pharmaceuticals, machinery and electrical equipment. Ciudad Guayana in the east is a major center for the processing of local iron ores. Significant amounts of diamonds and gold are also extracted.

Only a small proportion of the land is used for agriculture. Despite various agrarian reforms, modernization programs and extensive irrigation in the llanos, some food still has to be imported. The principal food crops include bananas, sorghum and maize, while cash crops include coffee, sugar cane and tobacco. Cattle are the most important livestock; the llanos provide good grazing.

Fishing potential is considerable but largely unexploited. However, anchovies, sardines and shellfish are caught off the coast by local fishing fleets. Most forestry land is in government ownership.

The road network is well developed in the north, with three major highways. Railroads make only a small contribution, chiefly to the iron and steel industries. Shipping carries most overseas trade, and there are dredged channels into Lake Maracaibo and the Orinoco river. There are three national airlines and some 30 airports operating scheduled flights, including internal links to areas that would otherwise be inaccessible. The press, radio and television are privately owned and operated, and are not subject to government censorship.

The welfare system is well established, with social security for the old, disabled and unemployed, and increasing public health provision. The quality of health care is good, but the rising population and a general move to urban centers have created shanty towns with inadequate housing and sanitation.

Primary education is free and compulsory, but secondary education is less well developed; however, adult literacy is very high. Higher education is free to students who qualify to enter a university, teacher-training college or polytechnic institute.

**NATIONAL DATA**

<table>
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<th>Land area</th>
<th>912,050 sq km (352,144 sq mi)</th>
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<td><strong>Climate</strong></td>
<td></td>
</tr>
<tr>
<td>Altitude m (ft)</td>
<td>January °C (°F)</td>
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<tr>
<td>Caracas</td>
<td>1,042 (3,419)</td>
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<tr>
<td>Major physical features</td>
<td>highest point: Pico Bolivar 5,067 m (16,627 ft)</td>
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<td>Population (1990)</td>
<td>19,735,000</td>
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<td>Form of government</td>
<td>federal multiparty republic with two legislative houses</td>
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<td>Armed forces</td>
<td>army 54,400; navy 10,100; air force 6,500</td>
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<tr>
<td>Largest cities</td>
<td>Caracas (capital – 3,247,000); Maracaibo (1,295,000); Valencia (1,135,000); Maracay (857,000); Barquisimeto (618,000)</td>
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<tr>
<td>Official language</td>
<td>Spanish</td>
</tr>
<tr>
<td>Ethnic composition</td>
<td>mestizo 69.0%; white 20.0%; black 9.0%; Amerindian 2.0%</td>
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<tr>
<td>Official religion</td>
<td>none</td>
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<td>Religious affiliations</td>
<td>Roman Catholic 91.7%; others 8.3%</td>
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<td>Currency</td>
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<td>Gross national product (1989)</td>
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<td>Gross domestic product (per person 1990)</td>
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<td>Life expectancy at birth</td>
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<td>Major resources</td>
<td>agriculture/fisheries 5.7% GNP; mining 15.1% GNP; manufacturing 19.6% GNP; trade 14.4% GNP; services 20.0% GNP</td>
</tr>
</tbody>
</table>

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SOUTH AMERICA
Guyana

COOPERATIVE REPUBLIC OF GUYANA

Guyana, formerly British Guiana, is a small state on the north coast of South America, lying between Venezuela to the northwest, Brazil to the west and south, and Surinam to the east across the Courantyne river. The country's name is derived from an Amerindian word meaning "land of waters".

ENVIRONMENT

Apart from the narrow coastal plain, which is mostly reclaimed land protected by dikes and crisscrossed by canals, most of the country consists of an irregular, thickly forested plateau. Straddling the western border are the ancient Pakaraima Mountains, including Mount Roraima – inspiration for the famous novel The Lost World by the British writer Sir Arthur Conan Doyle (1859–1930). The Rupununi area in the southwest of the country supports savanna grassland interrupted by low mountain ranges.

The climate is hot and often humid. Heavy seasonal rains bring flooding to the poorly drained soils. The forests are mostly tropical hardwoods. Among the varied wildlife, manatees and capybaras are found in and beside the rivers, sloths and jaguars in the forests, and giant anteaters and armadillos on the savanna. The rich bird life includes toucans and brilliantly plumaged hummingbirds.

SOCIETY

The area was originally inhabited by Arawaks and Caribs. The first European settlers were the Dutch, who brought in thousands of African slaves to work the sugar plantations. The British occupied the area around the Demerara river during the Napoleonic Wars (1796–1815), and secured most of present-day Guyana in 1814. With the abolition of slavery, immigrant laborers were imported from Asia. A border dispute with Venezuela was temporarily settled in 1899, and in 1923 British Guiana became a crown colony. In 1953 it was granted home rule along British parliamentary lines, and in 1966 was granted full independence as Guyana. In 1970 it became a republic under Prime Minister Forbes Burnham (1923–85), who was made the country's executive president in 1980.

Guyanans are remarkable for their racial diversity. The great majority are descendants of Asian Indians or Africans. Amerindians are a minority, but are the dominant group in the villages of the sparsely populated interior. There are also small European and Chinese communities. Religion and language reflect the cultural mix: English is the main language, but creole and Hindi are also spoken and there are many Hindus and Muslims as well as Christians.

ECONOMY

Guyana has a mixed economy. Attempts have been made in recent years to reduce its dependence on fluctuating foreign markets. Agriculture is important, but is mostly confined to coastal areas. Plantation sugar cane is the principal crop, followed by rice and coconuts. There is some livestock ranching, chiefly of cattle, in the Rupununi valley in the southwest.

Guyana's industry is dominated by its world-class deposits of bauxite, which provide the chief export item. Other activities include sugar processing and river dredging for diamonds. The main imports are fuel and manufactured goods. There is great hydroelectric potential, but its development has been hampered by poor road and railroad links in all but coastal areas. Light aircraft is the most common mode of transportation inland.

Health conditions are generally good, and endemic diseases are under control. Social welfare schemes are comprehensive, but inadequate housing remains a problem. Good education is generally available, and literacy levels are high.

The Kaieteur Falls, formed where the Potaro river plunges over an escarpment in the highlands of west-central Guyana. Some 230 m (750 ft) high and 110 m (350 ft) wide, the falls lie at the center of the Kaieteur National Park.
Surinam, formerly the colony of Dutch Guiana, is a small state on the northeastern coast of South America, lying between Guyana to the west, French Guiana to the east and Brazil to the south.

**ENVIRONMENT**

Surinam's landscape falls into three main areas. The narrow coastal plain is low and swampy, consisting largely of artificially drained or reclaimed land. The coastal soils are rich and fertile, and most of the population live here. Farther inland the land rises to a low savanna plateau. In the south the plateau becomes higher and more rugged, with low mountains and thick forests. Several rivers rise near the Brazilian border and flow northward, the Corantijn forming the border with Guaya, while the Marowijne and Litani straddle that with French Guiana.

The climate is hot and very humid, tempered only by light coastal breezes, and there is heavy seasonal rainfall. The forests are chiefly of tropical hardwoods inland, with some mangroves along the coast. Wildlife is plentiful, and includes tapis, sloths and ocelots, together with many unusual bats, snakes and birds.

**SOCIETY**

The Surinamese peoples, after whom the country is named, had been mostly ousted by other indigenous groups before the arrival of European colonists. In 1667 the Dutch secured the colony from Britain in exchange for New Amsterdam (later New York). From 1682 the Dutch West India company brought in African slaves to work its tea and coffee plantations. Many escaped to the interior, where their descendants are known as bush blacks. When slavery was abolished in 1863, laborers from India, China and Java were brought over to work the land. In 1954 Surinam was granted internal self-government; independence followed in 1975. Racial conflicts led to a military coup in 1980 under Lieutenant-Colonel Desi Bouterse. Foreign aid was withdrawn, the economy collapsed, and the Jungle Commandos, a bush blacks organization led by Ronnie Brunswijk (b.1961), began a guerrilla campaign. Bouterse contested elections in 1988 and lost. The new civilian government concluded a tentative peace with the Jungle Commandos. Bouterse staged another coup in 1990, but soon afterward he signed a peace accord with Brunswijk.

The country's many political parties reflect its strong racial divisions. Bush blacks form the majority in the interior, with a small Amerindian minority. The two main groups, however, are Asian Indians and mestizos (of mixed descent). There are also significant Javanese and Chinese minorities. The official language is Dutch, but many others are spoken, including a lingua franca called Sranan. The main religions are Christianity, Hinduism and Islam.

**ECONOMY**

Surinam's economic potential is high. Agriculture is mainly concentrated on the coastal plain. The main crop is rice, some of which is exported; other crops include sugar cane and bananas. Livestock raising is small-scale, but forestry and fishing fulfill both domestic and export needs. Most exports, however, are provided by the country's rich bauxite deposits, which are smelted to aluminum using local hydroelectric power. The road network is mainly limited to coastal areas, and transportation elsewhere is mostly by water or air. Welfare and health-care standards are generally high, and free education is available to university level.

### NATIONAL DATA

<table>
<thead>
<tr>
<th>Land area</th>
<th>163,620 sq km (63,251 sq mi)</th>
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<td>Altitude</td>
<td>Temperature</td>
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<td></td>
<td>January</td>
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<tr>
<td>Paramaribo</td>
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<td>Major physical feature</td>
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<td>Population</td>
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<td>Form of government</td>
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<td>Armed forces</td>
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<td>Capital city</td>
<td>Paramaribo (192,000)</td>
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<td>Official language</td>
<td>Dutch</td>
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<td>Ethnic composition</td>
<td>Asian Indian 37.0%, Suriname Creole 31.3%, Javanese 12.4%, Bush Negro 8.5%, Amszindain 3.1%, Chinese 2.8%, Dutch 1.4%, others 1.7%</td>
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<td>Official religion</td>
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<td>Religious affiliations</td>
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<td>Currency</td>
<td>Suriname guilder (Sg) = 100 cents</td>
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<tr>
<td>Major resources</td>
<td>agriculture, fisheries 9.1% GNP, mining 9.3% GNP, manufacturing 13.3% GNP, finance 11.2% GNP, public administration/defense 30.8% GNP</td>
</tr>
</tbody>
</table>
Ecuador, as its name suggests, lies astride the Equator on the west coast of South America between Colombia to the north and Peru to the south and east. It also includes the Galapagos Islands some 1,000 km (600 mi) out in the Pacific.

ENVIRONMENT

Mainland Ecuador is a country of high mountains that is prone to earthquakes. The coastal lowlands consist largely of fertile alluvial plains interspersed with volcanic hills. Inland the massive wall of the Andes crosses the country from north to south. It is made up of two main parallel chains divided by high valleys, one of which is the site of the capital, Quito. Many of the highest peaks are volcanic, notably Cotopaxi, the world’s tallest active volcano. The eastern slopes of the Andes drop into the impenetrable rainforests of the Amazon basin. In this wild, little-known area the exact borders with Peru are disputed.

The climate is generally hot and humid, especially in the east, but the mountainous areas are much colder. The coastal lowlands are cooled by the Humboldt Current, which also reduces rainfall along parts of the coast. The forest here is sparser than on the mountain slopes and in the east, where wildlife is abundant.

The Galapagos are a complex archipelago formed by the cones of young volcanoes. Their shores consist of arid lava rocks, and only the peaks are forested. Kept cool and dry by the Humboldt Current around their shores, the islands have a unique wildlife, including marine iguanas, giant tortoises, flightless cormorants and 13 species of Darwin’s finch, whose variations inspired the evolutionary theories of Charles Darwin (1809-82). The islands are protected for research, but have a limited tourist trade.
SOCIETY

In the 15th century a short-lived Amerindian kingdom on the mainland was conquered by the Incas, the ruling class from Peru. Civil war later weakened the Inca empire, which was quickly overrun by the Spanish conquistadors in the 1530s. Spanish settlers divided the country into large estates worked by landless Amerindian laborers, or peons. The situation remained unchanged up until the 19th century, when independence movements grew up among the emergent middle classes. Ecuador won its independence in 1830 after some two decades of war.

A divide remained between the conservative landowners of Quito and the more liberal commercial classes of Guayaquil, the chief port. The resulting insularity brought about a series of ruthless dictatorships that lasted until World War II, when Ecuador lost some territory to Peru. The postwar period was dominated by the charismatic president, José María Velasco Ibarra (1893–1979), whose inconsistent policies sometimes hampered the country’s economic development. Military rule in the 1970s was followed by a series of more liberal civilian presidents.

ECONOMY

Economically, Ecuador remains largely agricultural. Bananas are the principal crop, along with sugar cane, coffee and cacao. Rice and the indigenous potato are among the main staples. Despite land reforms, much food is still grown on massive hacienda estates. Livestock is raised both along the coast and in the mountain valleys. The great hardwood forests remain relatively unexploited, while the fishing industry is one of South America’s largest. The chief mineral resources are petroleum and natural gas, which have overtaken bananas and shrimps as the main export.

Transportation is hindered by the difficult terrain. Road and rail networks are limited, and the mule is often the most effective means of land transportation. Social welfare schemes are in place, but there is much rural poverty, and health care and living conditions are often poor. Education is available to university level.

Women in Quito (above) carry their burdens in bundles on their backs. The Ecuadorian capital – which retains the air of a Spanish colonial town – lies almost on the Equator, situated in a high valley about 3,000 m (9,000 ft) above sea level.

whose reforms were badly frustrated by problems in the economy.

Spanish is the main language, although a large portion of the population are Quechua-speaking Amerindians. Most of the rest are mestizos (of mixed descent), with small African and European minorities. The majority are at least nominally Roman Catholic, though much Amerindian culture survives.

NATIONAL DATA

| Land area | 269,178 sq km (103,930 sq mi) |
| Climate | Temperatures (°C/°F) | Annual precipitation mm (in) |
| Altitude m (ft) | January | July |
| Quito | 2,879 (9,446) | 14 (58) | 1,115 (43.9) |
| Major physical features | highest point | Chimborazo 6,310 m (20,702 ft); longest river | Napo 1,100 km (700 mi) |
| Population | 10,587,000 |
| Form of government | multiparty republic with one legislative house |
| Armed forces | army 35,000; navy 4,000; air force 3,000 |
| Largest cities | Guayaquil (1,301,000); Quito (capital - 1,116,000); Cuenca (272,000); Ambato (221,000) |
| Official language | Spanish |
| Ethnic composition | Quechua 49.9%; mestizo 40.0%; white 8.5%; other Amerindians 1.6% |
| Official religion | none |
| Religious affiliations | Roman Catholic 93.5%; others 6.5% |
| Currency | 1 Sucro (S/) = 100 centavos |
| Gross national product | (1989) US $10,774 million |
| Gross domestic product | per person (1990) US $37.20 |
| Life expectancy at birth | male 59.8 yr; female 63.6 yr |
| Major resources | agriculture/fishing 15.0% GNP; mining 11.8% GNP, manufacturing 21.4% GNP; trade 21.7% GNP |
Peru, which lies astride the Andes on the western coast of South America, derives its name from a Quechua word implying abundance, recalling the former opulence of the Inca and Spanish empires. However, its modern development has been hindered by the hostile, though often spectacular terrain.

ENVIRONMENT

Peru is divided into three distinct geographical areas. The narrow coastal plain, or Costa, runs along the whole length of the Pacific coast from Ecuador in the northwest to the Chilean border in the south. Much is arid desert, but the Andean rivers have laid down patches of fertile alluvial soil. Most of the population lives in this part of the country.

The lofty Andes, or Sierra, form a continuous backbone that enters from Ecuador and broadens in the southeast on the border with Chile and Bolivia. The mountains are most dramatic in central Peru, where peaks such as Huascaran, the highest, tower above deep mountain trenches. In the south the two main ranges run either side of an extensive high plateau called the Altiplano, at the center of which is the great Lake Titicaca straddling the Bolivian border. The whole country is liable to earthquakes, and several volcanoes in the south are dormant rather than extinct.

The Andes fall away northeast to the Montaña – the deep, forest-clad valleys that lead out into the dense rainforests of the Amazon basin. This wild, undulating country bordering Colombia and Brazil is almost uninhabited.

The climate of the Amazon basin is hot and humid, typical of its latitude, but the mountains are much colder with seasonal rain and snow. The coastal areas are kept dry by cold offshore currents; cloud and fog are common, but little rainfall normally occurs. However, an occasional switch from cold to warm sea currents creates a climatic phenomenon known as El Niño, causing severe flooding on land and a reduction in offshore marine plankton, leading to loss of coastal fish and birds.

Plant and animal life vary tremendously. Coastal vegetation ranges from cacti to hardy spiny shrubs; the highlands support grasses and puna scrub; and the east has typical hardwoods such as mahogany and wild rubber. Wildlife includes tapirs and sloths in the forests, and chinchillas, vicunas and condors in the mountains.
The cold offshore seas support rich fish populations and the many birds that feed on them such as pelicans and boobies.

**SOCIETY**

Various cultures once flourished among Peru's original Amerindian inhabitants, including most notably the Chavin, the desert-dwelling Nazca, the Chimú and the Huarí. In the 13th century, however, the whole country was taken over by the Quechua-speaking Incas. They built massive stone cities, the most famous of which are at Cuzco — their capital and the center of their religion, which was based on sun-worship — and mountain-top Machu Picchu. Weakened by civil war, however, their wealthy empire was overthrown by the Spanish adventurer Francisco Pizarro (c. 1475–1541) in 1531. This marked the beginning of the Amerindian peoples' long history of exploitation.

Peru, with its immense natural wealth, remained Spain's treasure house for some three centuries, until its liberation by the Argentine general José de San Martín (1778–1850) in 1821. A brief federation with Bolivia collapsed in 1839. After the liberal presidency of General Ramón Castilla (1797–1867) military juntas alternated with civilian politicians, who failed in their attempts to stabilize the economy. Such problems were exacerbated by the War of the Pacific (1879–84), in which valuable territory was lost to Chile.

In 1963 Fernando Belaunde Terry (b. 1912) was elected president, and launched a program of reforms. In 1968 he was ousted by an army junta, which in turn was toppled by another junta in 1975, but in 1980 Belaunde was returned to power in new elections. His attempts at reform were frustrated by economic difficulties, a devastating El Niño and ever-increasing

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**Mestizo-style architecture** (above) at Juli on the western shore of Lake Titicaca, Peru. The elaborate carving is Amerindian in style, but the subjects — the coat of arms above the door on the right and the floral motifs — are colonial.

A Peruvian river valley (left) shows the legacies of the inca empire. Terraced fields make subsistence farming possible on the steep hillsides, while the road running parallel to the river was once part of a sophisticated communications network.

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**NATIONAL DATA**

<table>
<thead>
<tr>
<th>Land area</th>
<th>1,285,216 sq km (496,225 sq mi)</th>
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<tr>
<td>Climate</td>
<td>Altitude</td>
</tr>
<tr>
<td></td>
<td>m (ft)</td>
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<tr>
<td>Lima</td>
<td>120 (394)</td>
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<td>Major physical feature</td>
<td>highest point Huascaran 6,768 m (22,205 ft)</td>
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<td>Population</td>
<td>(1990) 22,332,000</td>
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<tr>
<td>Form of government</td>
<td>multiparty republic with two legislative houses</td>
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<td>Armed forces</td>
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</tr>
<tr>
<td>Largest cities</td>
<td>Lima (capital) 6,234,000; Arequipa 612,000; Callao 515,000; Trujillo 513,000; Chachayo 410,000</td>
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<tr>
<td>Official languages</td>
<td>Spanish, Quechua</td>
</tr>
<tr>
<td>Ethnic composition</td>
<td>Quechua 47.1%; mestizo 32.0%; white 12.0%; Aymara 5.4%; other Amerindians 1.7%; others 1.6%</td>
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<tr>
<td>Official religion</td>
<td>Roman Catholicism</td>
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<td>Roman Catholic 92.4%, others 7.6%</td>
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<tr>
<td>Currency</td>
<td>1 int (fé) = 100 céntimos</td>
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<tr>
<td>Gross domestic product</td>
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<td>Life expectancy at birth</td>
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<td>Major resources</td>
<td>agriculture/fisheries 9.2% GNP, mining 1.5% GNP, manufacturing 29.5% GNP, trade 20.6% GNP, finance 11.8% GNP, public administration 13.4% GNP</td>
</tr>
</tbody>
</table>
guerrilla activity. The two main guerrilla groups involved were the Tupac Amarú Revolutionary Movement and the neo-Maoist group known as Sendero Luminoso (Shining Path).

President Alan García, elected in 1985, fared no better with the economy, the guerrillas or drug trafficking. He was eventually forced to reverse many of his policies, and lost the 1990 election to Alberto Fujimori. In April 1992 Fujimori staged a coup against his own government, giving himself dictatorial powers to enforce economic reforms and defeat the guerrillas. Shining Path leader Abimael Guzmán was captured in September, and Fujimori was re-elected in November, ending his brief dictatorship.

Peru’s political instability results in part from the sharp ethnic and social divisions between the more prosperous Spanish-speaking mestizos of the Costa and the Quechua-speaking Amerindians of the Sierra. Other minority groups include some whites, Aymará and other Amerindian peoples. The majority of the population are Roman Catholic, but local practices are strongly influenced by older Amerindian traditions.

**ECONOMY**

Peru’s economy is heavily dependent on the export of its rich mineral and other resources. Agriculture is limited by a lack of arable land, most of which is found in coastal areas, where irrigation is needed to grow crops such as rice and sugar cane. Farming in the highlands is mainly at subsistence level. Crops here include wheat, potatoes and coca, which supplies an illicit cocaine trade. Sheep, llamas and alpacas are the main livestock animals, bred chiefly for their wool.

There is some forestry in parts of the east, but exploitation is limited by inaccessibility and the need for conservation. The vast fishing industry was devastated in the 1980s by a severe El Niño, but the conservation measures adopted since have helped stocks to recover.

Industry is powered mainly by Peru’s considerable hydroelectric resources. Copper ore is the major mineral, but petroleum is becoming almost as important. These are the two main exports, followed by uranium and other metals such as iron and silver. Manufacturing industries are concentrated around the capital, Lima, and nearby Callao, the main port; many manufactured goods still have to be imported.

Transportation is limited by the rugged terrain and the climate: the roads inland are often impassable, and there are few railroads. Coastal areas are better served. Air travel is hampered by the difficulty of constructing airstrips in swampy forest or steep mountain terrain.

Welfare provision and health care is available in the cities, but not in the rural uplands. However, inadequate housing and health conditions are not confined to impoverished mountain areas, but extend to the outskirts of cities such as Lima. Where education can be obtained it is free and compulsory, but it is often unavailable to poor or rural communities. Peru has several universities.

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**The Incas**

The popular image of the Inca empire, the last of the great South American indigenous civilizations, is of a society as durable and mysterious as the mighty Inca fortifications that survive today. Yet the Inca empire was relatively short-lived. It was established only a few years before the birth of Christopher Columbus (1451-1506), and lasted little more than a century. The real mystery is how the Incas achieved so much in that short time. They began as a band of Andean mountain dwellers who left their little
Machu Picchu (above), perhaps the best-known of Peru’s Inca cities, was probably built no earlier than the 15th century, and is perched high above the Urubamba valley on the eastern flanks of the Andes.

Inca artifacts (left) An Inca stirrup cup in the form of a jaguar savaging its victim, and a rare ceremonial gold figure, one of the few pieces of gold to have survived the marauding Spanish conquistadors.

village to found a city at Cuzco in what is now south-central Peru. They grew into a dominant city-state that raided and feud-ed with its neighbors. Their chieftains - the Incas, for whom the empire was later named - became the focus of a divine cult. Under the eighth Inca, Viracocha (reigned 1410–38), a process of conquest and colonization began; Cuzco became the capital of the growing Inca territory. His son Yupanki (1438–71), who assumed the name Pachacuti, continued the expansion. To govern his large territories he created an entire administrative class of honorary Incas and undertook what may have been the Incas’ most amazing achievement - an elaborate road system, thousands of kilometers long, that included tunnels and suspension bridges. Along it at regular intervals ran a system of relay stations that could send government communications as far as 250 km (150 mi) a day. The Incas achieved this without the use of either the wheel or the horse; messengers ran between the stations on foot. They had no writing system either, so messengers had to relay their messages from memory, with only knotted-string patterns called quipu to aid them.

Pachacuti and his successor Topa (1471–93) conquered an enormous area of western South America from present-day Ecuador in the north to Chile and Argentina in the south. Everywhere they passed, they built not only roads but towns, canals, roadside forts, resthouses and irrigation schemes in order to increase food production. Topa’s successor, Huayna Capac (1493–1525), continued the process, building a newer and more splendid capital on the site of the present-day Ecuadorian capital of Quito.

What made all this possible was sheer manpower; Huayna ruled some 12 million people, and every province owed the Inca not only tribute but levies of soldiers and workers. Service was a religious as well as a social duty, and may well have been given gladly. The results were impressive. The mountain-top city of Machu Picchu was surrounded by wide terraced fields, all the soil for which must have been carried up the mountainside on men’s backs.

Every man was bound to his father’s occupation, but no one starved; relief was generous, and storehouses provided support during famines. Although the result appeared to be a stable if authoritarian society, Huayna’s sudden death precipitated a war between his two sons. No sooner had a winner emerged than he was seized and murdered by the Spanish conquistadors. Without a ruler at the top, the entire Inca edifice crumbled almost at once; within a century even its stone walls were mostly in ruins.
Bolivia is a landlocked state in central South America, bordering Brazil to the northeast, Paraguay and Argentina to the south, and Chile and Peru to the west. It is a country with a rich culture and plentiful natural resources, but geographical isolation has tended to hamper the development of the economy.

**ENVIRONMENT**

The population of Bolivia is mostly concentrated in the west on the Altiplano – a high plateau sandwiched between the two lofty ranges of the Andes. The Cordillera Occidental on the Chilean frontier includes several active volcanoes, while the Cordillera Oriental to the east is thickly forested. At the northern end of the Altiplano is Lake Titicaca, which Bolivia shares with Peru. Its southern outflow feeds the smaller and shallower Lake Poopó. The southern Altiplano is an arid tableland scattered with salt flats. The Cordillera Oriental descends sharply to the northeast through the cliffs and cloud forests of the Yungas to the vast lowlands of the Oriente, which occupy the north and east of the country.

Bolivia is a tropical country, but local climate varies enormously. Seasonal rainfall is high in the rainforests of the northern Oriente, moderate near Lake Titicaca and very sparse in the south. Temperatures are high in the lowlands, but far lower on the Altiplano. More than half the country is forested; however, the windswept terrain of the Altiplano and the southern Oriente support only grass and scrubland.

Native plants and animals are as rich and varied as the landscape. The valuable pelts of some mountain species such as vicunas and chinchillas means that their numbers are being reduced by hunters.

**SOCIETY**

In the 7th century AD Tiwanaku to the south of Lake Titicaca became the center of the first great Andean empire – that of the Aymara people. The Aymara culture survived despite the later arrival of the Quechua-speaking Incas in the 13th century and of the Spanish in the 16th. In 1545 the world’s largest silver deposits were found at Potosí in the southwest. For more than two centuries the Spanish lived on these riches, forcing the local Amerindians to work as slave miners, until the more accessible veins had been completely worked out.

In 1809 uprisings in Chuquisaca (Sucre) and La Paz signaled the start of South America’s struggle for independence. In 1824 the rebel leader Antonio José de Sucre (1795–1830), a lieutenant of the revolutionary commander Simón Bolívar (1783–1830), routed the Spanish at Ayacucho in Peru, bringing independence the following year. The new country was named Bolivia after Bolívar, and Sucre became the first president of a land that was all but shattered by war.

Between 1836–39 Bolivia formed a confederation with Peru, but this was brought to an end after Chile declared war on it. Further disputes with Chile over nitrate extraction led in 1879 to the War of the Pacific; Bolivia and Peru were again defeated, and Bolivia lost the province of Atacama – its only outlet to the sea. By 1900 tin had replaced silver as the chief export, bringing substantial international investment. A disastrous war with Paraguay in the 1930s brought a further loss of territory in the southwest.

A series of bloody coups and counter-coups began in 1943, but in 1952 the military were ousted by civilian forces promising a new social order. For the first time Amerindians were given the vote, but attempts to improve their social and economic conditions failed to make headway. A succession of military regimes followed until civilian rule was restored in 1982, marking the beginning of a long struggle to strengthen the economy and destroy the cocaine trade.

The 1947 constitution, which is still in force, allows for a two-chamber multiparty assembly. The president is directly elected for a four-year term, as are the 27 senators and 130 deputies.

Bolivia’s ethnic and cultural mix is...
complex. The largest group are mestizos of mixed Spanish and Amerindian ancestry, but they are outnumbered by the Quechua and Aymará together, the two main Amerindian groups; there is a small white minority. Spanish, Quechua and Aymará are all official languages. Most Bolivians are Roman Catholics, though the inhabitants of the Altiplano hold traditional beliefs, and the constitution guarantees freedom of religion.

**ECONOMY**

Almost half the labor force work on the land; many are subsistence farmers. Coffee and sugar are the chief export crops. Food crops vary, but include the indigenous potato in the traditional farming country of the northern Altiplano. Coca, chiefly from the Yungas, is easy to grow, accounting for a large proportion of the world's cocaine supply. Though illegal, this trade has given a massive boost to the ailing economy. Llamas and alpacas have long been domesticated in the Andes, while sheep and cattle thrive in the Yungas and Oriente areas. The potential for managed forestry is enormous but largely unexploited.

Bolivia has considerable mineral resources — notably tin, tungsten, zinc and antimony — but natural gas is the main legal export. Petroleum production meets local needs; there is no coal. Most of the country's electricity comes from hydroelectric installations. The chief imports are raw materials and industrial and transportation equipment. Manufacturing is underdeveloped and largely geared to local demand. Tourism centers on the Lake Titicaca area with its rich cultural and historical heritage.

The transportation network is greatly hampered by the country's difficult terrain. Roads are largely confined to the Altiplano, and few are surfaced. Railroad links with Peru and Chile carry Andean minerals to Pacific ports; another route links Santa Cruz with Brazil and Argentina. La Paz and Santa Cruz have international airports, and the national airline, Lloyd Aéreo Boliviano, provides a vital link with isolated settlements, especially across the forests of the Oriente.

Press freedom is guaranteed under the constitution, but there has been censorship during periods of military rule. There are two television stations and many radio stations, broadcasting in all three main languages.

Health care is adequate in the cities but under-resourced elsewhere. Malara and Chagas' disease, a parasitic disease of tropical America transmitted by insect bites, are common in the Oriente. In some areas malnutrition is a problem, and housing conditions are often poor. Primary education is free and compulsory though not yet universal; literacy levels are fairly low but rising fast. Secondary and higher education are available.

**NATIONAL DATA**

<table>
<thead>
<tr>
<th>Land area</th>
<th>1,098,581 sq km (424,164 sq mi)</th>
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<td>Altitude</td>
<td>m (ft)</td>
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<tr>
<td>La Paz</td>
<td>4,103 (13,461)</td>
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<td>highest point: Sajama 6,542 m (21,463 ft); largest lake: Lake Titicaca part 8,340 sq km (3,220 sq mi)</td>
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<tr>
<td>Population</td>
<td>(1990) 7,314,000</td>
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<tr>
<td>Form of government</td>
<td>multiparty republic with two legislative houses</td>
</tr>
<tr>
<td>Armed forces</td>
<td>army 20,200, navy 3,800, air force 4,000</td>
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<tr>
<td>Largest cities</td>
<td>La Paz (administrative capital – 977,000); Santa Cruz (529,000); Cochabamba (404,000); Oruro (178,000); Sucre (judicial capital – 106,000)</td>
</tr>
<tr>
<td>Official languages</td>
<td>Spanish, Quechua, Aymará</td>
</tr>
<tr>
<td>Ethnic composition</td>
<td>mestizo 31.2%, Quechua 25.4%, Aymará 16.9%, white 14.5%, others 12.0%</td>
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<td>Religious affiliations</td>
<td>Roman Catholic 92.5%; 92.5% (official religion), Baha'i 2%, others 4.9%</td>
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<tr>
<td>Currency</td>
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<td>Gross domestic product</td>
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<td>Life expectancy at birth</td>
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<td>Major resources</td>
<td>agriculture:fisheries 22.4% GN, mining 11.9% GN, manufacturing 11.1% GN, trade 11.9% GN, finance 13.4% GN, public admin/defense 13.3% GN</td>
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</table>

SOUTH AMERICA
Brazil

BRAZIL IS THE LARGEST COUNTRY IN SOUTH America, the fifth largest in the world and the sixth most populous. To the northeast and southeast it faces the Atlantic along a 7,400-km (4,600-mi) coastline, while to the west it shares borders with most other South American countries. A land of wealth and opportunity, it has attracted settlers from all over the world. However, its development as a modern industrial state has brought with it problems of inadequate finance, overpopulation and environmental damage.

ENVIRONMENT

Brazil divides into two main areas. The vast Amazon basin to the north contains the largest river system in the world, while the highland areas of the south and east are the most populous.

The land

Brazil’s northern frontier runs through an area of mountains and plateaus known as the Guiana Highlands, which extend into Venezuela, Guyana, Surinam and French Guiana. They include Brazil’s highest mountain, Pico da Neblina, discovered as recently as 1962.

Immediately to the south is the great Amazon basin, which occupies most of the north of the country. Its landscape is generally low-lying, apart from the hillier fringes, and some flatter areas are flooded every year. The main river is some 6,570 km (4,080 mi) long – second in the world only to the Nile – and has over 1,000 known tributaries; most of the larger ones rise farther west in neighboring Colombia, Peru and Bolivia. To the east, the Amazon enters the Atlantic via a broad delta, and the lowlands extend eastward along the northern coast.

The Brazilian Highlands cover most of the rest of the country, rising gently from the Amazon basin along a line roughly from Bolivia to Cape São Roque, Brazil’s northeasternmost point. The highlands consist mostly of broad tablelands cut by deep river valleys. Along the eastern seaboard they rise more sharply to form a steep escarpment overlooking a narrow coastal plain. Among the highest peaks is Pico das Agulhas Negras near Rio de Janeiro and São Paulo, the two largest cities. Most of the rivers drain southwest into neighboring Paraguay, Argentina and Uruguay. The Paraná and Uruguay rivers run along sections of the border, creating spectacular waterfalls as they leave the plateau.

The only other extensive lowland area is in the west bordering Bolivia and northern Paraguay, where the swampy plains of the Pantanal form the northernmost extension of the Gran Chaco.

Climate

The climate is generally warm and humid with seasonal rains, but varies somewhat across the country. Temperatures are higher around the Amazon basin, where they remain largely stable throughout the year. Conditions are similar along the east coast, while the Brazilian Highlands and the south are both cooler, with occasional winter frosts.

In the northeast the São Francisco basin has a unique microclimate of its own. This notorious drought pocket, known as the drought polygon, has virtually no rain in the dry season, and far less than the surrounding areas at other times. Elsewhere, rainfall is heaviest in parts of the Amazon basin and along the flanks of the eastern mountains.

Plants

Much of Brazil is forested; the tropical evergreen rainforests of the Amazon basin have a greater variety of plant species than any other habitat on earth. There are similar forests along the southeastern coast, and semideciduous forests on the heights of the escarpment. Inland, the highlands show a mixture of savanna and deciduous woodland, and in the far south are some of the original grass plains. The dry northeastern areas are characterized by the cerrado – a type of thorny woodland.

There has been international concern over the mass destruction of the Amazon rainforests for cattle ranching and mining. Some effort has been made to slow down the process of uncontrolled ex-
ploitation, but more effective conservation measures are essential if this fragile ecosystem is to be preserved.

Animals
Animal life in the Amazon Basin is as colorful and variegated as the plant life. Numerous species of monkeys, snakes and tree frogs share the trees with hundreds of different bird species. The rivers teem with caimans, capybaras, river dolphins and as many as 1,500 known species of fish.

Outside the Amazon basin, much of Brazil's once-abundant wildlife has all but vanished. There are still wildfowl in the marshlands of the Pantanal, and rheas (flightless birds) roam the tablelands, as do bustard-like seriema. Snakes, lizards and armadillos abound, while giant ants eat termites in their pillar-like nests. Ocelots and jaguars, the predators of the Brazilian savanna, have been hunted to virtual extinction.

SOCIETY
Brazil has produced a remarkably integrated society since the early days of Portuguese colonial settlement. The country was named after its first export, brasil, a red dye made from wood. As the interior was opened up, other valuable items were exploited, including gold, diamonds and coffee. After World War II, Brazil's predominantly rural society was dramatically changed into an urban, industrial society beset with the problems common to many developing countries.

History
Pedro Álvares Cabral (1467-1520), a Portuguese naval commander, was probably the first European to set eyes on Brazil. He recorded his discovery in 1500, but it was not until 1532 that Martin Alonso de Sousa (c.1500-64) founded the Portuguese colony of São Vicente - the first of 15 hereditary captaincies. The colonists created large estates, worked by Amerindians and later by African slaves.

In 1549 King John III of Portugal (1502-57) appointed a governor-general, who controlled the captaincies from his base at Bahia (later Salvador). Meanwhile, other colonial countries began to take an interest in Brazil. The French established a settlement at Rio de Janeiro in 1555, and it took the Portuguese five years to evict them. By 1580 the Spanish had gained control of Portugal, and colonial administration in Brazil was being neglected. The Dutch briefly captured Bahia in 1624, and settled at Pernambuco (modern Recife) in 1630. They were driven out by Brazilian forces in 1654, 14 years after the Portuguese had once again wrested control of their homeland from Spain.

During the 17th and 18th centuries, numerous expeditions set out from São Paulo to capture Amerindians for slaves and to exploit the resources of the vast interior. The first rebellion against Portuguese rule came as early as 1789, but independence was to take another three decades. In 1808 the French invaded Portugal, and the prince regent, Dom John (1767-1826), took refuge in Brazil. He took a strong interest in his new home, and in 1815 he proclaimed the United Kingdom of Portugal, Brazil and the Algarve. A year later he became King John VI. In 1821 he returned to Portugal, leaving behind his son, Dom Pedro (1798-1834), as regent. The Portuguese court sought to return Brazil to its former colonial status, and Dom Pedro was faced with an angry population. In 1822 he declared independence, and became Brazil's first emperor.

His reign was troubled: war with Argentina (1825-28) led to the loss of Uruguay, and in 1831 he abdicated in

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favors of his five-year-old son. After a difficult period of regency, Pedro II (1825-91) came to the throne in 1840, ruling for almost 50 years. His continuing involvement in Uruguayan affairs drew Brazil into the long and bloody War of the Triple Alliance (1865-70). A military coup in 1889 forced the emperor's abdication, and a republic was proclaimed; in 1891 this became the United States of Brazil.

Between 1895 and 1909 a series of boundary disputes were settled peacefully in Brazil's favor, while coffee and rubber brought new levels of prosperity. World War I was followed by a period of growing unrest, which ended, in 1930, in a successful rebellion. The de facto president, Getúlio Vargas (1883-1954), revised the constitution twice, giving himself dictatorial powers. In 1942 he entered World War II, siding with the Allies. After the war, Vargas lost power, only to return in 1950. He battled, with limited success, against spiraling inflation, until revelations of murder and corruption led him to commit suicide in 1954.

In 1960 the newly built city of Brasilia in central Brazil became the country's capital in place of Rio de Janeiro – the climax of a campaign to develop the resources of the interior. Yet in spite of a rapid rise in productivity and material progress, inflation and foreign borrowing reached record levels. Instability led to a military coup in 1964, and civilian government did not return until 1985. In 1992, President Fernando Collor (b. 1949) was impeached for corruption.

**Government**

Brazil is a federal republic. The 1988 constitution – the eighth in the country's history – endorsed a two-chamber multiparty federal assembly. The 72 senators are elected for eight years, the 503 deputies for four years, and the president for a five-year term.

The country is divided into 26 states and a federal district (Brasilia). Each state elects three senators, as does the federal district, but the number of deputies from each depends on the population. Each state has its own laws and constitution, and each is divided into municipalities governed by elected councils.

**People**

Brazil's population shows the results of large-scale immigration and integration, with the result that divisions are socioeconomic rather than ethnic. Just over one-half the population are of mainly European descent, but most of the rest are mixed European, African and Amerindian. More recent immigrants include the Japanese. Only a few pure-blooded Amerindians remain, chiefly in the remotest parts of the Amazon basin.

An important unifying factor is the Portuguese language, which was adopted by virtually all immigrants. However, Brazilian Portuguese has become very distinct from its European counterpart, strongly influenced by Amerindian as well as other immigrant languages.

The prevalence of Roman Catholicism is another unifying factor, although there is a significant Protestant minority. A number of African religions are held more or less in parallel with Catholicism; the candomblé cult in particular has a large following among many social groups.

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**Economy**

Brazil has enormous natural resources, but lacks enough capital to exploit them effectively. The government controls many of the vital industries, but much of the funding comes from international loans, and successive governments have struggled with the double burden of foreign debt and massive inflation. One consequence of this is the large gulf between the rich and the poor.

**Agriculture and fisheries**

Brazil grows enough food to meet domestic needs, and agriculture provides raw materials for a significant proportion of exports. Although agricultural land is expanding, considerably fewer people are needed to work it.

Most of the arable land is along the coast and in the south. The main export crops are soybeans (for animal feed),
Service industries are expanding, and there is an increasing influx of tourists lured by the warm waters, attractive scenery and glamorous city nightlife of the eastern seaboard. Copacabana Beach, in Rio de Janeiro, is the country's most famous resort.

**Transportation and communications**

Brazil's road network has been greatly improved in recent years, with surfaced roads linking all the major population centers; many of the smaller roads are unsurfaced. Railroads are few outside the Rio de Janeiro-São Paulo region, apart from freight lines for ore transportation. Many northern areas can only be reached by water or air.

The Amazon river is navigable for most of its length, and coastal traffic is served by a sizable merchant fleet. Air transportation provides a vital link between Brazil's widely scattered and often isolated communities. Most cities have an airport, and there is usually a dirt landing strip in even the smallest villages. Most international flights run from São Paulo and Rio de Janeiro, with shuttle services to other cities.

The main newspapers are published in São Paulo and Rio de Janeiro; censorship has been relaxed since the return to civilian government. The newspaper O Globo and the magazine Manchete both have links with the country's major broadcasting networks. There are numerous smaller networks operating at both national and local level.

**Welfare and education**

Health care is well resourced in major cities, but underfunded and understaffed in rural areas, where malaria, yellow fever and other diseases are rife. Malnutrition is common, especially among children. Urban housing shortages mean that many of the people moving to the cities in search of work are compelled to take up residence in vast shanty towns, where poor sanitation aids the spread of disease.

All employers contribute to the National Social Security Institute, which pays benefits for illness, unemployment, and retirement. For many, however, the system is costly yet ineffective.

Education is free and compulsory from the ages of 7 to 14, and free secondary education is also available, but only a small proportion of students — usually from wealthier families — are able to take full advantage of it; very few enrol for university or college education. Literacy levels are correspondingly low overall.

sugar cane and especially coffee, of which Brazil is the world's leading producer. Sugar cane is used to produce gasohol, an automobile fuel consisting of ethanol and gasoline - a process that Brazil has pioneered. Maize, rice and wheat are the chief food crops.

Pastureland is mainly concentrated in the south, which is the center of the meat-packing industry. Brazil's livestock population — mainly pigs and cattle — is among the world's largest. The creation of cattle ranches in the Amazon basin has led to widespread destruction of the forests, and there has been violent conflict with rubber tappers. Most trees are cleared by burning, leaving unstable soil that quickly becomes exhausted.

Almost two-thirds of the country is forested. Lumber from the northern forests generally goes for fuel. Most commercial timber, used for cellulose and paper, comes from eucalyptus and pine plantations in the south and southeast.
PARAGUAY IS A SMALL LANDLOCKED STATE IN South America, lying between Argentina to the south, Bolivia to the northwest and Brazil to the northeast. The Paraguay river flows north-south through the country, dividing it into two very distinct areas. The river Paraná forms part of the border with Argentina.

ENVIRONMENT

The Region Occidental, or Western Region, forms part of the flat plains of the Gran Chaco, which extend into Bolivia and Argentina. The Region Oriental, or Eastern Region, rises gently from the floodplains of the Paraguay and Paraná rivers to a series of low mountain chains that form part of the Brazilian plateau. At the eastern border the Paraná river descends from the plateau in a series of spectacular waterfalls.

The climate is subtropical with seasonal rainfall, heavy in the east, which is prone to flooding, but sparse in the west, where droughts are frequent. The country is well forested, with tropical hardwood species in the eastern hills, and open savanna woodland on parts of the Chaco. The wildlife includes typical South American species such as peccaries, jaguars, armadillos and anteaters.

SOCIETY

The first European explorers to Paraguay found the country inhabited by the friendly Guarani peoples. Spanish settlers lived peaceably among them, as did the Jesuit missionaries. Later slave-traders were much harsher toward the indigenous peoples, though they were generally treated better than elsewhere. In 1776 Paraguay effectively became part of the Viceroyalty of Rio de la Plata, centered on Buenos Aires. Resentment at this eventually led to independence in 1811, followed by the establishment of an isolationist dictatorship under José Gaspar Rodríguez de Francia (1766–1840), known as El Supremo.

For many years Paraguay was ruled by sometimes brutal dictators. Carlos Antonio Lopez (1790–1862) and his son Francisco Solano Lopez (1827–70) ended isolationism and encouraged Paraguay's development, but embroiled the country in conflicts with its neighbors. The War of the Triple Alliance (1865–70) ended in total devastation and occupation by a Brazilian army. The subsequent painful period of reconstruction saw the introduction of greater democracy. Paraguay fought the Chaco War with Bolivia from 1932 to 1935. In 1954 General Alfredo Stroessner (b.1912) seized power. He improved the economy, but alienated the church and other bodies with his harsh treatment of dissidents. In 1989 he was overthrown and exiled by General Andrés Rodríguez Pedotti (b.1923), who later became president in open elections.

The Paraguayan people are proud of their mainly Guarani descent, though there is also a strong Spanish element. There are few pure-blooded Amerindians, but Guarani is the main spoken language alongside the official language, Spanish. Most Paraguayans are nominally Roman Catholic.

ECONOMY

Paraguay's economy has traditionally been based on agriculture, which is still a major source of income. Cattle ranching is the main pursuit, but crops such as cotton, sugar cane and soybeans are gaining in importance; forestry is also extensive. There are no significant mineral or energy reserves, but the hydroelectric potential is enormous, and Paraguay is already a leading power exporter. Water and road transportation are both well developed. Health care and sanitation are adequate in the capital, Asunción, but poorly developed elsewhere. Education is generally good, and literacy levels are relatively high.
ENVIRONMENT

Chile’s shape is unusual; it measures on average little more than 160 km (100 mi) from east to west, but extends south from the tropics to within about 1,000 km (600 mi) of Antarctica, with the result that there are marked climatic differences.

The land

Perhaps surprisingly for such a long thin country, the landscape divides lengthways; the three main divisions are the coastal mountains, the Andean ranges and the long trench between them. The entire country is subject to severe earthquakes; the city of Concepción on the central west coast has been rebuilt four times following earthquake damage.

The coastal ranges are older and less steep than the Andes. They follow the Pacific coastline from near the Peruvian frontier as far south as the Gulf of Ancud in central-southern Chile. From here onward they are partly submerged, their peaks forming a long chain of islands.

The central depression extends from the salt flats of the Atacama Desert in the north to the Gulf of Ancud. The central

A herd of llamas forages for sparse grazing in the harsh mountain landscape of far northern Chile, beneath the snowcapped Parinacota volcano. Their thick woolly coats enable these New World relatives of the camel to survive in the chill Andean highlands.

southern section between the Aconcagua and Bio-Bio rivers is known as the Central Valley. This is the most populous part of Chile, where the capital, Santiago, lies.

The mighty Andean cordillera includes many volcanoes – some active – both in the far north and in the central zone, where the highest peaks are to be found. The southern Andes have a glaciated landscape of lakes and fjords, and the far south is fragmented into innumerable islands, including Tierra del Fuego (the western part of which is Chilean) and Cape Horn, the southernmost point.

Climate

The climate of Chile is predominantly temperate, moderated by the proximity of the sea, but with extremes ranging from tropical to antarctic. Temperatures are lower in the high Andes, and rainfall increases southward. There is virtually no rain in the Atacama Desert, and in central Chile most of it falls in winter. In the south strong westerly winds blow all year round, and rainfall levels here are among the highest outside the tropics.

Plants and animals

The plant life is varied, with a diversity of species having adapted to the different types of climate and topography. In the north, tamarugo trees are able to survive the harsh desert conditions, while the high Andes support mountain grasses;

Chile

CHILE OCCUPIES A NARROW AND MOUNTAI

nous strip of land along the southwestern seaboard of South America, bordering Peru to the north, Bolivia to the northeast and Argentina to the east. It was one of the first South American countries to develop democratic political and economic structures, but in recent times went through a period of military rule, when public and private freedoms were greatly curtailed.

Republic of Chile

NATIONAL DATA

<table>
<thead>
<tr>
<th>Land area</th>
<th>756,626 sq km (292,135 sq mi)</th>
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<tbody>
<tr>
<td>Climate</td>
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<td></td>
<td>Santiago</td>
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<td>Major physical feature</td>
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<td>Population</td>
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frequent fog along the coast provides moisture for cacti and shrubs. Farther south, the vegetation becomes gradually more prolific, ranging from hardy algarobas to the hardwoods and shrubs of the Central Valley, with stands of monkey puzzles (Araucaria) on the neighboring Andean slopes. The slopes surrounding the lakes farther south are cloaked in forests, as is much of the mountainous south. The harsher climate of the far south and Tierra del Fuego supports only dwarf trees and hardy grasses.

Animals are less abundant than elsewhere in South America, but they include guanacos, vicunas, coyotes, punas and Andean cats. Bird life is diverse, thanks to the many migratory species that pass through the country. The Andean condor – a permanent resident – lives high in the mountains. There are no spiders or poisonous reptiles.

SOCIETY

The Chilean people have a strong sense of national identity, and can boast a history of relative freedom and democracy that was interrupted rather than extinguished by military rule in the 1970s and 1980s.

History
Little is known of Chile’s precolumbian history except in general terms. In the 15th century Inca invaders established a foothold in the north, but were halted by the fierce resistance of the Araucanian peoples farther south.

The Spanish arrived from Peru in 1536 under the command of Diego de Almagro (1475-1538), but returned northward the following year, having found none of the wealth that had provided such rich plunder in Peru. In 1541 Pedro de Valdivia (c. 1498-1554) established a colony at Santiago. The settlement grew, though efforts to push southward were hampered by Amerindian resistance, which continued well into the 19th century, by which time their population had been drastically reduced. For most of the colonial period, Chile remained isolated and dependent on Spain. In an economy relying on agriculture, most available land was divided into large estates held by a few wealthy families.

The struggle for independence began in 1800 under the influence of neighboring Spanish colonies. It started relatively peacefully, but the Battle of Rancagua (1814) inspired spirited resistance. In 1817 an army led by José de San Martín (1778-1850) crossed the Andes from Argentina and defeated the Spanish at Chacabuco. Bernardo O’Higgins (1776-1842), a Chilean patriot who had fought with San Martín, was elected to the post of supreme director, and in 1818 he proclaimed Chile’s independence.

Conflict between the army and the landowning families was resolved in 1830, initiating a period of democratic rule that was to continue until 1973. In the War of the Pacific (1879-84), Chile gained large areas of land from its northern rivals, Peru and Bolivia, securing the rich nitrate deposits of the Atacama Desert.

After World War I, the demand for naturally occurring nitrates (used in fertilizers) fell as the means of forming them chemically were developed, and the economy declined. Political instability increased despite land reforms in 1964. The election of a Marxist president, Sal-
vador Allende Gossens (1908–73), in 1970 led to a United States boycott, and in 1973 the government was overthrown in a military coup led by General Augusto Pinochet Ugarte (b. 1915). Chile remained under repressive military rule until the election of President Patricio Aylwin Azócar (b. 1918) in 1990.

**Government**
The 1981 constitution provided for the reestablishment in 1989 of a multiparty two-chamber parliament. The president, most senators and all 120 deputies are elected for eight-year terms. However, conservative appointments to the senate have denied the government a majority in that chamber. This showed the continuing influence of the military rule despite the gradual return to democracy.

**People**
The culture of Chile’s largely mestizo population combines their Spanish heritage with Amerindian elements. Spanish is the dominant language even among the Amerindian minority and Roman Catholicism is the majority religion.

**ECONOMY**
Chile is a country with plentiful natural resources, but fluctuating world prices have made it economically vulnerable; it relies increasingly on its developing manufacturing industry.

Agriculture and industry
Agriculture is a flourishing sector, but much food is imported. Arable farming is concentrated in the fertile Central Valley. The variety of crops grown includes wheat, potatoes and rice. Fruit (including apples), vegetables and wine are exported. The most common livestock animals are sheep and beef cattle.

Fish stocks off the coast are enormous, and the market has expanded greatly. Sardines and anchovies are among the chief catches, and fish products such as oil and meal are a valuable export. Forestry, which is concentrated mainly in the south, is a source both of timber and paper for export.

Chile is the world’s leading supplier of copper; other minerals include iron and molybdenum. The main energy source is hydroelectric but some coal provides a supplementary source, together with petroleum and natural gas from Tierra del Fuego. Manufacturing industry is largely concentrated in central Chile. Varied activities include iron, steel and petroleum refining, fish processing and petrochemicals. Despite growth in this sector, manufactured goods are among the chief imports of the country.

**Transportation and communications**
Historically, Chile has depended on the sea for its communications; the southernmost provinces are accessible only by sea or air. The Pan-American Highway runs south the Gulf of Ancud, but there are few other surfaced roads outside the Central Valley. Railroad services are good here but limited elsewhere. Two main airlines provide internal services, with international flights from Santiago.

The press and broadcasting media are gradually emerging from military censorship. Many television and radio stations are operated by the universities.

**Welfare and education**
Chile has a well-established health service based on decentralized local units, and health conditions are generally good; a parallel private system was introduced in 1980. The welfare system is equally well developed; since 1973 the comprehensive social insurance system has been gradually converted into a savings plan operated by private companies.

Education is free and compulsory from the ages of 6 to 13, followed by four years of optional secondary education. Literacy levels are high, and there is a well-established tradition of education at university and college level.

Few of the stone carvers’ descendants survive on the modern island, Peruvian slave raids in 1862–63, combined with major epidemics, virtually wiped out the Polynesian population. Christian missionaries in the 19th century contributed further to the decline of the indigenous culture, and with its annexation to Chile 26 years later, the island was repopulated with Spanish-speakers from the mainland.

Most of the 1,400 inhabitants are concentrated in the village of Hanga Roa on the sheltered western coast. Traditionally they earn their living by farming, particularly sheep ranching, which generates some trade in wool, but since the mid 1980s the mainstay of the economy has been tourism.

**Man of mystery** One of the strange stone faces carved by the original Polynesian inhabitants of Easter Island over 1,000 years ago.
Argentina

Argentina is shaped like a long, narrow triangle occupying much of the southern end of South America. The scenery not only differs widely from north to south, but shows a marked contrast between the high mountains of the west and the broad plains of the east.

The land
The impenetrable barrier of the Andean mountain range runs the whole length of the western border with Chile, and carries on into Bolivia to the northwest. Some of the mountains are volcanic, including South America's highest peak, Aconcagua. The area is also subject to frequent earthquakes.

In the north, bordering Paraguay, are the plains of the Gran Chaco, which are poorly drained and covered in thorny subtropical scrubland. Southeast of here is a low-lying expanse of rainforests, known as Mesopotamia - from the Greek meaning "land between the rivers" - because it is sandwiched between the river Paraná to the west and the river Uruguay to the east, which forms the border with Brazil and Uruguay.

Southward again are the flat, fertile grasslands of the Pampas, which extend southeast to meet the Atlantic coast south of the river Plate. This is by far the most densely populated area in the whole of the republic, especially around the capital, Buenos Aires.

The southernmost part of the country is Patagonia - a barren, arid plateau that is rich in mineral deposits. The Patagonian coastline has cliffs along its whole length. The scenery becomes generally more rugged toward the south, especially on the island of Tierra del Fuego, the eastern half of which belongs to Argentina.

Climate
Almost the whole of the country lies within the southern temperate zone. However, the northeastern plains are subtropical and humid, while the extreme south is subpolar.

Rainfall is light, and tends to be concentrated in Mesopotamia, the eastern Chaco and the Pampas, where winters can be damp and cold. Thunderstorms are common here, and snow falls occasionally. Patagonia, which is colder and more arid, is subject to strong winds from the Andes carrying dust and sand.

Plants and animals
Vegetation varies greatly throughout the country. The scrublands produce mainly dwarf shrubs, while the rainforests support giant cedar and laurel trees. Quebracho trees, from which tannin is extracted, are native to Mesopotamia.

The wildlife is typically South American, with llamas, monkeys, jaguars, armadillos and many snakes. Bird life includes toucans, hummingbirds, parrots and the ostrich-like rheas. Fish, including piranhas, abound in the many streams, and there are sea lions off the coast. Pigs, introduced by European settlers, are to be found wild in Patagonia.

Society
From the 16th century down to the present day, Argentinian society has been dominated by the European culture introduced by the colonists.

History
The indigenous Amerindian population of Argentina were mainly nomadic hunters, although in the northwest they had established settled agrarian societies.

Spanish settlers, mainly from Peru, Chile and Paraguay, began to colonize northern Argentina from the beginning of the 16th century. Asuncion in neighbor-
growth, but the country was led by military rulers, who were backed by the most prosperous ranchers.

From 1916 to 1930 government was democratic and moderate. This situation was ended by a military coup. During the troubled years that followed, Juan Domingo Perón (1895–1974) emerged as a popular leader, becoming president in 1946. He established social reform and economic stability, but was deposed in 1955. After a period of great instability, Perón was recalled from exile in 1973, but died a year later, to be succeeded by his widow, Isabel (b. 1931). The Perónist regime was overthrown by a coup in 1976, and there followed seven years of oppressive rule by military junta.

In 1982 Argentina invaded the British colony of the Falkland Islands (or Islas Malvinas), which it had claimed since 1820. Argentina’s defeat in the ensuing conflict brought about the resignation of the president, General Leopoldo Galtieri (b. 1926). Elections were held in 1983, and the Radical Party’s Raúl Alfonsín (b. 1926) became president, introducing many social and economic reforms. In 1989 the Perónist Carlos Saúl Menem (b. 1930) succeeded him.

Government
Argentina is a federal republic. The head of state is the president, who is elected for a single six-year term. The legislature consists of a senate, which includes two representatives from each province, and a chamber of deputies. The 46 senators are elected for nine-year terms, the 254 deputies for four-year terms.

There are 22 provinces, one territory (Tierra del Fuego) and the federal capital

The artist’s quarter of Buenos Aires (above) Brightly painted houses and Italian restaurants crowd the area—called La Boca—where the city’s first settlers landed.

The masts of an early steamship (left) in Buenos Aires. Spanish sailors named the port after Santa María del Buen Aire, meaning “St Mary of the good wind.”

Guarding the Casa Rosada (below), the presidential palace in Buenos Aires. The uniform is little changed since the days of prosperous military rule in the 19th century.

**NATIONAL DATA**

<p>| Land area | 2,780,692 sq km (1,073,399 sq mi) |</p>
<table>
<thead>
<tr>
<th>Climate</th>
<th>temperatures</th>
<th>annual precipitation</th>
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<tbody>
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<td>Buenos Aires</td>
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<td>24 (75)</td>
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<td>Major physical features</td>
<td>highest point: Aconcagua 6,960 m (22,834 ft), longest river: Paraná (part) 4,500 km (2,800 mi)</td>
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<tr>
<td>Population</td>
<td>(1990) 32,322,000</td>
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<td>Form of government</td>
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<td>Armed forces</td>
<td>army 55,000, navy 25,000, air force 15,000</td>
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<td>Buenos Aires (capital—11,126,000), Córdoba (1,134,000), Rosario (1,071,000), Mendoza (707,000)</td>
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<td>Ethnic composition</td>
<td>European 86.0%, mestizo/Amerindian 15.0%</td>
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<tr>
<td>Gross national product</td>
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<tr>
<td>Major resources</td>
<td>agriculture—cereals 15.2% GNP, mining 2.7% GNP, manufacturing 22.6% GNP, trade 14.0% GNP, public administration/defense 17.2% GNP</td>
<td></td>
</tr>
</tbody>
</table>
ECONOMY

Argentina has a free market economy and plentiful resources, but the instability associated with high inflation and foreign debt has tended to restrict its economic development.

Agriculture and fisheries
Farmland occupies more than half the total land area, and much of this is pasture. Beef production, the traditional mainstay, is concentrated mainly in the large ranches of the Pampas, and beef is still one of Argentina's major commodities. Sheep, pigs, and goats are also raised, and wool provides yet another important export.

The principal crops include wheat, maize, soybeans and sugar cane. Argentina is a major exporter of wheat, soybeans and animal feedstuffs. Grapes are also grown to make wine mainly for the domestic market.

Although more than one-fifth of the total land area is forested, the forestry industry is not sufficient to supply the country's needs. Most wood is used for timber, though quebracho trees supply tannin for the leather industry. Although the fishing catch is quite small, both fish and oil are exported.

Industry and resources
Argentina is so rich in energy resources that it is now self-sufficient in power. The main sources are hydroelectricity and petroleum, the latter occurring mainly in Patagonia and the Mendoza area bordering the central Andes. However, natural gas is also being exploited, and there are several nuclear power plants. Most coal is imported, although some is mined in Patagonia. Other mineral reserves, mainly of metal ores, are scattered and difficult to exploit in quantity.

About one-fifth of the population is involved in the manufacturing industry, of which food processing is still a major sector. Beef in particular is processed for both the domestic and export markets; products include canned meat, meat extracts, tallow and leather. Petroleum-refining and petrochemical industries have been established around Mendoza and Buenos Aires. Among many other activities, there is a growing iron and steel industry, but some iron and steel products are imported.

Transportation and communications
Argentina has the best transportation system in the whole of South America. The road network is extensive, as is the government-run railroad system, especially in central Argentina. Most freight is carried by road, though some is taken by rail or in the small ships that ply between the coastal ports and along the main river arteries. Air transportation, both for internal and international travel, is well developed, with airports serving all the country's major cities. Most radio and television stations are under private ownership, although at various times they have been subject to strong state influence. There are over 200 daily newspapers.

Welfare and education
Social welfare systems were developed during the first Perón presidency. However, many social problems remain. Housing in particular is often stretched to maximum capacity in the cities, where workers from rural areas have moved in search of work. Health provision includes both public and private services, but standards vary across the country.

Education is compulsory at primary level (up to the age of 13), and literacy levels are relatively high. Primary, secondary and higher education are all free and there are over 50 universities, the largest being at Buenos Aires.
SOUTH AMERICA

Uruguay is a small country on the east coast of South America, bordered by Brazil to the north and by Argentina to the west across the river Uruguay. The country is still often known locally as the Banda Oriental, or "East Bank" (of the Uruguay river).

ENVIRONMENT

The country is mostly low-lying apart from two ranges of hills that extend south from the Brazilian border. The climate is mild and temperate, with plentiful rain throughout the year. Most of Uruguay is covered with lush grassland, and there are few trees apart from those along the river banks. The natural vegetation is tall pampas grass with a few flowers and shrubs. Wildlife is varied but no longer abundant, and includes armadillos and capybaras. Birds are still common, however, including the burrowing owls of the pampas and many river fowl.

SOCIETY

The original inhabitants were the fierce Charrúa Amerindians, who drove away the first Spanish explorers in the 16th century. The first settlers were Portuguese from the north in about 1680. In 1726 the Spanish founded Montevideo, and went on to drive out the Portuguese, effectively exterminating the Amerindians in the process. In 1776 they incorporated the country into the Viceroyalty of Río de la Plata. After 1811 a growing independence movement staged a revolt, but it was soon followed by a period of Brazilian–Portuguese occupation. This was ousted in 1828 with help from Argentina and Britain, and Uruguay became independent.

For many years the country was torn by war and civil unrest, until it became a military dictatorship. A short period of civilian rule (1890–1903) again degenerated into civil war. In 1903 the country was reunited under the social reformer José Batlle y Ordóñez (1856–1929). A period of prosperity was followed by economic collapse in the 1930s, leading to a brief dictatorship. In World War II Uruguay remained neutral under a liberal president, heralding a further economic boom. Then growing economic problems fueled a campaign by the Tupamaro urban guerrillas, leading to a gradual military takeover in the 1970s. Civilian rule was restored in the 1980s.

The government is made up of a two-chamber elected assembly and an elected president, who appoints his own ministers. The people are mostly descendants of Spanish and Italian immigrants. The main language is Spanish, with a Portuguese element near the Brazilian border.

ECONOMY

Uruguay's economy is dominated by the livestock industry, which was established by the early settlers to exploit the pampas. Sheep and beef cattle are the main animals; their meat, wool, hides and other products are the principal exports. Crop farming, chiefly flax, rice and sugar beet, is less important.

Mineral resources are poor, but industry is increasing, thanks to imports of raw materials and fuels. Food industries are the most important, then textiles and chemicals. The road network is good, and tourism is growing rapidly. Uruguay can boast South America's oldest welfare state, and has led its neighbors in education, welfare and health care.

NATIONAL DATA

<table>
<thead>
<tr>
<th>Land area</th>
<th>175,016 sq km (67,574 sq mi)</th>
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</thead>
<tbody>
<tr>
<td>Climate</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>m (ft)</td>
</tr>
<tr>
<td>Temperatures</td>
<td>°C (°F)</td>
</tr>
<tr>
<td>January</td>
<td>22 (72)</td>
</tr>
<tr>
<td>July</td>
<td>10 (50)</td>
</tr>
<tr>
<td>Annual precipitation</td>
<td>mm (in)</td>
</tr>
<tr>
<td>Montevideo</td>
<td>950 (37.4)</td>
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<tr>
<td>Aranas</td>
<td>561 m (1,843 ft)</td>
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<tr>
<td>Population</td>
<td>(1990) 3,094,000</td>
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<tr>
<td>Form of government</td>
<td>republic with two legislative houses</td>
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<tr>
<td>Armed forces</td>
<td>army 17,200; nav 4,500; air force 3,500</td>
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<tr>
<td>Largest cities</td>
<td>Montevideo (capital – 1,248,000), Salto (71,880), Paysandú (62,412), Rivera (49,000), Melo (38,300)</td>
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<tr>
<td>Official language</td>
<td>Spanish</td>
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<tr>
<td>Ethnic composition</td>
<td>Spanish/Islam 88.5%, mestizo 3.0%, mulatto 1.2%, others 7.3%</td>
</tr>
<tr>
<td>Official religion</td>
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</tr>
<tr>
<td>Religious affiliations</td>
<td>Roman Catholic 59.5%, nonreligious 35.1%, other Christians 3.4%, Jewish 1.7%</td>
</tr>
<tr>
<td>Currency</td>
<td>1 new Uruguayan peso (NU$) = 100 centésimos</td>
</tr>
<tr>
<td>Gross national product</td>
<td>(1989) US $8,069 million</td>
</tr>
<tr>
<td>Gross domestic product</td>
<td>(per person 1990) US $6,000</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>male 67.8 yr; female 74.4 yr</td>
</tr>
<tr>
<td>Major resources</td>
<td>agriculture/forestry 9.2% GNP, mining/services 11.7% GNP, manufacturing 19.0% GNP, finance 14.2% GNP, public admin/defense 10.4% GNP</td>
</tr>
</tbody>
</table>
Dependencies in the region

FALKLAND ISLANDS
UNITED KINGDOM

The Falkland Islands, or Islas Malvinas, are a self-governing British colony in the South Atlantic consisting of an archipelago off the southeastern coast of South America. The colony also administers a series of island dependencies. These include the volcanic South Sandwich Islands and South Georgia – the largest of the dependencies – a whaling settlement some 1,300 km (800 mi) to the southeast.

The islands of East and West Falkland comprise most of the land area. Both are heavily indented, hilly and often swept by cold westerly winds. The landscape is mostly peat-covered moorland, with low grasses, scrubby vegetation and no native trees. Animal life, apart from sheep, is largely maritime, including elephant seals, sea lions and penguins.

These previously uninhabited islands were first sighted by British navigators in 1592. It was not until 1765, however, that they were settled by a British garrison. This was removed in 1774, but Britain maintained its claim to the islands. Spain kept a settlement there until 1811, and in 1820 the newly independent Argentina claimed the islands on the basis of previous Spanish claims – marking the start of a long-running conflict between the two nations over the islands. An Argentinian attempt to settle the islands in 1832 soon collapsed in mutiny, and in 1833 a British garrison was reestablished.

An almost entirely British population became established with a limited economy based, as it is now, on fishing and sheep-rearing. In 1892 colonial government was introduced, with a governor appointed by the British monarch.

Argentina, however, continued to uphold its claim to the islands. Intervention by the United Nations in 1964 led to talks, in which Britain sought to settle the sovereignty issue on the basis of the islanders' wishes to remain British. Nevertheless, in 1982 Argentina invaded the islands. British forces were brought in, and after six weeks of fierce fighting they expelled the occupying forces. Hostilities were formally ended in 1989, but Argentina still claims the colony.

The local economy and way of life have been greatly affected by the war and its aftermath. An exclusion zone was enforced around the islands to prevent overfishing, and fishing licenses have now become the Falkland Islands' largest source of income.

Port Stanley (above) on East Falkland, the largest of the Falkland Islands. In June 1982 fighting between British and Argentinian forces raged around this little town – the colony's principal settlement and main harbor – during the last days of a short war that was precipitated, in part, by the prospect of rich offshore oil fields.

Parasols in the jungle (right) These children belong to one of several Asian groups that have settled in French Guiana, notably the Hmong people from Laos, formerly a French protectorate in Southeast Asia. The Hmong, refugees from war-torn Indochina, were settled here in the late 1970s.

A tropical idyll (far right) French Guiana was once the home of the infamous penal colony of Devil's Island, to which France until 1945 exiled its worst offenders for long sentences of hard labor. Today this small tropical island is becoming a tourist resort.

FRENCH GUIANA
FRANCE

French Guiana is a French overseas départment lying just north of the Equator on the northeast coast of South America. It is bordered by Surinam to the west, and Brazil to the south and east.

There are two main geographical areas: the low-lying coastal plains and the forested plateau of the interior, which rises to form mountains along the southern border. The climate is hot and humid, with heavy seasonal rains. Most people live along the coast, which is fertile but often swampy, with savanna in the west. Much of the country is covered by impenetrable hardwood forests that support a wide variety of wildlife.

French merchants first founded Cayenne, now the capital, in 1643, but their
initial attempts at colonization were frustrated by other European colonists. However, by the late 17th century the French were fully established, importing African slaves to work their plantations. After the French Revolution, political prisoners were sent here to die in appalling conditions. In the 1850s, the abolition of slavery caused economic collapse in spite of the introduction of indentured laborers from India. French missionaries, however, set up educational institutions for freed slaves. Penal settlements were again established, including the notorious Devil's Island; they were not abolished until after World War II. French Guianans have had French citizenship since 1848 and parliamentary representation since 1870; moves toward independence have had little success. Most people are of mixed descent, speaking French and Creole; most are Roman Catholic.

French Guiana remains economically dependent on France. Agriculture is concentrated in coastal areas, producing both staples and cash crops such as bananas and sugar cane. Fish are the other main export apart from minerals, particularly gold and bauxite. The European Space Agency has a rocket-launching base at Kourou. The roads are few, and most internal transportation is by air. Welfare and healthcare are to French standards.
REGIONAL PROFILES

South America

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Land iguana on the Galápagos Islands
The Pacific rim of the Andes dominates the physiography of South America, and separates most of the continent from the Pacific Ocean. West of the Andes environments are dominated by the ocean. The air above the cold waters welling up along the coast is stable and dry, and winds blow along the shore. As a result the narrow central coastal strip is largely desert, though in the north and south onshore winds bring rain: the narrow Pacific coast of Colombia has more than 5,000 mm (200 in) a year.

To the east of the Andes the climate is dominated by the influence of the Atlantic Ocean, with its warm onshore currents and winds. Rainfall in general decreases toward the south away from the Equator and westward away from the coast. The interior basins of the eastern Andes in Argentina have less than 500 mm (20 in) of rain a year, while large areas of the equatorial forest (selvas) of the Amazon basin receive over 2,000 mm (80 in). An important exception is the northern coast along the continent’s eastern edge, which receives only 650 mm (26 in), mainly from November to April.

This broad pattern hides sharp contrasts, especially in the Andes, where rainfall can decline from 2,000 mm (80 in) a year to 300 mm (12 in) a year in as little as 20 km (12 mi). Here relief is the main factor controlling climate.

There are also strong seasonal contrasts, which become more marked with distance from the Equator. The Amazonian lowlands are hot and wet all year round, but winters are temperate and dry to the south (July), and hot and dry to the north (January). On the interior plains June, July and August tend to be the driest months; in the Andean foothills of Argentina winters are very dry. In the south of the continent rainfall is evenly spread; July temperatures become progressively lower toward the extreme south.

Climates and vegetation

During several periods in the last 2 million years the Andes have contained extensive glaciers, and the continent’s southernmost coasts have been surrounded by nearly permanent sea ice. There are also fossil dunes in areas that are now covered with rainforest, suggesting that
Map of physical zones South America stretches from north of the Equator almost to Antarctica. The western edge is divided from the east by the great mountain range of the Andes, which run almost the full length of the continent. To the west the land drops sharply down to the sea, there is only a narrow coastal plain. The sea bed plunges to the depths of the Peru-Chile trench, where the Nazca plate meets the South American plate. The bulk of the continent, to the east of the Andes, is a more stable land, less subject to earthquakes and volcanic activity. The great Amazon river dominates much of the region.

Forces at work in the Andes The Valley of the Moon in north-central Chile demonstrates the strength of the forces that created the mountain chain. The rocks have been warped to form an inverted arch known as a syncline, the crest of fold (the anticline) has been worn away. Piles of rock debris (scree) build up on the slopes as a result of frost action, though the valley lies within tropical latitudes.

Where rain never falls The sandy desert that runs along the coast of Peru is almost totally devoid of vegetation because rain hardly ever falls. The cold current off the west coast is the principal reason for the extreme aridity. Cold water from the south moves northward along the coast until it is forced by the bulge in the land and by easterly winds to move westward out into the Pacific. These dry offshore winds blow for much of the year, even when air moves east from the sea over the coast there is no rain, because the air is cool and contains little moisture. When the air heats up over the land it becomes even more dry. The coastal desert is narrow, only because the Andes, whose foothills can be seen in the distance, are never far from the coast.

large areas of the lowlands may have been too dry for tropical evergreen forest when the ice advanced during recent glaciations. It was thought that the rainforest had survived glacial periods intact, but this evidence suggests that it was restricted to small isolated patches (refugia).

The vegetation today largely reflects the influences of heat and moisture. Most of the Amazon basin is covered by the world's greatest rainforest, though large areas of it are destroyed each year. Lianas climb beneath the canopies of hardwood trees of enormous size. The Amazon has both wet and very wet seasons, causing seasonal flooding along the great rivers. Toward the south in the Plateau of Mato Grosso (the name means great forest), and toward the north in the plains, vegetation responds to seasonal shortages of moisture with a mixture of trees and grasses in the tropical grasslands. In the pampas of Argentina in the southwest the grasses take over completely.
MOUNTAINS, BASINS AND PLAINS

The major landform regions of South America include the Andean cordillera (the parallel mountain ranges and the land between them), the ancient shield lands of Brazil and Guiana, the sedimentary basins of the great rivers, and the Atacama Desert.

The continent of South America sits on one of the crustal plates that are moving slowly over the surface of the Earth. To the west, fresh crust produced by seafloor spreading at the East Pacific Rise is moving eastward, carrying with it the Nazca plate. This is being forced (subducted) beneath the South American plate. The subduction zone is marked by the deep offshore Peru–Chile trench. The movement has crumpled up the Andes and caused igneous activity along the chain, which has volcanoes and lava deposits along almost of entire length.

Eroded uplands and lowland sediments
On the eastern side of the continent are the stable shield areas of the Plateau of Brazil and the Guiana Highlands, made from Precambrian rocks over 600 million years old. On the edges of these areas are found the important metallic ores of South America: bauxites (used for aluminum) in Guiana, manganese in northeastern Brazil, iron in Minas Gerais in the southeast and in the Serra dos Carajás, south of the Amazon delta. Over hundreds of millions of years the shield areas were eroded almost flat, but they have been lifted up during more recent periods of mountain-building and now constitute the highland areas. The Guiana Highlands include Angel Falls, the highest waterfall in the world. South of the Plateau of Brazil the spectacular horseshoe of the Iguazu Falls is higher and several times wider than that of North America’s Niagara Falls.

Erosion of the old shield and the newer high mountains produced huge amounts of sediments. These have been deposited in the low plains and basins of South America, especially in the Amazon basin and the sub-Andean trough, which runs down the east side of the mountains and widens in the south to form the Gran Chaco in Bolivia and Paraguay. The rocks are mainly sandstones and conglomerates (the latter comprising rounded fragments set in a cement such as hardened clay). It is here that oil and gas are most likely to be found in the future.

The Pacific coast has only a few small rivers; not far away, on the eastern side of the Andes, flow the major rivers. The Amazon is only a few hundred kilometers from the Pacific as it starts its 6,570 km (4,080 mi) journey to the Atlantic. The Uruguay, Paraná, São Francisco and Orinoco rivers all rise on the shield areas.

Island mountains and deserts
Much of the shield area is relatively featureless, but where there is granite high, steep-sided hills called inselbergs may be found. In places these have been eroded into distinctive rounded forms; the most famous example is the Sugarloaf Mountain in Rio de Janeiro on the southeast coast of Brazil. Less well known are the tepuis, isolated island mountains on the border between Venezuela and Brazil. They include Neblina Peak (3,014 m/9,978 ft) and Roraima. Rising above the surrounding plateaus, these often inaccessible peaks have evolved their own distinctive plants and animals.

The Atacama is one of the driest deserts

The altiplano in Bolivia is a high plateau area between two chains of the Andes. At 3,700 m (12,000 ft) it is one of the highest permanently settled areas in the world, but the land is difficult to cultivate.

GREAT CATARACTS OF THE WORLD

<table>
<thead>
<tr>
<th>Total height</th>
<th>m</th>
<th>ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angel, Venezuela</td>
<td>979</td>
<td>3,212</td>
</tr>
<tr>
<td>Tagel, South Africa</td>
<td>948</td>
<td>3,110</td>
</tr>
<tr>
<td>Utigard, Norway</td>
<td>800</td>
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<tr>
<td>Mongefossen, Norway</td>
<td>774</td>
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<td>Mtarazi, Zimbabwe</td>
<td>762</td>
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<tr>
<td>Yosemite, United States</td>
<td>739</td>
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<td>Mardalsfossen, Norway</td>
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<td>646</td>
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<tr>
<td>Coqueman, Venezuela</td>
<td>610</td>
<td>2,000</td>
</tr>
<tr>
<td>Sutherland, New Zealand</td>
<td>580</td>
<td>1,900</td>
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</tbody>
</table>

The Angel Falls in the Guiana Highlands of southeast Venezuela is the world’s highest waterfall. On one of the tributaries of the Orinoco, it drops from an isolated plateau block (tepui) into the tropical forest below.
EL NIÑO - AN UNWELCOME CHRISTMAS GIFT

The Peru Current off South America's west coast is normally very cold. Every three to seven years, however, the sea surface warms up between October and March, and may stay warmer for up to two years. In 1982, for example, the Galápagos Islands west of Ecuador had temperatures 4.3°C (7.7°F) higher than usual and 10 times their normal rainfall.

The arrival of El Niño (the Child), as this event, which often takes place at Christmas, is called locally, is of concern to fishermen, as the warm surface water prevents plankton-rich colder water from reaching the surface, so the fish catch is drastically diminished.

The onset of El Niño may be related to a weakening of the trade winds that normally blow from the south and cool the ocean surface. El Niño itself causes the winds to slacken further, producing a kind of vicious circle. Volcanic activity on the Pacific seabed may also be responsible. The effects are not only local: temperature changes as far afield as Canada, western Europe and Australia have been traced to the El Niño phenomenon.

Periodically the trade winds weaken (they sometimes even reverse) and the cold upwelling is stopped as the warm countercurrent extends east.

The Amazon basin
Apart from deserts, all these landforms are to be found in the vast area drained by the Amazon. This great river basin drains an area nearly half that of the United States. The Amazon pours 180,000 cu m (6.4 million cu ft) of water into the Atlantic every second.

The basin is bordered to the west by the Andes, which rise steeply from the lowlands of the Marañón, Putumayo and Japurá. These and many lesser rivers flow east to from the upper reaches of the Amazon. The port of Manaus, where the
The water flowing in the great rivers of South America was once described as the “urine of the continents”. Although perhaps rude, this is an apt description; a medical expert can learn a lot from a sample of urine, and river waters reveal much about the environments they drain.

**Black waters and white waters**

Seen from an airplane flying over the Amazon basin, there is a clear contrast between “black water” and “white water” rivers. Where great black and white water rivers meet there are dramatic contrasts in color and chemistry that may persist downstream for tens of kilometers before the waters finally merge. This mingling takes place, for example, where the Negro meets the upper waters of the Amazon (known in Brazil as the Solimões), and where the Caroni joins the Orinoco just above its delta.

The “black” waters are in fact coffee-colored, acquiring their color from acids...
THE BURIAL OF ARMERO

On 13 November 1985 a mixture of hot lava, ash, melted snow and ice flowed down a valley in western Colombia at incredible speed, wiping out much of Armero and half its population.

Armero, a town of about 22,000 inhabitants, lay in the valley of a tributary of the Magdalena river, which runs north parallel to the Cordillera Oriental in Colombia. About 50 km (35 mi) to the west rises the ice-capped cone of Nevada del Ruiz, one of the highest volcanoes in the Andean chain.

During 1984 residents learned that their slumbering giant, dormant for many years, had started to smoke. A few recalled folk stories of an eruption in 1845 producing a mixture of mud and hot volcanic ash that swept down the valley at great speed. Geologists call such phenomena lahars.

At first nothing was done, but as signs of an eruption continued to be reported hazard warnings were issued; they were generally ignored. By summer 1985 it was clear to the authorities that a major volcanic event was imminent. In September a map of hazards was commissioned. The mountain continued to erupt.

On 12 November the map was ready. It showed that Armero lay in the zone of probable damage. But it was too late. Within 24 hours disaster had struck, and 25,000 people had died under the mud flows.

River flows on mountains and plains

The flow, or discharge, of the large rivers is controlled mainly by seasonal changes, often in the area of the headwaters. The Amazon has an enormous seasonal change in height; because of this, during the rubber boom of the last century a floating dock was built at Manaus to take ocean-going ships. The Negro flows into the Amazon; it is also connected to the Orinoco river to the north by the unique Casiquiare Canal, a 220 km (137 mi) river joining two great river basins.

The amount of rain that falls locally within the basin has little impact on such big rivers. By contrast, small streams in the forest rise almost immediately after a rainstorm because the soil is already saturated. As forest is cleared there are likely to be major changes to the seasonal and short-term responses of rivers to rainfall, because the forest will not be there to absorb the water, reduce runoff or hold the soil in place.

In the Andes the flow of the rivers is controlled by melting snow as well as by rainfall. Here the steep mountain slopes mean that avalanches, floods and mudflows are a constant danger. In 1877, for example, the eruption of Cotopaxi in Ecuador set off a mudflow that removed everything in its path for 240 km (150 mi). In 1970 near Huascaran in Peru, following an earthquake a great landslide swept into a valley, killing some 20,000 people.

in the water derived from humus. They look black because they contain no sediment, which is a pale color, and therefore absorb rather than reflect light. These waters are chemically almost as pure as distilled water; they support hardly any life because they contain very few nutrients. Black waters such as those of the river Negro come chiefly from areas where prolonged weathering has resulted in soils poor in nutrients, and where the trees of the forest take out what few nutrients remain.

The white waters, by contrast, do carry sediment, are chemically rich and are full of animal life. When white waters flood the land they leave a thick layer of silt that provides nutrients for plants, whereas a black water flood washes out the few remaining minerals in the soil. There is a saying that people live on the black waters (which are largely free from insects) but farm on the white waters.

Large parts of the Plateau of Brazil, the Guiana Highlands and the hot wet lands of Amazonas (the middle and upper parts of the Amazon basin) have reddish laterite soils composed mainly of oxides of aluminum and iron, and quartz. Rainwater, which is chemically richer than the river water, loses its few minerals in the thick root mat of plants. Dying or burnt vegetation produces minerals, but these are quickly absorbed back again by the roots of neighboring plants. (Laterite usually lies just beneath the surface. If it becomes exposed it hardens and turns into a chemically inert crust that is difficult to remove. It has been suggested that removal of the forest will expose and harden the laterite and turn Amazonas into one huge, hard desert.) When water from the forest does have a high mineral content in the ancient shield areas, it is usually a sign that natural conditions have been disturbed by human activity.

White waters such as those of the upper Amazon river itself originate where the rocks and soils are rich in minerals, including feldspars and micas. They rise in the Andes, or in basins where the newer, soft rocks have not been exposed to so much weathering and where soil erosion and landsliding are common. The many nutrients in the water are washed into the rivers, which teem with life.
The world's longest mountain chain

From the sunshine of the Caribbean to the icy waters off Cape Horn, the Andes extend over nearly 70 degrees of latitude and a distance of more than 7,250 km (4,500 mi). They form the world's longest unbroken mountain system.

The rocks of the Andes have been thrust upward and folded by the eastward movement of the Nazca plate. The process is still active, so the mountains are still being formed. The mountains occupy only a narrow zone, and there are rapid changes in altitude over short distances. From the offshore Peru-Chile trench to South America's highest peak, Aconcagua, the rise is 14,000 m (46,000 ft) - in just over 150 km (93 mi). These great changes of altitude cause processes such as erosion and landslides to act rapidly, simply because gravity is a relatively strong influence.

The Andes form part of the "Ring of Fire", a great arc of volcanoes that surrounds the Pacific. There are active volcanoes along most of the length of the Andes, especially in the northern section in Peru and Ecuador. They include the world's highest active volcano, Cotopaxi (5,896 m/19,344 ft) in Ecuador, Peru's highest peak, Huascaran, and Llullaillaco on the Chile-Argentina border.

Crossing the Andes
Changing altitude can have the same effect on vegetation as changing latitude if the length of the growing season is affected. Latitude changes are gradual but in the Andes the changes in vegetation can be dramatic; over only 20 km (12 mi) there may be a transition from tropical rainforest in the Amazon basin, through drier oak forest at 1,000 m (3,300 ft), dwarf forest and scrub (2,500-3,500 m/8,200-11,500 ft) and the alpine bog vegetation of the páramo, to frozen wilderness above 4,500 m (14,750 ft).

Rainfall on the eastern slopes facing the Amazon basin may reach 5,000 mm (200 in) a year. The interior basins and gorges receive only between 500 and 1,000 mm (20-40 in) a year, while the western coasts of Peru and northern Chile, though often blanketed in low cloud, receive virtually no rain at all. Farther south the western slopes have Mediterranean climate, with hot, dry summers and warm, moist winters because the westerly wind belt moves north with the overhead sun. Farther south still, the westerlies bring rain throughout the year.

As rainfall decreases at lower altitudes, so temperatures rise. In the Peruvian Andes Vincocaya at 4,300 m (14,100 ft) has an annual average temperature of 1.9°C (35.4°F); in Cuzco at 3,500 m (11,500 ft) it is 10.7°C (51.3°F) and in Arequipa at 2,700 m (8,860 ft) it is 13.8°C (56.8°F).

In the far north the Cordillera Oriental forks and is divided by an inlet of the sea, Lake Maracaibo. Farther south the chain is simpler but also wider, at up to 600 km (370 mi). The Cordillera Oriental and Cordillera Occidental are separated by the high plateau, known as altiplano near Lake Titicaca and as puna to the south. Farther south still, the range becomes one, separated from the sea by much lower coastal ranges and the central valley of Chile.

Snow, glaciers and thin air
The Andes are narrowest in Tierra del Fuego in the far south, where they are penetrated by deep fjords. Here the permanent snowline is almost at sea level because of the extreme cold and the high precipitation brought by the Roaring Forties, the prevailing westerly winds. In the drier zone around 15-30°S, where the Pacific high pressure anticyclone is
dominant, the snowline rises to 6,700m (22,000 ft) on Llullaillaco. To the north the snowline falls again, to about 4,500 m (14,750 ft). Apart from those in the far south, glaciers are scattered and small. During the last glaciation, which ended some 10,000 years ago, the Andean glaciers were much more extensive; they are now still smaller than they were 400 years ago.

The lower atmospheric pressure of the high Andes makes breathing difficult for visitors; local inhabitants – the guanaco, llama and alpaca as well as humans – have adapted to the shortage of oxygen.

**GREAT MOUNTAIN RANGES**

Asia has by far the largest share of great mountain ranges over 1,000 kilometers in length, an arbitrary limit that excludes, for example, the Alaska Range, the Alps and the Hindu Kush. Many ranges are parts of one major zone of mountain-building, such as the Andes and Rockies in the east Pacific’s “Ring of Fire”, or the system that extends from the Atlas and Alps to the Himalayas and into Southeast Asia.

<table>
<thead>
<tr>
<th>Mountain Range</th>
<th>Approximate Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andes, South America</td>
<td>7,250 km (4,500 mi)</td>
</tr>
<tr>
<td>Rockies, North America</td>
<td>4,800 km (3,000 mi)</td>
</tr>
<tr>
<td>Great Dividing Range, Australia</td>
<td>3,700 km (2,300 mi)</td>
</tr>
<tr>
<td>Trans-Antarctic Range, Antarctica</td>
<td>3,200 km (2,000 mi)</td>
</tr>
<tr>
<td>Himalayas, China/India</td>
<td>2,500 km (1,500 mi)</td>
</tr>
<tr>
<td>Uralis, Russia</td>
<td>2,000 km (1,200 mi)</td>
</tr>
<tr>
<td>Atlas, North Africa</td>
<td>2,000 km (1,200 mi)</td>
</tr>
<tr>
<td>Altai, China/Mongolia/Kazakhstan</td>
<td>1,600 km (1,000 mi)</td>
</tr>
<tr>
<td>Kunlun Shan, China</td>
<td>1,600 km (1,000 mi)</td>
</tr>
<tr>
<td>Carpathians, Europe</td>
<td>1,500 km (930 mi)</td>
</tr>
<tr>
<td>Tien Shan, China/Kirghizia</td>
<td>1,300 km (800 mi)</td>
</tr>
<tr>
<td>Caucasus, Georgia/Azerbaijan/Armenia</td>
<td>1,200 km (750 mi)</td>
</tr>
</tbody>
</table>

The Cordillera Oriental or eastern range of the Andes in southern Peru forms the watershed between the eastward-flowing tributaries of the Amazon and rivers flowing south into the inland drainage basin that feeds Lake Titicaca.

Building the mountains

The eastward movement of the Nazca plate forces it beneath the South American plate, whose rocks are buckled, and pushed up to form the Andes. Where the two plates meet, the Peru-Chile trench is formed.

**Rock types**

- Precambrian
- Granite
- Volcanic
- Metamorphic
- Sedimentary
- Oceanic crust
HABITATS AND THEIR CONSERVATION
CONTINENTAL DIVERSITY · WILDLIFE PROTECTION · PLANNING FOR THE FUTURE

South America shelters the richest plant and animal life found anywhere on Earth. This tremendous diversity is the result of the climatic influence of the Andean mountain chain, which runs almost the length of the continent along its western rim and determines the pattern of its plant and animal communities, as well as of the geological past. With the shifting of the Earth’s tectonic plates, South America gradually became separated from the ancient, drifting supercontinent of Gondwanaland and its animal and plant species evolved in isolation, until the creation of the Central American land bridge about 3.5 million years ago enabled the species of North America to mix with those of the south. Its great diversity of habitats range from barren, ice-covered mountain peaks to lush, species-rich rainforest.

COUNTRIES IN THE REGION
Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela

<table>
<thead>
<tr>
<th>Major protected area</th>
<th>Hectares</th>
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<tbody>
<tr>
<td>Amazona (Tapajós) NP</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Banados del Este NP RS BR</td>
<td>200,000</td>
</tr>
<tr>
<td>Brasilia NP</td>
<td>29,000</td>
</tr>
<tr>
<td>Canarana NP</td>
<td>3,000,000</td>
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<tr>
<td>Cara-Cara FBR</td>
<td>70,000</td>
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<td>Chiribiquete NP</td>
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<tr>
<td>Cotacachi-Cayapas ER BR</td>
<td>45,000</td>
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<tr>
<td>Defensores del Chaco NP</td>
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<td>Fray Jorge NP BR</td>
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<td>Iguaçu NP</td>
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<td>Isabelo Sécure NP BR</td>
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<td>Los Alerces NP</td>
<td>260,000</td>
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<td>Los Glaciares NP WH</td>
<td>446,900</td>
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<td>Manu NP BR</td>
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<td>Monte Pascoal NP</td>
<td>22,500</td>
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<tr>
<td>Nahuel Huapi NP</td>
<td>428,100</td>
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<tr>
<td>Noroeste BR</td>
<td>226,300</td>
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<tr>
<td>Pacaya Samiru NR</td>
<td>1,387,500</td>
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<tr>
<td>Sangay NP WH</td>
<td>370,000</td>
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<tr>
<td>Serra Nevada de Santa Marta NP BR</td>
<td>383,000</td>
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<tr>
<td>Torres del Paine NP BR</td>
<td>16,300</td>
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<td>Ulla Ulla NFR</td>
<td>200,000</td>
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<tr>
<td>Vicente Pérez Rosales NP</td>
<td>220,000</td>
</tr>
<tr>
<td>Wai Wai NR</td>
<td>96,000</td>
</tr>
</tbody>
</table>

BR = Biosphere Reserve; ER = Ecological Reserve; FBR = Federal Biological Reserve; NFR = National Natural Reserve; NP = National Park; NR = Nature Reserve; NS = Ramsar site; WH = World Heritage site

CONTINENTAL DIVERSITY

One physical feature jumps out at even the most casual observer of a map of South America: the Andes. This still-growing mountain chain exerts tremendous influence on the climates and soils of the region, and consequently upon the distribution of plants and animals. Because it acts as a barrier to the moist Pacific weather systems, most of the continental rainfall is supplied by systems originally in the Atlantic. The driest part of South America is the cold fog desert flanking the Pacific coast of Peru. In some places, rain may fall no more than once a century; only acacias, mimosa and a few scattered cacti manage to survive. In stark contrast are the lush rainforests of the Amazon basin. This vast jungle, with its network of rivers and swamps, contains 10 percent of all the world’s species – at least one million. Its value as a world resource has only just begun to be appreciated, yet some 10 percent of the rainforest has already been felled or burned.

Along the east coast are pockets of Atlantic rainforest. These, too, are rich in species, many of them unique to the area (endemic species). Atlantic rainforest is under even greater threat than the forests of the Amazon Basin – little more than 2 percent survives today, and even this remnant is in danger of being destroyed.

The subantarctic beech forests to be found in southern Chile (of which only tiny fragments remain) are all that survive of an ancient vegetation that is also found in parts of New Zealand and Australia. Once all belonged to the ancient supercontinent of Gondwanaland. The forests are dense and evergreen in the north, and more open and deciduous in the south, where the beeches are mingled with larches and araucaria pines (monkey-puzzle trees). They are lively with parakeets and hummingbirds; the endemic species include a primitive marsupial (pouched mammal) called a rincolesta.

Seas of grass
Between the great snow-capped volcanic ranges of the Andes lie the altiplanos, a series of high plateaus broken by hills and valleys, lakes and marshes, where
Vicuna graze at 3,800 m (12,500 ft) on the altiplanos - the high grasslands of the Andean mountain plateau. The coarse spiky grasses are adapted to withstand the cold and aridity of this windswept terrain. In the background rises the dormant volcanic peak of El Misti.

Map of biomes: The climatic influence of the Andes and the north-south extent of the continent has created a great diversity of habitats, ranging from warm deserts to icefields and glaciers. East of the Andes there are vast expanses of tropical forest as well as tropical and temperate grasslands.

Forests of Parana pine or candelabra tree, which is a relative of the monkey-puzzle tree, dominate the highlands in the southern part of Brazil. One of Brazil's most important timber trees, this strange conifer has broad leaves rather than the customary needles.

Alpine meadows fade into cold steppe on the higher slopes. These support mainly tough grasses, ground-hugging rosette plants, shrubs and cacti. Members of the South American llama family, guanacos and vicunas, together with deer and increasing numbers of domestic livestock, graze these windswept grasslands. They share the habitat with rodents, mainly chinchillas and guinea pigs, and predators such as pumas and foxes. Carrion-eating condors soar high above, scanning the ground for carcasses. Farther south, the Andes become barren wastes of permanent snow and ice.

To the east of the Andes, and in its rainshadow, is the pampas, a huge area of grassland measuring some 770,000 sq km (300,000 sq mi). Few animals live here other than rhea (large flightless birds), grazers like guanacos and vicunas, and small, burrowing rodents such as maras and viscachas.

The grasslands of the Brazilian plateau to the north, the campos cerrados, are poor in species, but the marshy area around the Paraguay river - the Pantanal - provides a habitat for lungfish and the rare maned wolf. By contrast, the subtropical llanos grasslands of Venezuela contain many species. However, large parts of this habitat have been destroyed by overgrazing, a threat that is increasing in other South American grasslands.
Island ecosystems

Off the southeastern coast of South America are the Falklands, South Georgia and the South Sandwich Islands. Hilly, barren and swept by Atlantic gales, they are covered with peat, low dense shrubs and tussock grass. No native land mammals live on them, but their shores and the surrounding waters support porpoises, dolphins, elephant seals, penguins and many species of seabirds, including the black-browed albatross and the red-backed buzzard.

On the opposite side and at the opposite end of the continent the rugged volcanic islands of the Galapagos lie nearly 1,000 km (600 mi) from the mainland, too far to be colonized by mammals. This meant that other species moved in to occupy their niche in the ecosystem by evolving special adaptations to exploit the islands’ different habitats. The islands therefore contain an extraordinarily large number of endemic species, including giant tortoises, seaweed-feeding marine iguanas and flightless cormorants. There are several species of finches, each of which has its own particular diet and a specially modified beak to deal with it.

WILDLIFE PROTECTION

Slowly but surely the concept of protecting South America’s outstanding natural areas has taken hold. The continent’s first protected area was Chile’s Vicente Perez Rosales National Park which opened in 1926. This was followed soon after by Argentina’s Nahuel Huapi National Park, established in 1934, and in the same year Ecuador created the Galapagos National Park, now a World Heritage site.

Conservation speeded up in the 1960s and 1970s. Between 1972 and 1984 the number of parks and reserves doubled from 126 to 253, increasing the area of land under protection from 180,000 sq km (69,500 sq mi) to 450,000 sq km (173,000 sq mi). In the Amazon areas of Brazil, Bolivia, Ecuador and Venezuela, the creation of new parks and reserves accounted for more than 1 million sq km (386,000 sq mi).

Even more significant is the quality of these new areas. Many of them take in ecosystems that were previously under-represented, demonstrating a readiness to use ecological criteria in selecting sites. Most South American countries are seeking to establish protected areas that will adequately represent each of the major habitat zones, as well as protect unique or endangered landscapes and species. They are also realizing that increased tourism can give an added economic value to well-protected areas.

Multiple-use reserves

There has been a recent move in the management of parks toward establishing multiple-use systems – or Biosphere Reserves – which allow for the full integration of indigenous peoples and their methods of food production. Such reserves contain a highly protected core zone, surrounded by buffer and transition zones. Local people live within these areas, which are also used for experimental research and species-monitoring.

In a reserve on the Colombian border, the Awa Indians are being trained in reserve management and organization, as well as learning how to deal with government and conservation agencies. The Indians in the northeastern part of the Amazon basin are being encouraged to raise pig-like peccaries and pacas (a type of rodent), activities which do not disrupt the surrounding environment. In Peru’s Manu Biosphere Reserve the local economy has been given a boost by the development of fish farming and the encouragement of small-scale tourism.

By 1986 there were 19 Biosphere Reserves in South America, but not all are managed in accordance with the internationally recognized criteria for such reserves, and many exist on paper only. Bad planning, economic constraints, corruption and the pressure of prospectors, speculators and settlers make it difficult to ensure the proper protection of these areas. Multiple-use reserves place a heavy burden on administrators, whose duty it is to ensure the survival of the intact ecosystem. It is also their responsibility to secure the cooperation of the local people and to safeguard their livelihoods. Achieving the correct balance is an enormous challenge and a difficult task. However, there have been some notable successes, of which the Manu Biosphere Reserve is an outstanding example. Its strictly protected core zone alone covers some 1.5 million ha (3.75 million acres). It is home to many large mammal predators and grazers, and boasts some 1,000 species of birds, 13 species of monkeys and more than 15,000 plant species.

Action by the people

Until recently there had been relatively slow growth in popular conservation movements in South America, but education programs are expanding. Ecuador’s Nature Foundation, a nongovernmental organization created in 1978, shows what can be achieved. After producing a report on the country’s many environmental problems, it prompted the formation of an association of environmental journalists, and produced a range of imaginative radio programs, films and television shows, as well as environmental education programs for the use of schools and government officials.

Perhaps the Foundation’s greatest contribution has been to organize a debt swap in which part of Ecuador’s outstanding international debt was purchased at a discount in return for increased government financing of conservation projects, especially the national park system. If the other organizations that are springing up elsewhere in South America follow this example, it may help to reduce the pressures and financial constraints that at present assail the hard-pressed reserves in this region.
A river ecosystem Both algae and decomposing plants that fall to the river bed are important primary producers at the bottom of the food chain.

Swampy ground high in the Andes at Sangay National Park, Ecuador, provides a habitat for a rare marsupial frog. Alpine cushion plants stud the drier slopes.

**Components of the ecosystem**
1. Plant plankton (algae)
2. Amazonian water lily
3. Plant detritus
4. Animal plankton
5. Terrestrial turtle
6. Capybara
7. Neon tetra
8. Leporinus fish
9. Amazonian dolphin
10. Piranha fish
11. Giant arapaima
12. Cayman

**Harvesting Natural Resources**

The Pacaya Samiria National Reserve lies on the upper waters of the Amazon in central Peru, and covers more than 13,800 sq km (5,325 sq mi). Its management exemplifies the regional policy of combining protection of valuable natural resources with the controlled harvesting of some species in order to supply the living requirements of local people. Almost 50,000 people live around the reserve's borders.

The Pacaya and Samiria rivers were originally set aside in the 1940s as fishery reserves to preserve the paiche, a huge catfish found in the waters of the Amazon. In 1982 the reserve was enlarged to its present size, and its conservation program extended to all its plants and animals. The reserve contains a wide range of wildlife, including many species not found in Peru's better-known park, Manu. In addition to the paiche, peccaries, deer, monkeys and pacas are hunted by the local people to a limited extent.

A management plan established that many species could be sustainably harvested, both for food purposes and for scientific research, without depleting their numbers below the level necessary for survival. The aim was to improve the situation for endangered species and to maintain or increase already abundant wildlife populations, particularly paiche, caymans, some monkeys, and capybaras and pacas. A series of research stations is planned throughout the reserve to monitor this work. The local people will be allowed to harvest the reserve's resources for their own needs, and it is hoped that the wildlife program will eventually supply them with a steady income and involve them directly in the management and benefits of what is perhaps the world's largest tropical multiple-use conservation project.
PLANNING FOR THE FUTURE

Although great strides have been made in recent years to increase the number of protected areas in South America, many difficulties remain. Most are the result of the overwhelming economic and social problems facing all the countries of South America. There is a rapidly rising population – numbers will have reached about 400 million by the year 2000 – but the real problem is not overpopulation so much as unequal land distribution. In non-Amazonian Brazil, for example, less than 5 percent of the landowners own 81 percent of the country’s farmland, and 70 percent of the population has no land at all. The situation is roughly similar in most other countries.

To alleviate landlessness, most governments have sought to colonize previously unsettled lands, with little regard to their suitability. Most of these areas are in the tropical rainforests. The settlers are inevitably forced to practice unsustainable forms of shifting cultivation because of the thin, infertile forest soils, while the driving of roads into previously impenetrable forest allows access for hunting, mining and other activities that destroy these fragile ecosystems. Even the national parks are not exempt: Manu National Park has had its forest areas periodically threatened with a road that would cut the park in half in order to facilitate colonization.

A recent innovation may help to stem this invasion of the wilderness. This is the concept of conservation-for-debt: part of a country’s debt to a Western bank is sold at a discount to a charity or conservation agency, which then extracts an agreement from the debtor country to put the full value of the debt purchase into a conservation project. Such schemes are rare, and it is difficult to ensure that the promised work is carried out.

Menace in the forest
The greatest cause of deforestation is the clearance of land for largescale agriculture and cattle ranching. Second to this comes logging for commercial purposes. The loggers remove only about 3 percent of each area they work, but in the process they damage more than 50 percent of the remaining vegetation. The building of logging roads into the forest opens it up to further exploitation.

A SPECIES-RICH HABITAT AT RISK

The Amazon Basin is among the most biologically rich areas on Earth. Drained by the 6,570-km (4,080-mi) long Amazon river system, its vast expanse of seemingly uniform tropical rainforest contains at least three major ecological zones and over 1 million species of plant, animal and insect life. According to one reckoning, a single patch of rainforest measuring 10 sq km (4 sq mi) in extent may contain as many as 1,500 species of flowering plants, 750 different tree species, 125 mammals, 400 birds, 100 reptiles, 60 amphibians and 150 butterflies.

The consequences of the eventual destruction of the Amazon rainforest are incalculable. Species whose value we scarcely yet know will simply disappear. Only a tiny percentage of the Amazon’s incredible abundance of species is fully understood by science, but we know that many plants are rich in secondary compounds that have potential use as medicines, pesticides and herbicides. Many of today’s principal food crops originated from wild ancestors growing in these forests. Even when secondary forest growth regenerates on cleared areas of land, the diversity of the forest species can never be recovered.

Of even greater significance are the possible global consequences of continued deforestation. Most scientists agree that the loss of forest cover contributes to a buildup of carbon dioxide in the atmosphere. This absorbs infrared radiation reflected from the Earth’s surface, causing a gradual increase in the Earth’s overall temperature – the “greenhouse effect”.
Much forest has been cleared to convert the wood to charcoal for iron smelting and other industrial processes, and to allow mineral extraction to take place. The wasteheaps of excavated soil are washed away by the heavy tropical rains and silt up the rivers. Gold prospecting can be even more devastating; the mercury used to extract the gold runs into rivers, killing aquatic life and poisoning the water, often with fatal consequences for both animals and humans living further downstream.

The removal of vegetation cover from watersheds allows more water to reach the rivers and streams. This causes them to flow faster and to become more turbulent. Whereas fish were able previously to browse on the nutritious floodplains during periods of high water, now they are unable to hold their own against the increased current. Seasonal rain is lost in floods, and many rivers dry up altogether for the rest of the year.

**Islands on the continent**

Originally most of South America's parks and reserves were created in the middle of large tracts of unspoilt wilderness. But as a land-hungry population encroaches on these areas, they are left as islands in a sea of altered and degraded land.

The survival of most species depends on there being an adequate breeding population — usually a minimum of about 500 individuals — to ensure sufficient genetic variation. Some mammals, and even some rainforest trees, require many thousands of square kilometers to support the feeding and reproductive needs of that number of individuals. In addition, many animals, especially birds, need to live within huge areas because they migrate seasonally to different feeding or breeding sites. The hard fact is that most parks and reserves are too small to protect every species.

The creation of buffer zones, as in multiple-use reserves, is one solution to this problem. Another is legislation that rewards landowners for conserving large parts of their land in a natural state. This could help to preserve corridors of vegetation linking protected areas, thus helping to conserve genetic variation by allowing animals and seeds to travel between them. The future outlook for protected areas in South America is promising in spite of the immense problems that still have to be confronted.
Chiribiquete

Chiribiquete National Park, created in 1989, covers 1 million ha (2.5 million acres). It is the latest stage in a land transfer process that is designed to make Colombia’s Indians the protectors of the country’s tropical forests, which rank among some of the richest in the world.

Traditionally the Indians have lived in harmony with the forest, taking no more than they need from it and resting the land between cultivations to allow the forest to regenerate. The concept of harvesting a surplus in order to generate a profit is quite alien to them.

The mainstay of their traditional way of life is the chagra – a garden in the forest. The Indians clear a patch of forest and grow crops such as yuccas, peppers, avocados, papaya, mangoes, lemons and other fruits. After a couple of years the soil starts to lose its fertility and the Indians move on to clear a new chagra, returning from time to time to harvest the fruit and to hunt the game it attracts. Wood and vines for building and for making canoes, as well as game, fish and plants, are collected from the surrounding forest, rivers and lakes. It has been estimated that each member of a traditional Indian family uses some 1,000 ha (2,500 acres)
of forest. The exploitation of forest resources is controlled by the local headman or guardian, who has a natural understanding of the environment and decides how many animals and plants of each species may be taken at any one time; he also imposes food and sexual restrictions on the other members of the group as he judges necessary.

The chagras are managed in such a way that the forest is able to regenerate fairly quickly; they mimic natural forest clearings created by fallen trees, though they are considerably larger. The Indians' practice of removing all the trees and burning them results in the death of some species of pioneer seedlings, but their fruit trees attract birds and mammals which bring in new seeds. A natural clearing takes only 40 years to return to mature forest, but an Indian chagra may require up to 200 years for complete recovery. This is a vast improvement on the time it is estimated that sites bulldozed by settlers will take to regenerate.

In recognition of the Indians' efficient management of the land, the Colombian government is returning over 1.8 million ha (4.5 million acres) of the Amazon to their ownership, thereby creating the largest single territory in the world legally in the hands of ethnic peoples. The plan involves considerable financial outlay in order to compensate landowners and peasant farmers who have been forced to move away. However, Colombia's rainforest areas have suffered relatively little invasion by colonists.

The decision to make the Indians' entitlement to the land irreversible has generated some controversy: there are those who wish to retain the option of developing this land in the future, while others point out that the forest will be protected only if the Indians continue to live in their traditional way. A provision in the land settlement goes some way toward meeting this objection by prohibiting the sale of the land to outsiders.

Colombia's far-sighted policies are in stark contrast to the situation in neighboring countries such as Brazil, where uncontrolled exploitation and colonization of the tropical forests are rampant. Other countries are watching developments in Chiribiquete and other reserves — already Bolivia has sought Colombian advice on creating Indian reserves. If the idea catches on, it could revolutionize conservation in the Amazon.
Life at the top

On the cold, rocky mountain heights few plants can survive. Those that do are mostly cushion plants, typical of high-altitude habitats the world over. Their low growth reduces exposure to chilling winds and allows them to shelter under an insulating blanket of snow in winter. Tufts of spiny grasses and cushions of small-leaved herbs dot the landscape, often sheltering in the lee of protective rocks.

Few animals can survive on these sparse rations and in these cold temperatures, but on the high plains of the Andes the plants are grazed by herds of guanaco and by Darwin’s rheas, large flightless brown birds that stand some 3 m (9 ft) high. Smaller herbivores include mice and chinchillas, well-protected against the bitter climate by their long silky fur. Pumas still stalk the guanaco, while the smaller animals are hunted by smaller predators – Geoffroy’s cats, and red and gray (South American) foxes. The lakes attract many rare birds, including Coscoroba and black-necked swans and colorful Chilean flamingoes. The sky is the undisputed domain of the Andean condor, the world’s largest vulture.
South America contains some 3,000 species of birds – one-third of the world's total – 80 percent of which are unique to the region. But birds are only part of South America's animal riches. Its wide range of habitats – coastal desert, mountains, grasslands, rainforests, rocky shores and coral reefs – means that a unique collection of land and aquatic animals evolved to take advantage of all the opportunities for survival. In moist tropical rainforests in particular, insects, amphibians and fish all developed unique specialized lifestyles. This diversity is partly due to South America's unusual geological history: the fragmentation of the continents over 100 million years ago meant that its animals evolved in isolation for millions of years, until the creation of the land bridge with North America let other species in.

COUNTRIES IN THE REGION
Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, Uruguay, Venezuela

ENDEMISM AND DIVERSITY
Diversity Very high – probably highest in the world
Endemism High to very high (a number of species shared with Central America)

SPECIES

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<th>Total</th>
<th>Threatened</th>
<th>Extinct</th>
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<td>Mammals</td>
<td>800</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>Birds</td>
<td>3,000*</td>
<td>296</td>
<td>2</td>
</tr>
<tr>
<td>Others</td>
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</tbody>
</table>

1 species extinct since 1600 including Falkland Islands wolf (Dusicyon australis), Glacialis macau (Androdophimus glacialis), Colombian greebe (Podiceps andinus) * breeding and regular non-breeding species

NOTABLE THREATENED ENDEMIC SPECIES
Mammals Golden lion tamarin (Leontopithecus rosalia), Emperor tamarin (Saguinus imperator), Woolly spider monkey (Brachyteles arachnoides), Maned wolf (Chrysocyon brachyurus), Giant otter (Pteronura brasiliensis), Mountain tapir (Tapirus pinchaque), Marsh deer (Blastocerus dichotomus)

Birds Junin grebe (Podiceps taczanowski), White-winged guan (Penelope albipennis), Little blue macaw (Cyanopsitta xanthops), Esmeralda's woodstar (Aethopyga berlepschi)

Others South American river turtle (Podocnemis expansa), Black caiman (Melanosuchus niger), Ginger pearlfish (Cynolebias marmoratus), Galapagos land snail (Bulinus)

NOTABLE THREATENED NON-ENDEMIC SPECIES
Mammals Caribbean manatee (Trichechus manatus), Giant anteater (Myrmecophaga tridactyla), Jaguar (Panthera onca)

Birds Dark-rumped petrel (Pterodroma phaeopygia), Orange-breasted falcon (Falco mexicanus), Harpy eagle (Harpia harpyja)

Others Leatherback turtle (Dermochelys coracoid), Hawksbill turtle (Eretmochelys imbricata)

DOMESTICATED ANIMALS (originating in region)
Llama (Lama 'glima'), alpaca (Lama 'vacas'), Guineapig (Cavia porcellus), Muscovy duck (Cairina moschata)

AN ANCIENT HISTORY
South America is the only landmass in which marsupials (pouched mammals) and placental mammals, which evolved later, coexist in large numbers – the result of its long period of separation from other continents after the breakup of the supercontinent of Gondwanaland. Both forms of mammal were already present in the region, and subsequently evolved into a large number of unique species. Sloths, armadillos and anteaters, which died out elsewhere, survive here, and llamas, guanacos and vicuñas, related to camels, graze the grasslands instead of the antelopes or bison that are found in similar habitats in other parts of the world. When the land bridge with North America formed about 3.5 million years ago, a wide range of placental mammals migrated southward to take advantage of the new territory.

Among its marsupials South America supports a variety of opossums, which have continued to evolve and are still extending their range – the common opossum has spread through Central and South America to reach Canada. South America also contains the only aquatic web-footed opossum, the yapok. Other opossums, with their prehensile tails, are well adapted to forest life, while the marmosas (small ratlike marsupials) forage on the forest floor.

As the continent of Africa began to break away from Gondwanaland, rodents and monkeys probably island-hopped to South America. Here, the monkeys have since evolved into two distinct groups, the tamarins and marmosets (small-sized fruit-eaters) and the cebids. This latter group includes the noisy howler and slender spider monkeys.

South America's main groups of fish – the catfish, characins and cichlids – as well as the ancient lungfish, had already evolved before the continents separated. The creation of the Andes mountain range blocked the path of the Amazon river to the Pacific. Until it cut a new path to the Atlantic, it formed a vast inland sea. Many former marine species, such as dolphins and stingrays, evolved into freshwater species.

An array of species
South America's wide range of habitats, from mountains to savannas, tropical rainforest to desert, has allowed the evolution and coexistence of numerous specialized animals, especially in the tropics. The rivers today contain a diversity of species – voracious piranhas, electric fish, strange armored fish and the giant arapaima that can leap out of the water to capture insects and even small birds on the forest branches above. These share the water with crocodiles, caimans and anacondas – the largest snakes in the world. Capybaras, the largest of all rodents, feed on the lush vegetation that grows at the water's edge.

Many amphibians inhabit the region's wetlands and moist tropical forests. They
include the poisonous dendrobatid frogs that carry their eggs and tadpoles on their backs, the beautifully camouflaged tree frogs with suction pads on their toes and the marsupial frogs, which carry their eggs and tadpoles in pouches. Insect life is similarly various - there are countless species of butterflies, moths, ants, bees, wasps, beetles and other insects - many, perhaps most, still unknown to science.

More than twenty families of birds are endemic to South America. Among them are the predominantly ground-living tinamous and the trumpeters, hoatzins (related to cuckoos) and the two species of cock-of-the rock, which build a bracket-shaped nest fixed to sheer rock faces. The forests provide insects for New World flycatchers, antbirds and ovenbirds, flowers for hummingbirds and fruits for, among others, toucans, brightly colored tanagers and even more brilliant trogons.

Tapirs and a wide range of rodents browse the forests. Sloths, monkeys and tree-climbing rats and mice feed in the tree canopy, along with a multitude of birds and insects. Both armadillos and anteaters have become specialized for feeding on those most abundant of insects, the ants and termites. The taman-dua, a forest-dwelling anteater, has a prehensile tail that enables it to raid ant and termite nests hanging from high branches. While jaguars, jaguarundis and ocelots (small wildcats) are agile climbers, they prefer to stalk the forest floor for their prey, where bands of peccaries (piglike animals) root for tubers.

Even the inhabitants of the South American grasslands are quite unlike those of other continents. Guanacos and vicuñas wander across the high plains. Another fast-moving grassland grazer is the rhea, a large flightless bird related to ostriches and emus. There are only a few species of deer, including the Andean deer or huemul, which can survive harsh extremes of climate at great height.
Monkeys of the family Cebidae (capuchin-like monkeys), a characteristic of many New World monkeys is a prehensile tail that acts as a fifth limb when climbing. The Guianan or White-faced saki, the Red uakar—uakars are the only short-tailed primates in the New World; the Dusky titi and the Squirrel monkey—both move chiefly by leaping, and do not have prehensile tails; the Brown capuchin, the Female Black howler monkey, the Back-handed spider monkey—it uses its tail for picking up food, the Night monkey, whose nocturnal habit is rare among monkeys; the Humboldt's or Smokey woolly monkey.

WHERE DIVERSITY REIGNS

In the tropical rainforests evolution occurs rapidly. The animals living in this environment have specialized to fill every microhabitat and to exploit every possible source of food. Yet some ancient species have survived from before the region's early period of isolation. One of these is the velvet worm, Peripatus, which has short stumpy legs and a segmented body, similar to a fleshy millipede. It appears to be an intermediate form between annelid worms (such as earthworms and leeches) and arthropods (insects, crustaceans, and so on); it may have shared an ancestor with both.

Some insects in South America can reach unusually large proportions. The Hercules or Rhinoceros beetle, for example, has long horns and grows to 150 mm (6 in) in length. Another recordholder is the Giant ghost moth, which has the
their African and Asian counterparts by having widely spaced forward-directed nostrils. Some species, such as the spider monkeys, are also unique in having prehensile tails. The small, fruit-eating marmosets and tamarins are monkeys with silky coats and sharp, curved claws for climbing trees. Tamarins and marmosets hate water and have thus evolved into many different species separated by the rivers that fragment the rainforest. The family includes some of the most endangered primates, such as the Emperor tamarin, the Golden lion tamarin and the Cotton-top tamarin. The Pygmy marmoset, which weighs less than 200 g (7 oz), is the smallest monkey in the world.

The capuchins and their relatives eat a range of food, from fruits and leaves to birds' eggs, insects and other animals. They include the only nocturnal monkeys in the world, the douracoulis, and the howler monkeys. They gain their name from the call the males make – among the loudest produced by any mammal.

The South American rainforests are home to over 300 species of hummingbird. These brilliant iridescent birds have evolved into a variety of species ranging in length from 5.8–21.7 cm (2.3–8.5 in), with a wide range of different bill shapes. They are supreme fliers, able even to fly backward or to hover motionless while feeding from the sugary nectar of countless different flowers, which supply them with a store of energy. Hovering is the most energy-demanding activity in the animal kingdom. Hummingbirds will typically consume half their weight in sugar a day; they also eat flies and spiders to gain protein and other nutrients. The humming sound is due to the amazing speed at which they vibrate their wings, up to 200 times per second.

Specialist lifestyles
One of South America's strangest birds is the oilbird – a cinnamon-brown, crow-sized bird that roosts in colonies in mountain caves throughout much of the region. It finds its way out of the cave in total darkness, using a sonar system similar to that of bats, an unusual feat for a bird. At night oilbirds leave their roosts in thousands to forage for the oily fruits of palms and laurels, sometimes traveling more than 80 km (50 mi) in one night. The nestlings, stuffed with these fruits, develop masses of fat and weigh up to twice as much as the adults. For centuries Amerindians have used the oil from the chicks for cooking, hence the name.

South America is also home to an impressive variety of amphibians. Some frogs carry their tadpoles in a pouch on greatest wing-span of any butterfly or moth in the world: 28 cm (11 in).

In the tree canopy
An astonishing array of animals with prehensile tails have evolved in the South American rainforests. Not only monkeys, but also porcupines, mice, rats, opossums, a raccoon – the fruit-eating kinkajou – and even some tree snakes have this useful "extra" limb. One reason for this may be the tendency for large areas of the South American forests to become flooded at certain times of year, compelling animals to travel from branch to branch rather than along the ground.

By feeding on different kinds of food and at different levels in the forest, a wide range of monkeys can coexist here. They belong to two families, the Callitrichidae (the tamarins and marmosets) and the Cebidae (capuchins and other monkeys), which are found only in South and Central America and are distinguished from

<table>
<thead>
<tr>
<th>THE HOA'TZIN</th>
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</thead>
<tbody>
<tr>
<td>Among the notable endemic birds of South America is the hoatzin. It has so many unique features that only recently has it been recognized as closely allied to the cuckoos. It is a slender bird, similar to a pheasant, with a distinctive crest of stiff narrow feathers and a row of bristles that form mammal-like eyelashes. It lives in riverine swamps and forests throughout the Amazon and Orinoco river basins.</td>
</tr>
<tr>
<td>The hoatzin's nest is a platform of sticks above the water, where it lays two or three eggs. Both parents take care of the offspring, aided by the young from previous years. One remarkable peculiarity of the chicks has long intrigued ornithologists: they have two well-developed functional claws on each wing that enable them to leave the nest and clamber along branches using all four limbs in reptilian fashion. The claws are an advanced feature that has evolved in response to their way of life. When threatened by a potential predator, the chicks readily plunge into the water – they are not only able swimmers, but also accomplished divers. When danger is past, they climb back up the tree to the nest.</td>
</tr>
<tr>
<td>The hoatzin feeds mainly on green leaves, most unusually for a flying bird. It digests the fibrous plant matter in much the same way as cows do; this probably gives the bird its characteristic odor of fresh cow dung. The hoatzin selects the most nutritious leaves and retains the food for as long as 43 hours for fermentation to take place. Geese, by contrast, pass leaves through in one and a half hours, but have to eat prodigious quantities. The drawback of the hoatzin's system is that the breastbone is undersized to make room for the digestive organs, and hoatzins are consequently poor fliers.</td>
</tr>
</tbody>
</table>
their backs until they metamorphose and can be released; this avoids the intense competition and predation in the ponds. Other frogs live in the pools of water contained in the rosettes of bromeliads, plants that grow high on the branches of forest trees. There is also a species aptly named the Paradoxical frog, whose tadpole can be up to 28 cm (11 in) long, more than three times the size of the adult. The brilliant colors of the poison-arrow frogs warn that they are highly toxic, threatening any would-be predator.

The absence of hoofed mammals during much of South America’s history left many vacant ecological niches. These have mostly been filled by the large rodents, such as cavies, found only in Central and South America. The mara of the Patagonian scrub desert is a monogamous animal with a harelike head and legs that resemble those of deer. It weighs about 4 kg (9 lb). Maras also perform the “stot”, a high jump typical of some deer species. While stotting, they expose a white rump patch, which can also be seen on deer.

The capybara is the largest living rodent weighing 50 kg (110 lb) and measuring 1.2 m (4 ft) long. It grazes the water meadows, but is always ready to retreat into the water at the first sign of danger. The coypu is even more aquatic; the female has nipples on her flanks to suckle her young while swimming.

Fleet-footed pacas live on the forest floor, along with Guinea pigs and agoutis, which are armed with large claws for digging. The tuco-tuco of the plains also has huge claws for burrowing, like its North American equivalent, the Pocket gopher. High mountain pastures are home to the chinchillas, with their highly prized long, soft fur.

The tiny Golden-headed tamarin is found only in a small area of forest in eastern Brazil. It is in serious danger of becoming extinct as its nature reserve home is being invaded by squatters. The only other population is a colony of some 25 individuals at the Rio de Janeiro Primate Center.

COOPERATION AND EXPLOITATION

Long before the arrival of Europeans in South America in the early 16th century, the indigenous Amerindians had domesticated various animals. Archaeological evidence indicates that the Guinea pig has been raised in farms in Peru since 2500 BC. Today, up to 20,000 tonnes of meat per year are produced from a population of 20 million of these animals. The success of Guinea-pig farming lies in their high reproductive rate, typical of rodents: they produce up to four litters of three or four young every year.

Alpacas and llamas were first domesticated in the high Andean plains around Lake Titicaca on the Bolivia-Peru border as long ago as 3000 BC. Alpacas produce high-quality wool, while llamas are used mainly as pack animals. There is evidence to suggest that Amerindians had domesticated a stock of dogs before the arrival of the European dog.

Parrots, parakeets and toucans have long been favored as pets in South America. The Amerindians also tamed trumpeter birds, which they caught in the forest. As that name suggests, they have loud, strident voices and were often kept around dwellings to act as “watchdogs”.

Wild animals are an important source of food for the indigenous human population. The honey produced by native bees and the roasted larvae or adults of many wasps, ants and termites provide highly esteemed and nutritious meals – even large caterpillars and tarantulas are sometimes eaten. Turtle eggs and hatchlings are taken by the thousand from nesting beaches – a practice that has seriously reduced populations of some species in recent years.

Trade in wildlife

Since the Spanish and Portuguese conquest of South America, the region has had a long history of animal use and abuse. Egrets and herons were almost exterminated in the northern floodplains when hats decorated with long feathers were the height of fashion among American and European ladies. Hummingbirds suffered a similar fate; millions of skins were shipped to European markets to be made into ornamental pins and other decorations. However, when the fashion changed, the exporters went
out of business, and the bird populations recovered their numbers.

Reptile skins were a later fashion, resulting in the virtual extermination of the crocodiles of the Orinoco. They are slow breeders and have been unable to recover. Now the small caimans are being exploited, though in a more controlled way as a result of the efforts of conservationists. Crocodiles are now bred in captivity for reintroduction into their natural habitat. The large tegu lizards are also bred for their skin, which may conserve the species.

Current trade in South American birds and mammals—notably parrots, macaws, hummingbirds and monkeys—involves large numbers of live animals intended for the pet markets of North America and Europe. Most of this trade is now illegal, but such trafficking has brought several species of South American parrot to the brink of extinction.

Problems of coexistence
A number of South American animals carry diseases that plague humans. Malaria is transmitted by mosquitoes; Chagas' disease (similar to sleeping sickness) is produced by a protozoan carried by kissing bugs; and bilharzia (river blindness) is caused by a parasitic flatworm found in rivers and streams. True vampire bats—those that feed on blood—are a mainly South American group, feeding at night on warm-blooded birds and mammals, including horses, cattle and occasionally humans. They transmit rabies through their bites, but this has been greatly reduced by the use of medicines and through the largescale slaughter of vampires and many other species of bat.

A growing—and now the gravest—threat to the wildlife of tropical South America is the loss of wild habitat. The rainforests are being felled at an alarming rate, and the rivers and streams that flow through them are being polluted. On the extensive grasslands, native grasses have been replaced by alien species to feed livestock that have displaced the native grazing mammals. For how much longer will the continent remain a vast treasure house of rare and fascinating species?

The world's largest rodents These capybaras are sharing their river bank feeding grounds with a group of Spectacled caiman. Capybaras feed in the cool of evening, and sleep or bathe during the hottest hours of the day.

In much of the tropics widespread flooding occurs in the wet season and severe drought in the dry season. The fish living in these regions have had to adapt to the contrasting conditions. Many species move into the flooded forests and reproduce prolifically during the period of peak flooding. In the dry season they concentrate in the retreating shallows, while fish-eating birds—for example, terns, gulls and skimmers—nest on the newly exposed sandbanks, taking advantage of the plentiful food.

The Amazon has at least 20 species of fish that breathe atmospheric oxygen when pools dry up. One of these is the Swamp eel. Some, including the Giant electric eel, have mouths that are well-supplied with blood vessels, enabling them to absorb oxygen. Other fish, including the lungfish, which evolved 150 million years ago, use an air bladder for breathing; in the dry season the lungfish will bury itself in the mud.

Many species have evolved ways of finding food in the murky floodwaters. The electric fish uses weak pulses of electricity, while the Giant electric eel uses its electricity to stun its prey. It can produce up to 500 volts of low current. River dolphins use echolocation for hunting, and catfish feel for and taste their prey with sensitive barbels on their chins. Some fish, which feed on fruit and seeds that fall into the water, may act as important dispersers of plants to new locations.
Wildlife of the Galapagos

Some 960 km (600 mi) west of the coast of Ecuador lie the Galapagos Islands, famed for the uniqueness of their plant and animal life. The Galapagos began to rise as volcanoes from the ocean floor more than 3 million years ago and have never been connected to South America. Their animals are derived from ancestors that colonized from the mainland.

The islands' land birds are dominated by the Galapagos finches, which were important in molding Charles Darwin's ideas on evolution by natural selection. The finches constitute a group of 13 species found nowhere else. They are believed to have evolved in the Galapagos from an original South American ancestor. Lacking competition from other birds, they were able to colonize many different ecological niches.

The finches' bills evolved into a wide range of shapes and sizes suitable for dealing with various types of food; different species assumed roles of seed-eaters, woodpeckers, warblers and even (in the case of the ground finches) blood-suckers. Several Galapagos finch species are remarkable among birds in their use of tools: the Cactus finch holds a long cactus spine in its beak and probes with it into the crevices of plant stems for the insects hidden there, and the Mangrove and Woodpecker finches use thorns or slender twigs.

Galapagos reptiles have also undergone extensive evolution. The different races of the giant tortoise are so distinctive that sailors who exploited them for food could easily identify the island of origin from the tortoise's carapace or shell. The land iguanas of the islands are large lizards that specialize in eating prickly pear cacti. The Galapagos Islands also boast the Marine iguanas, the world's only marine lizards; these have blunt noses and serrated teeth for feeding on seaweed, as well as sharp claws for clinging to wave-battered rocks. They control their salt level by expelling strong saline solution in sprits from their nostrils. However, as Darwin observed, when threatened they head for land, not water; until the arrival of humans and their animals, these lizards never had any predators on land.

The cool, nutrient-rich waters of the Peru (Humboldt) Current that sweep northward past the Galapagos support a rich underwater life. Galapagos sea lions and fur seals breed along the coast, and a great variety of whales and dolphins feed offshore. Almost three-quarters of a million seabirds nest on the islands, including nearly the entire world population of the Waved albatross and some boobies. The flightless Galapagos cormorant is an excellent swimmer and diver; lacking predators on land, it has no need of full-sized wings. However, it still holds out its vestigial wings to dry after a swim, betraying its ancestry.

Dragon of the sea (right) The Marine iguana is the world's only seagoing lizard. Its blunt nose and serrated teeth enable it to scrape algae from the rocks to feed on, and with its sharp, curved claws it can cling to rocks in the surf. It copes with sea water by having salt-secreting nostril glands that expel saline fluid.

A living address book (below) The shells or carapaces of the Giant land tortoises of the Galapagos Islands have evolved into different shapes (for different subspecies) on particular islands.
Human disruption

Until people came to these islands, the animals of the Galapagos had few predators. The first threat came from passing sailors, who slaughtered the islands’ tortoises for food. Then came whalers and sealers hunting for furs. As the islands were settled, introduced animals caused havoc to the native wildlife. Rats and pigs dug up the eggs of tortoises, sea turtles and iguanas; cats and dogs preyed on their young; and goats ravaged the vegetation. A massive program to eradicate these intruders has been partially effective, and some of the more threatened species have been successfully bred in captivity and reintroduced to their former haunts. Today 97 percent of the islands’ land area is a national park, and the animals have been afforded legal protection.

The islands’ human population is growing at 12 to 15 percent a year as settlers from the mainland arrive, seeking to profit from the tourist boom. This, together with some 60,000 annual visitors (despite the official limit of 25,000), causes pollution and puts pressure on natural habitats as the settlements expand, and shellfish and other marine animals are in greater demand. With such large numbers of people visiting the Galapagos Islands, alien species are often introduced unintentionally: in the past decade alone, at least 50 species of plants, several dozens of insect species, a lizard and a bird have all arrived.
Kings of the south

The cold waters from the Antarctic that stream up each side of southern South America, as the Peru Current on the west and the Falkland Current on the east, are rich feeding grounds for several species of penguins, as well as many other kinds of seabirds. Penguins are superbly adapted to exploit this wealth of food. Awkward on land, they are expert swimmers, and can spend weeks at sea. The torpedo-shaped body is streamlined with a layer of fat and a sleek coat of feathers, both of which keep the penguin warm during its long immersion in chill water. Penguins swim with powerful beats of stiff, bladelike wings or flippers, and are steered by the feet and tail acting as multiple rudders. Like whales and seals, they are physiologically adapted for deep diving. The King penguin can dive to over 240 m (800 ft) as it searches for fish and squid.

Penguins are very sociable during the breeding season; King penguins gather to rear their young in colonies on the Falkland Islands, South Georgia and other subantarctic islands. They pair to breed. The single egg is laid in November or December, and hatches in two months. The young penguin is then fed by both parents through the winter and launched into independence a year after the egg was laid. The parents do not lay again until the following summer, so the breeding cycle of the King penguin is unusual because pairs can rear young only once every three years.

The regal plumage of these King penguins on South Georgia becomes mudstained as they shelter their young from the wet weather. Some have quite well-grown young, while others are still incubating eggs balanced on their large feet.
**PLANT LIFE**

**TROPICAL TREES AND GRASSLANDS • WATER USE AND POLLINATION • STAPLE FOODS AND STIMULANTS**

South America contains lush tropical rainforest, grasslands, arid deserts and high mountains. Such variety is reflected in the unparalleled richness and diversity of the plants, many of which are of great economic, medicinal or decorative value. The sheer size of the rainforests gives them an added significance in terms of global ecology. The total number of plants in the region is unknown, and many have yet to be investigated. Many plants have also migrated from North America - the Andes provide a route through the tropics, and seeds may be carried by birds. A few primitive plants, which are related to species found in Australasia, are ancient remnants from the time when South America was part of the giant landmass called Gondwanaland, from which it broke away many millions of years ago.

**COUNTRIES IN THE REGION**

Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, Uruguay, Venezuela

**EXAMPLES OF DIVERSITY**

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<th>Region</th>
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**PLANTS IN DANGER**

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<tr>
<td>South America</td>
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<tr>
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<td>122</td>
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<tr>
<td>South Atlantic Islands</td>
<td>4</td>
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</tbody>
</table>

**USEFUL AND DANGEROUS NATIVE PLANTS**

**Crop plants**

- Anacardium occidentale (cashew nut)
- Ananas comosus (pineapple)
- Arachis hypogaea (peanut)
- Bertholletia excelsa (Brazil nut)
- Capsicum annuum (chili peppers)
- Canavalia ensiformis (bean)
- Lycopersicum esculentum (tomato)
- Nicotiana tabacum (tobacco)
- Passiflora edulis (passion fruit)
- Phasoleus vulgaris (wheat)
- Solanum tuberosum (potato)
- Theobroma cacao (cacao)

**Garden plants**

- Begonia species
- Bernina (Acanthaceae)
- Bougainvillea species
- Buddleja globosa (blackcurrant)
- Fuchsia corymbosa
- Gunnera manicata
- Jacaranda mimosaefolia
- Tradescantia albiflora

**Poisonous plants**

- Datura species
- Dieffenbachia species (dumbcane)
- Lantana camara (yellow sage)
- Styrchnos toxifera
- Tradescantia pachystachya

**BOTANIC GARDENS**

- Department of Botany and Agriculture, Castelar 15,000 taxa
- Jose C. Wolfs, Bogotá, Rio de Janeiro 17,000 taxa
- São Paulo 1,000 taxa
- University of Southern Chile, Valdivia 1,200 taxa

**TROPICAL TREES AND GRASSLANDS**

Some South American plants are remnants of the plant life of the ancient supercontinent of Gondwanaland. Examples of these are certain primitive genera of trees, including monkey puzzles (Aracaria) in Brazil and Chile, and the podocarps (Podocarpus), which also occur in Australasia. Trogonobalanus excelsa, a Colombian tree, is the only South American representative of a genus of three species; it forms an evolutionary link between the oaks (Quercus) and beeches (Fagus) of the northern hemisphere and the beeches (Nothofagus) of the southern hemisphere.

The tropical zones of northeastern South America are extremely rich in plants. The principal families are the orchids (Orchidaceae), daisies (Compositae), Bignoniaceae and Melastomaceae, with 400 genera endemic to the region. The 30 species of fern-tree (Jacaranda) are centered in the area but not restricted to it. Among the many lianas that contribute to the structure of the Amazonian forests are spiny Bougainvillea, Coboaca, golden trumpet (Allamanda) and passion flowers (Passiflora). Many plants in the rainforest - particularly orchids and bromeliads (Bromeliaceae) - are epiphytes, relying on a host tree for anchorage and support.

**The spine of the continent**

The Andes dominate South America. Their altitude (maximum 6,960 m/22,800 ft) means that they provide a cool temperate route for southern plants such as the Antarctic pearlwort (Colobanthus quitensis) to migrate north to Peru and beyond, and for North American groups, such as Oregongyrrhis, to move south into Patagonia. The Andes also obstruct the rain-bearing winds, giving rise to the Atacama Desert in northern Chile and southern Peru, and the arid Patagonian steppe of Argentina.

The Atacama Desert is largely devoid of plant life; a few species grow locally, and coastal fogs support the caetá Eulychnia and Copiapoa and the bromeliad Puya berteroa - other species of Puya occur at higher altitudes in the Andes. Farther south, central Chile enjoys a Mediterranean-type climate in which aromatic trees such as the boldo (Peumus boldus), raras (Myrtegena obtusa) and huacan (Myrtegena pavonis) flourish. The annuals

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*Note: The text is a compilation from the sources*
Blossom in the Atacama Desert (above) Even the driest desert in the world flowers after a rare rainfall. Then ephemerals with large colorful flowers complete their brief lives while the residual moisture lasts.

Map of floristic regions (right) Temperature and the dominating Andes mountain chain have had the greatest influence on plant life in South America. The northern tropical areas contrast with the warm- and cool-temperate southern zones.

Clarkia and Blennosperma grow in the coastal region of central Chile, along with the swollen-stemmed Chilean honey palm (Jubaea chilensis). The annuals originated in western North America and were probably dispersed by migrating birds. Birds are also responsible for introducing many plants to the Galapagos Islands, which lie about 1,000 km (600 mi) off the coast of Ecuador. Many plants on these islands show similarities to species found in the Andes.

Southern grasslands
Moving southward across Argentina, the subtropical forests give way to open grassland – the pampas. This habitat is dominated by many species of feather grass (Stipa) and, especially in rocky areas, by the enormous silvery plumes of pampas grass (Cortaderia selloana), which grows 2-3 m (6.5-10 ft) tall. In southeast Argentina the arid Patagonian meseta is a sparse grassland of drought-resistant species of feather grasses, tough, narrow-leaved fescues (Festuca) and piojilletes (Poa). Some areas are dominated by shrubs that have adapted to the dry conditions (xerophytes), such as mata negra (Verbena tridentis) and the spiny Chuquiraga and Malvinum; there are also many spiky-leaved, low-growing plants such as the red-flowered mata guanaco (Anarthrophyllum rigidum).

At the southern tip of the continent lies Tierra del Fuego. There are few northern plants here; southern groups such as the abrojos (Acaena) and species such as Orylis magellanica and the dandelion Taraxacum giganteum are widespread.

The Falkland Islands (Islas Malvinas) off the east coast are a botanical extension of Patagonia, though with fewer species. Thirteen species are unique to the islands, but most of these show strong similarities to mainland plants – only the cabbage-relative Phlebolobium macloviense is truly distinctive.
WATER USE AND POLLINATION

The wide range of environmental conditions in South America have resulted in a great variety of plant adaptations. In the equatorial forests of Amazonia a large number of trees, such as Martiodendron parviflorum and mahogany (Swietenia macrophylla), have buttress roots at the base of their trunks. These structures resemble the supports found on the external walls of cathedrals, and are thought to perform a similar function.

The high humidity of these forests means that water tends to settle on leaves. If the water were to remain on the surface of the leaf, algae would develop and impair photosynthesis by blocking out the light. In order to avoid this, many unrelated species of forest plants have leaves with long, pointed drip-tips (apices), which encourages water to drip from the leaves.

Lianas flourish in the tropical forests. Some species, such as Cobaea trivincaei in Colombia, are pollinated by bats, while others, including the Chilean copihue (Lapageria rosea) and its southern relative the coicopihue (Philesia magellanica), are pollinated by hummingbirds. The southern forests also support mistletoes (Misorandrum), that are found nowhere else in the world. These green-leaved plants are hemiparasites—they are able to photosynthesize, and therefore manufacture a certain amount of food, but nevertheless derive most of their nutrients from the trees, usually southern beeches (Nothofagus), on which they grow.

Hostile environments

The highlands of Venezuela (paramos) are as much as 2,400 m (7,800 ft) above sea level. The plants that live there have to be specially adapted to deal with high temperatures during the day and low temperatures at night—conditions typical of any high-altitude tropical habitat. The frailejon (Espeletia) have adaptations typical of this environment. They have leaves arranged spirally in dense rosettes that close up at night to insulate the growing tissues from the cold. The leaves are also covered with fine hairs that help reduce water loss during the day.

In Patagonia the flanks of the Andes are clothed with temperate forests, but farther east the conditions become increasingly arid and the tree cover soon
disappears. The plants have developed many adaptations to the dry, windy conditions. Shrubs generally have leaves that are reduced to narrow, hard, often spiny structures; many species from quite unrelated groups show similar adaptations to the lack of moisture. The southernmost cactus in world, *Mammillaria patagonica*, also lives here.

A study of the leaf structure of 281 Patagonian species showed that, as one moves eastward into the more arid areas, the plants increasingly exhibit features that help them to combat water stress. These include, for example, leaves with a thick cuticle and an extra outer layer of epidermal cells, a covering of hair on the lower leaf surface, a high level of sticky secretions from the leaves and more abundant tissues for storing water (xylem); all these features help to reduce the amount of water lost.

In arid areas of Patagonia many plants have a cushion habit of growth. They include the lareta or balsam bog (*Bolax gumifera*) and Azorella trifurcata, both in the carrot family (Umbelliferae), and the white-flowered Benthamiella nordenskioldii (Solanaeae), a relative of the potato. These cushion plants provide their own microclimate to cope with the dry, windy environment. The small flowers of these species are grouped into a mass that is conspicuous to pollinators. Cushion plants grow in similar conditions at very different altitudes: the yellow-flowered Oreopoulos glacialis occurs at only 50 m (160 ft) above sea level in the cool conditions of the extreme south in Tierra del Fuego, and at 4,000 m (13,000 ft) in the high Andes above Santiago, some 20 degrees farther north.

Some plants have developed long taproots that enable them to reach water and also provide secure anchorage in the unstable, often volcanic soils. To counter the great difference between day- and nighttime temperatures typical of arid and high-altitude environments, the leaves of many plants are arranged in tight rosettes; unusual examples are a violet (*Viola cotyledon*) and the whitish yellow flowered Menonhilla nordenskioldii.

Other plants of the high Andes include natural migrants and colonizers, such as the Antarctic pearlwort. With male and female flowers on the same plant, it canself-pollinate; it produces numerous seeds that germinate readily, a necessary mechanism for a colonizing plant.
STAPLE FOODS AND STIMULANTS

South America is the source of many plants that are now grown commercially in other parts of the world. Conversely, some species have been imported into the continent and successfully exploited. It is difficult to assess the extent to which food plants were transported between Central and South America prior to the arrival of European settlers in the 16th century, but there is substantial evidence that many popular and widely cultivated crops originated in the south.

Cash crops
South America is the original source of rubber (Hevea brasiliensis). The Brazilian monopoly of this crop was destroyed when wild seeds were taken from the Amazon forest and used to establish plantations in Malaysia.

Cocoa (Theobroma cacao), from which chocolate is made, also originates in the region. This tree, which produces seeds rich in stimulating alkaloids, probably originated in the upper Amazon, but it is now widely cultivated in both western Africa and Southeast Asia, while coffee (Coffea arabica), popularly associated with tropical South America, was introduced from Africa. Less widely known beverages include the Argentinian drink yerba mate, which is made from the dried leaves of tea (Ilex paraguayensis). In Chile beverages called aguitas are prepared by infusing the leaves of certain aromatic species, notably boldo (Peumus boldus). This shrub contains certain essential oils, such as terpinol and eugenol, and the drink is taken after meals as a digestive.

Foods and flowers
Many widely cultivated crops originated in South America. The peanut (Arachis hypogea) has close relatives in northwest Argentina, Paraguay and Uruguay, and is known from pollen evidence to have grown on the coast of Peru 3,800 years ago. The potato (Solanum) comes from the temperate areas flanking the Andes. The best-known species, S. tuberosum, probably originated from cultivation in the area spanning Bolivia to Colombia, but other wild species have been used subsequently in breeding programs.

The tomato (Lycopersicon) comes from the northern Andes and the Galapagos Islands. The cultivated chilli peppers (Capsicum) seem to have developed from C. baccatum, which can be found from southern Peru through Bolivia and Paraguay to southwest Brazil. Pawpaw (Carica papaya) probably originated in Peru; it is now a widespread weed tree of tropical forests, and its fruits are of increasing economic value. Plants of the genus Oxalis are not usually considered as a source of food, but the oca (O. tuberosa) has long been cultivated in the Peruvian Andes as a root vegetable.

South America has produced many plants that decorate gardens throughout the world. Notable examples are the spiny barberry, African marigolds (Tagetes) and fuchsia (which has been hybridized...
to produce a great variety of ornamental cultivars), petunia (*Petunia*) and godetia (*Clarkia tenella*).

**Medicines and hallucinogens**

South American plants are the source of a variety of drugs. Quinine is an anti-malarial alkaloid derived from the Jesuit’s or Peruvian bark species, *Cinchona*. Coca (*Erythroxylum coca*) has been used for at least 5,000 years by Andean Indians as a stimulant. The leaves are mixed with lime to increase the stimulant effect and then chewed, but not swallowed. Used in this way they help to combat dietary deficiency by maintaining blood glucose levels and reducing hunger pangs. Coca is also the source of cocaine, long used as an anesthetic but now notorious for its role in drug abuse.

Plants containing chemicals that induce hallucinations are, or were, important in many South American cultures. In the west of the region, the hierba loca or huedhued (*Pernettya furens*) of Chile and the taglii (*P. parvifolia*) of Ecuador – both members of the heath family (Ericaceae) – contain compounds that induce psychic alterations. The arbol de los brujos (*Latua pubiflora*) is used by the Mapuche Indians, who live in southern central Chile, for similar purposes.

Plants of the genus *Datura*, which includes the jimson weed or thorn apple, are rich in alkaloids such as hyoscyamine and hyoscine – substances widely used in the treatment of asthma. The tree *D. arborea*, found growing from Colombia to Peru, is valued for its hallucinogenic properties. Farther south, the Mapuche people use *D. candida* and *D. sanguinea* to correct the behavior of unruly children: they believe that the spirits of their ancestors chastise the children during their hallucinations.

In Patagonia and Tierra del Fuego the branches of the barberry or humer-zamaim (*Berberis buxifolia*) were greatly prized by the Yahgan Indians for making arrows. Not only does the species provide straight, true shafts, but when the bark is peeled off the wood underneath is yellow – a color that was of mystical significance to the Indians.

*A marvel of Peru* *Mirabilis jalapa* is also known as the four o’clock plant because its fragrant flowers open late in the afternoon. The specific name is an allusion to the fact that the plant was thought at one time to be a source of the purgative drug jalap. It is often grown in gardens as an annual.
Epiphytes in the rainforest

Epiphytes are plants that grow on other plants without – unlike parasites – deriving any nutrients from their hosts. In the rainforest, epiphytes take advantage of the trees, which provide them with an elevated position away from the gloom of the forest floor and closer to the light. The angles between the branches and trunks, and the crevices in the bark – places where moisture and organic debris accumulate – are favored by many species. Epiphytic ferns and mosses survive on water trickling down the tree trunks.

Prominent among the rainforest epiphytes are numerous species of orchid (Orchidaceae). Many produce long roots that dangle in the humid air and absorb moisture. In many instances the roots are green and able to photosynthesize. Palms such as the Brazilian jara (Leopoldinia pulchra) often support a wide range of epiphytes, as their fibrous stems are porous and retain water.

Another group of epiphytes, the bromeliads (Bromeliaceae), have water-absorbing hairs on their leaves and stems. Many bromeliads, such as Neoregelia and Guzmania, have tight spiral clusters of leaves arranged as inverted cones, which retain rainwater. The small pools of water provide a habitat for numerous insects, species of the aquatic plant bladderwort (*Utricularia*), and even frogs (genus *Hyla*).

**Epiphytes under attack**
The Amazon rainforest is incredibly rich in epiphytes, with many trees supporting hundreds of plants; the species come from several plant families. Orchids and bromeliads predominate, and have the most colorful and complex flowers. The exotic nature of their blooms has led to many species, especially orchids such as *Cattleya*, *Laelia* and *Epidendrum*, being collected to the point of extinction. These plants are highly prized not only as specimens but also for use in horticultural
hybridization programs. More destructive than the actions of plant collectors, however, has been the removal of the rainforests - the felling of one tree results in the destruction of numerous epiphytes that depend on it.

Other families of plants besides the orchids and bromeliads contain epiphytic species. The aroids (Araceae) are represented by the genus *Anthurium*. The popular houseplant known as the flamingo flower (*A. andraeanum*) has a conspicuous 12 cm (4 in) red leaf bract underlying the pencil-like flowerhead. The gesneriads (Gesneriaceae) also include prominent epiphytes such as *Columnea* and *Cedonanthe*, which are pollinated by birds. The latter species normally grows in association with ants' nests, and its seeds, which are the same size as ant eggs, are distributed by these insects.

It is not known what creature pollinates the Amazon moonflower (*Strophocactus wititi*); this white-flowered epiphytic cactus opens its strongly perfumed blooms for only a few hours on a single night. It might seem remarkable to find a cactus in a rainforest, but survival in this habitat - as in the desert - requires the ability to cope with water stress.
The lobster claws (*Heliconia*) inhabit both the moist humid, semideciduous, monsoon forests of the lowlands and the rainforests of Central and South America. These two types of forest have many species in common. The monsoon forest tends to have fewer species, in particular fewer lianas and epiphytes, but a better developed ground layer of which the heliconias form a part. In the monsoon forests they grow with tall bamboos, palms and *Calathea insignis*, a cormous plant with thin variegated foliage widely sold as a houseplant.

The large leaves and fantastic inflorescence of *Heliconia* are shared by other members of the banana family (Musaceae). The large, colorful, boat-shaped bracts conceal inconspicuous flowers. Copious amounts of nectar ooze into the bracts; the nectar is diluted with rainwater to produce a sweet drink for bird pollinators. The bird of paradise flowers (*Strelitzia*), South African relatives of the lobster claws, also have large sturdy flowerheads composed of brilliant-colored bracts to attract birds. By far the best-known species is *S. reginae*, with its spiky inflorescence of orange and purple.

One or two species of *Strelitzia* develop trunks, but the only woody genus of the banana family is *Ravenala*, represented in Madagascar by the traveler's palm (*R. madagascariensis*) and in Brazil and Guyana by *R. guianensis*. These both have a fan of paddle-shaped leaves at the top of their trunks.

Large, broad leaves are characteristic of all the Musaceae. They tend to tear easily along the parallel veins that run at right angles to the midrib. Another common feature is the way in which the leaf sheaths are rolled to form a stem. This false stem may grow to a height of more than 10 m (33 ft) in a banana "tree".
South America has tremendous diversity of farming – the result of the continent's geographical location, which extends from the tropics to the subantarctic. There are equatorial, tropical and temperate areas with plentiful all-year rainfall, but the Atacama Desert on the Pacific coast is as arid as anywhere on Earth. Cultural differences influence patterns of agriculture, which embrace shifting cultivation of temporary clearings in the Amazon rainforest and extensive commercial cereal farming of the Pampas plains of Argentina. Traditional cultivation of indigenous crops was augmented by the introduction of new crops, animals and farming techniques by European colonizers after the middle of the 16th century. Despite these natural riches, few South American countries have profitable agricultural economies.

### Countries in the Region

<table>
<thead>
<tr>
<th>Name</th>
<th>Land (million hectares)</th>
<th>Total</th>
<th>Agricultural</th>
<th>Arable</th>
<th>Forest/woodland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1,753 (100%)</td>
<td>617 (35%)</td>
<td>116 (7%)</td>
<td>900 (51%)</td>
<td></td>
</tr>
<tr>
<td>Bolivia</td>
<td>24.2 (58)</td>
<td>53.9 (6)</td>
<td>-12%</td>
<td>25.6 (26)</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>2153 (100%)</td>
<td>53.9 (6)</td>
<td>-12%</td>
<td>25.6 (26)</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>1520</td>
<td>654</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Colombia</td>
<td>513</td>
<td>348</td>
<td></td>
<td></td>
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<tr>
<td>Ecuador</td>
<td>129.9</td>
<td>1,753</td>
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</tr>
<tr>
<td>Paraguay</td>
<td>61</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td>2133</td>
<td>610</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surinam</td>
<td>124</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>50.9</td>
<td>30</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Farmers:**

- 24.2 million employed in agriculture (24% of work force)
- 5 hectares of arable land per person employed in agriculture

**Major crops**

Numbers in brackets are percentages of world average yield and total world production.

<table>
<thead>
<tr>
<th>Crop/Commodity</th>
<th>Yield 1000kg/ha</th>
<th>Production mill tonnes</th>
<th>Change since 1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>21.2 (58)</td>
<td>41.6 (9)</td>
<td>+133%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>18.9 (93)</td>
<td>25.6 (26)</td>
<td>+6,178%</td>
</tr>
<tr>
<td>Wheat</td>
<td>18.6 (80)</td>
<td>17.9 (3)</td>
<td>+78%</td>
</tr>
<tr>
<td>Paddy rice</td>
<td>21.5 (65)</td>
<td>15.9 (3)</td>
<td>+98%</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>627.7 (105)</td>
<td>337.5 (35)</td>
<td>+197%</td>
</tr>
<tr>
<td>Coffee</td>
<td>6.7 (120)</td>
<td>3.2 (51)</td>
<td>+26%</td>
</tr>
<tr>
<td>Bananas</td>
<td>—</td>
<td>15.2 (23)</td>
<td>+38%</td>
</tr>
</tbody>
</table>

**Major livestock**

<table>
<thead>
<tr>
<th>Animal</th>
<th>Number (1000)</th>
<th>Production mill tonnes</th>
<th>Change since 1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>257.9</td>
<td>—</td>
<td>+73%</td>
</tr>
<tr>
<td>Sheep/goats</td>
<td>129.9 (8)</td>
<td>—</td>
<td>-12%</td>
</tr>
<tr>
<td>Pigs</td>
<td>53.9 (6)</td>
<td>—</td>
<td>+37%</td>
</tr>
<tr>
<td>Milk</td>
<td>—</td>
<td>29.3 (6)</td>
<td>+93%</td>
</tr>
<tr>
<td>Fish catch</td>
<td>—</td>
<td>12.0 (13)</td>
<td>—</td>
</tr>
</tbody>
</table>

**Food security (cereal exports minus imports):**

<table>
<thead>
<tr>
<th>Mill tonnes</th>
<th>Domestic production</th>
<th>World trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

**Plowing in the Andes**

Among the changes that European colonists made to South American farming was the introduction of draft animals to pull plows. Farming at high altitude is arduous work. Subsistence farmers like this grow wheat and barley as well as indigenous crops such as potatoes, maize and beans.

**European colonists,** are now of widespread importance. Maize, manioc (cassava), sweet potatoes, potatoes and many types of bean – major world crops today – had been cultivated for centuries by Amerindian peoples. Indigenous crops flourishing in other continents include cocoa, cotton, groundnuts, pineapple, tomato, and various types of pepper and squash. Coca (cocaïne) and tobacco also originate from South America.

**European innovations**

The European settlers, with their new crops, livestock and agricultural techniques, had an immediate impact on South American agriculture. Wheat, barley, alfalfa, sugar cane, grapes, citrus fruit and garlic were some of the many crops they introduced; cattle, horses, sheep, goats, pigs and poultry were added to the limited range of indigenous domestic animals such as llamas, alpacas, guinea pigs and muscovy ducks.

From early settlements on the Caribbean coast of Colombia, Spanish colonists...
followed the Andes down the west side of the continent, attracted by the more temperate high-altitude climates and the more developed agricultural systems. Continuing southward, they reached central Chile where they found a familiar Mediterranean climate to which they could adapt many crops. Portuguese settlers colonized the moist tropical coast of Brazil, establishing plantation agriculture there as early as 1532, when sugar cane was introduced from Madeira. They also grew cotton and fruits for European markets. Sugar cane and banana plantations were established by Spanish, British, French and Dutch colonists in the tropical coastlands from northern Peru round to Guyana and Surinam.

Important developments in agriculture took place in the 19th century. The rich temperate grasslands around the Plate river in Argentina and Uruguay were opened up for cereal and beef production. After the introduction of refrigeration ships in 1877, cattle raising expanded dramatically in response to the new accessibility of the European market. Farther south in Argentina, cooler conditions were better for sheep farming, while in Brazil there was a steady movement inland to use the tropical grasslands of the Brazilian plateau for cattle ranching. Coffee, which is still South America's main agricultural export, was cultivated especially in the São Paulo area of Brazil and in Colombia.

Agriculture today
About one quarter of South America's work force is engaged in farming, which contributes one-fifth of the total economic product. Yields are generally low; subsistence farming is still widespread; agricultural exports remain small.

The rapidly expanding population and the drive for economic development, sometimes of a speculative nature, are the causes of the continued clearance of forest for agriculture, a source of great controversy, particularly in the Amazon rainforest. Nevertheless, half the continent remains sparsely populated. The cold deserts of Patagonia, the high Andean plateaux, the Atacama Desert and the vast Amazon Basin have failed to support significant productive agriculture.

Fishing and forestry are both of great economic importance in some countries of the region, and account for 16 percent and 10 percent respectively of total South America exports. Commercial fishing is concentrated in the rich, cool waters off the Pacific coasts of Ecuador, Peru and Chile. Forestry is most important in cool temperate southern Chile, in Brazil's tropical rainforests and in Paraguay. Together they provide 85 percent of South America's forestry exports.

A mountain of maize The only cereal that is native to South America, maize is now grown all over the world. It is the staple crop of the region; it contains up to 15 percent protein, though this is of lower nutritional value than that of other cereals.
The diversity of natural conditions, compounded by cultural differences, has produced many forms of agricultural organization. Farming systems are subject to infinite regional variation and often merge with one another. Nevertheless, several major types of farming are broadly characteristic of the region.

**Commercial farming systems**

Haciendas (which are known as fazendas in Portuguese-speaking Brazil) are large estates under single - and traditionally European - ownership, and range in size from a few hundred to several thousand hectares. They are based on the latifundia system of landholding transferred to South America from Europe, and exist throughout the Andean countries from Venezuela to Chile. In mainly arable areas the estates are divided between the home farm, where the owner's crops are tilled by tenants as labor rent, and very small plots (minifundia) tilled by the tenants for their own food supply. In the higher arable areas of Peru and Bolivia wheat, barley and potatoes are grown commercially on the home farm, while the minifundia typically produce potatoes, quinoa grain and beans for family subsistence.

In poorer, drier areas the haciendas are cattle ranches or, at high altitudes, sheep and llama ranges. They are frequently run by waged cattle hands. Cattle ranching predominates around the peripheral zones of the Pampas in Argentina, the Chaco district of northern Argentina and western Paraguay, and across the llanos grasslands of Venezuela. In spite of regional variations, haciendas do have features in common: they frequently have absentee owners, they are extensive, and productivity is low.

Plantations are found mainly in the tropical coastlands, and derive from the colonial system of using imported slave labor for specialist production of a single crop. Plantations are still monocultures, frequently owned or financed by overseas ventures, but unlike haciendas they are associated with reasonably high levels of mechanization and productivity. Sugar cane, the original plantation crop, is still widely produced, along with cocoa, palm oil and coconuts in Brazil, bananas along the humid coasts from Ecuador to Brazil,
and rubber in the lower Amazon. There are also large vineyards in central Chile and western Argentina, yerba maté (also known as Paraguay tea) plantations in northern Argentina, and large coffee fazendas in southeast Brazil.

Modern commercial farming for the sale and export of produce has developed in many areas previously used for subsistence farming, and there are both large, labor-efficient estates and much smaller intensive farms. Modern farms in the Argentinian Pampas and in Uruguay grow wheat and maize, and raise cattle on pastures that have been improved with sown grasses and alfalfa. Cattle from the drier ranches are fattened before being sent on to meat processing establishments. There are important dairy farms close to the population centers of Buenos Aires in Argentina and Montevideo in Uruguay, and sheep farms in southern Argentina and the Falkland Islands.

South-central Chile has well-developed commercial mixed farms with dairy cattle, wheat, barley and temperate fruits such as apples. Just to the north, farm products include beef cattle, maize, wheat, citrus fruits and small vineyards. Coffee is grown in the smaller, more specialist farms, as well as in large plantations in Brazil and Colombia. Southern Brazil has many mixed farms with cereals, tobacco, pigs and dairy produce. These commercial farms are typically worked by the owner's family and local laborers, or by tenants who pay cash rents.

Subsistence farming

Farming for purely family or community food needs is usual in remote and less advanced areas. In the northern and central Andes settled subsistence farming is commonly found at high altitudes, above the better land that is occupied by hacien-
das. At altitudes of about 3,500-4,000 m (11,500-13,000 ft) farmers graze sheep, llamas and alpacas, all for their wool, on mountain pastures (páramos). Below, at about 3,000 m (10,000 ft), they grow hardy
grains, potatoes and vegetables, and keep poultry and guinea pigs for eating. These isolated communities, which are mostly of Amerindian origin, carry on the ancient traditions of communal farming, sharing the key activities of building, harvesting and storage.

Primitive shifting cultivation is practiced mainly in tropical rainforest clearings in Brazil, and in similar lowland environments in Colombia, Venezuela and eastern Peru; in the high Andes squatter farmers cultivate temporary plots on unoccupied land. The crops raised vary according to the conditions, but the essential feature of all shifting cultivation in the region is the abandonment of plots after three to five years, when soil fertility and crop yields have diminished.

Farming on the Equator

In Ecuador the Andes rise from sea level to over 6,000 m (20,000 ft), so conditions for farming vary from fertile equatorial lowlands to treeless pasture below the snowline at 4,800 m (15,000 ft).

<table>
<thead>
<tr>
<th>Altitude (meters)</th>
<th>Subsistence farming</th>
<th>Cash crops and animals</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level</td>
<td>manioc, potatoes</td>
<td>bananas, sugar</td>
<td>+27</td>
</tr>
<tr>
<td>1,000</td>
<td>maize, beans</td>
<td>coffee, tobacco, sugar</td>
<td>+23</td>
</tr>
<tr>
<td>2,000</td>
<td>maize, beans</td>
<td>coffee, tobacco, sugar</td>
<td>+17</td>
</tr>
<tr>
<td>3,200</td>
<td>maize, beans, barley</td>
<td>sheep, lamas</td>
<td>+10</td>
</tr>
<tr>
<td>4,600</td>
<td>maize, beans, barley</td>
<td>sheep, lamas</td>
<td>+1</td>
</tr>
<tr>
<td>6,000</td>
<td>maize, beans, barley</td>
<td>sheep, lamas</td>
<td>-6</td>
</tr>
</tbody>
</table>

Vast equatorial rainforests are the natural vegetation of the Amazon Basin. They cover just under half of Brazil, and extend into adjacent countries. High rainfall and a very warm environment produce luxuriant vegetation, though the underlying forest soils are generally poor. Indigenous Indian peoples have practiced shifting slash-and-burn farming techniques here for at least 3,000 years.

A small patch of forest is cleared during a drier period of the year so that the wood can be burned before the onset of heavier rains. The plot, now covered in fertilizing ash, is then planted. The most important crop is manioc, which can be harvested all year and so provides a constant food supply. This small, bushy plant produces tubers similar to potatoes in appearance; these have to be boiled before they can be eaten in order to extract the toxins they contain. Maize and beans are also staple crops, and the diet is supplemented with wild fruit, nuts and game.

The plot has to be abandoned after three to five years, when the soil has become less fertile and crop yields have fallen. A new clearing is then prepared, if possible within walking distance of the existing settlement of round timber and thatch dwellings. If not, the whole community builds a new settlement beside the new clearing.

Because it is practiced on a small scale, and is transient in nature, slash-and-burn farming has only had a temporary effect on the ecosystems of the rainforest. Regrowth soon begins on the abandoned plots, and the forest quickly regenerates. By contrast, the modern commercial exploitation of the Amazon causes irreversible damage by largescale bulldozing, destruction of the vegetation cover and rapid depletion of soil nutrients because of inappropriate land use.
UNREALIZED POTENTIAL

Low productivity is the critical problem besetting South American agriculture. Although the region is still not densely populated – in 1990 there were roughly 300 million people, compared with 225 million people in under half the area in the United States – the population is nevertheless on the increase. The recent growth in population has not been matched by a comparable improvement in agricultural output. By 1980, South America had become a net importer of staple foods, with only the southern countries of Argentina, Chile and Uruguay managing to produce a food surplus. The export of cereals and meat products is still relatively insignificant, accounting for only 13 percent of the value of agricultural exports, mostly from Argentina, Brazil and Uruguay. By far the most valuable exports are coffee and cocoa, totaling 44 percent. Once again, this is almost all from only three countries – Brazil, Colombia and Ecuador – indicating few surpluses in the other countries.

Causes of low productivity

Technological backwardness and the hostility of the terrain in some areas partly account for poor productivity, but the fundamental cause of agricultural inefficiency is the inequitable nature of South American land ownership. A minority of very large landholdings occupy the better land at the expense of smaller units, which are scarcely viable. Surveys made in the 1950s of the pattern of land ownership showed that the percentage of small farms in South America varied from 22.5 percent in Brazil to 90 percent in Ecuador, but the farmland they occupied ranged from only 0.5 percent to 16.6 percent. Conversely, the number of large farms varied from 0.4 percent in Ecuador to 6.9 percent in Chile, but occupied between 45 percent and 81 percent of the total farmland.

The predominance of the haciendas means that ownership and power has rested with a disproportionately small class of landlords, leaving tenant farmers and paid laborers economically dependent on them. There has been little incentive for owners to invest in machinery and modern techniques, as they have always had access to a permanent source of extremely cheap labor.

Other factors weaken the agricultural economy still further. Access to markets is inhibited by poor transportation, storage and marketing facilities. Technical, advisory and support services – which are essential if agriculture is to develop – are also frequently inadequate.

The extent of change

Agrarian reform has been a central issue over the last few decades. All South American countries have attempted to solve the problems of farm size and land tenure, with differing degrees of commitment and success. Some hacienda lands have been redistributed under programs that compensate the previous owners. The land reforms undertaken by Chile’s socialist governments (1964–73) allowed owners to retain 40 ha (99 acres) of their choice; the rest, for which they received compensation, was redistributed among peasant workers. By 1973, when the government was replaced by a military junta, nearly half Chile’s farmlands had been redistributed in this way. Although some land was subsequently returned to haciendas, medium-sized commercial farms with improved fruit and vegetable production have now become established in the country.

Even where land reform has been seriously attempted, difficulties remain.

The possession of land does not necessarily help the new farmers if they lack the necessary backup services such as legal, financial and technical assistance, as well as transportation and marketing facilities. Some rural workers, displaced by agricultural reforms, have been forced to migrate to urban shanty towns.

A number of new crops and crop varieties, and new methods, have been introduced, particularly in the commercial farming areas. The production of rice on the northern Caribbean coastlands, and of soybeans in Brazil, have been notable successes. The latter are grown for export as cattle feed in countries that produce food surpluses of their own, at the expense of Brazil’s domestic food production. Crop yields in general have not increased since the 1950s, and rises in production have largely been achieved by the extension of agricultural land.

Fields of soybeans (right) surround the headquarters of a commercial farm in Brazil. Savanna soils in the south have been improved to expand production of this valuable export crop, but the profits generally go to multinational corporations outside the country.

Llamas in the Andes (below) This herd of llamas is being driven across a salt lake high in the Peruvian Andes. Llamas are a species of the camel family that can live and work at very high altitudes. They are the Andes’ principal livestock: they provide meat, wool and leather and can also carry heavy loads.
In several countries in South America, where agricultural performance is poor, the production and sale of illegal drugs is the most lucrative export earner. This agricultural subculture has flourished since the 1960s, supplying the markets of North America and Western Europe with cocaine and heroin.

The Amerindian people of the Andes have long been aware of the narcotic properties of the leaves of coca plants, which are native to the region. Since the last century they have been cultivated for supply to pharmaceutical companies. The cocaine extracted from the leaves is used in medicine as a valued anesthetic. But in recent years there has been a tremendous expansion of coca cultivation on the mountain slopes of Bolivia and Peru to supply the illegal drug trade. The high sale value of cocaine means that even small coca plots are extremely profitable. Illegal cocaine is thought to be Bolivia's most valuable export, while Peru produces about half the world's supply.

Much of the coca paste is converted into powder in Colombia. The notorious power of the Colombian drug barons is also based on heroin. This drug is extracted from the white juice of the opium poppy, which is grown in small, isolated clearings in Colombia and to a lesser extent in other South American countries. The cocaine and heroin are illicitly exported via certain Caribbean islands to Florida in the United States. Some drugs travel to Brazil and North Africa to enter Europe through Spain.

The highly addictive nature of these illegal drugs assures the continuance of a profitable market for them, despite the efforts of authorities worldwide to stem the flow. Although the Bolivian and Peruvian governments have both expressed the intention of offering farmers subsidies to grow other crops, profits from coca production are so large that they are unlikely to be able to afford sufficient inducement without outside financial aid.
Cattle ranching

Cattle ranching - the rearing of cattle on extensive rangelands - provides the most evocative image of South American farming. Horse-riding cowboys, the gauchos of Spanish-speaking countries or vaqueiros of Brazil, are still associated romantically with individual independence, wide-open spaces and untamed frontiers. It is a use of the land and a way of life that still prevails in many areas.

Cattle were introduced from Europe in the 16th century. Large hacienda ranches were soon established on the higher pastures of the Andes from Venezuela to Chile, and became the dominant landholding system on lowland tropical grassland areas (llanos) such as those of Venezuela and the Gran Chaco area of Paraguay and northern Argentina. Ranching is the main farming activity both in the drought-prone thorn scrub (caatinga) country of northeast Brazil and in the tropical grassland expanses (campo cerrado) of the Plateau of Brazil. More advanced methods of ranching have evolved on the temperate Pampas grasslands and the campanha of southern Brazil.

Extensive areas of land are devoted to ranching. South America has 21 percent of Third World cattle; Brazil alone has over 100 million head, the fourth largest herd in the world. Exports are limited, however, with cattle products representing only 6 percent of South American farming exports by value. Practically all these (94 percent in 1985) come from just three countries - Argentina, Brazil and Uruguay.

Cattle ranching illustrates the prevailing characteristics of agriculture in South America. Generally there is low productivity, unrealized potential, and persistent contrasts between traditional and modernized farming methods. In many areas free range cattle roam across unimproved natural grasslands that have low stock capacity. For estates to be viable they have to be large.

The Plateau of Mato Grosso in western Brazil typifies traditional cattle ranching in a contemporary frontier zone where the population has doubled since 1960. Improved zebu types of cattle, which are better able to withstand periods of drought and are able to resist disease, are bred for their hides and for salt or dried beef. Animals may take six years to achieve slaughter weight in the natural cerrado ranges. Ranching operates with a small labor force of vaqueiros, each responsible for as many as 2,000 steers. The cattle are driven eastward into São Paulo and Minas Gerais states to be fattened on improved pastures.

Further north the rapid clearance of Amazon rainforest for cattle grazing lands is the controversial "last frontier". There
are over 5 million cattle and 7.5 million ha (18.5 million acres) of cattle pastures; these are often in the hands of powerful overseas interests. Serious environmental misgivings may lead to further policies to restrict any extension of cattle ranching in the future at the expense of the Earth’s richest ecosystems.

By contrast with most ranching in these tropical pioneer zones, much more productive cattle ranges have developed on the Pampas of Argentina and Uruguay. Gentle gradients and fertile soils are combined with warm temperate conditions. From the mid-19th century new settlers established both large cattle estancias and smaller farms for the production of hides and salt beef. From the late 1870s refrigeration made the European markets accessible for beef exports. Quality and productivity have been improved by introducing British breeds, especially Herefords, and growing rye grasses, clovers and alfalfa in the richer humid Pampas areas, where more than 500 mm (20 in) of rain falls each year, around Buenos Aires and west of Montevideo. The peripheral drier areas have more traditional extensive ranching. Excellent road and rail networks provide links with the ports, with their tanneries, corned beef canneries and large chilling and freezing plants (frigerificos). Some 65 percent of South American meat exports are derived from this exceptional cattle farming zone.
In a region as diverse as South America it is hardly surprising that industry presents a widely varied picture. Brazil — which contains close to half the continent’s land area and population — boasts one of the world’s largest industrial economies. Mining, food processing and the manufacturing sector account for most of the activity. Exports include arms and passenger jet aircraft. Argentina industrialized much earlier than the rest of the region. Although its manufacturing sector has declined, agricultural products and mining remain important. Elsewhere, industry is dominated by extraction, often of only one or two minerals (copper in Chile, oil in Venezuela and Ecuador, tin in Bolivia, bauxite in Surinam, and oil and copper in Peru). Such dependency, however, causes over-reliance on the fluctuating world market.

### COUNTRIES IN THE REGION
Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, Uruguay, Venezuela

### INDUSTRIAL OUTPUT (US $ billion)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Mining</th>
<th>Manufacturing</th>
<th>Average annual change since 1960</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>231.5</td>
<td>22.9</td>
<td>181.7</td>
<td>+6.4%</td>
</tr>
</tbody>
</table>

### INDUSTRIAL WORKERS (millions)
(figures in brackets are percentages of total labor force)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Mining</th>
<th>Manufacturing</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23.8</td>
<td>0.56</td>
<td>16.7 (6.3%)</td>
<td>6.6 (6.4%)</td>
</tr>
</tbody>
</table>

### MAJOR PRODUCTS (figures in brackets are percentages of world production)

#### Energy and minerals

<table>
<thead>
<tr>
<th>Output</th>
<th>Change since 1960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil (mill barrels)</td>
<td>2674.0 (11.9%) +109.6%</td>
</tr>
<tr>
<td>Iron Ore (mill tonnes)</td>
<td>119.1 (21.1%) +91.8%</td>
</tr>
<tr>
<td>Bauxite (mill tonnes)</td>
<td>12.9 (13.2%) +15%</td>
</tr>
<tr>
<td>Copper (mill tonnes)</td>
<td>1.8 (21.2%) +89%</td>
</tr>
<tr>
<td>Tin (1,000 tonnes)</td>
<td>59.1 (29.4%) +72%</td>
</tr>
<tr>
<td>Silver (1,000 tonnes)</td>
<td>2.5 (12.9%) +54%</td>
</tr>
</tbody>
</table>

#### Manufactures

<table>
<thead>
<tr>
<th>Output</th>
<th>Change since 1960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco extracts (1,000 tonnes)</td>
<td>57.1 (55.3%) No data</td>
</tr>
<tr>
<td>Coffee extracts (1,000 tonnes)</td>
<td>119.4 (11.6%) No data</td>
</tr>
<tr>
<td>Rubber footwear (mill pairs)</td>
<td>124.7 (13.9%) No data</td>
</tr>
<tr>
<td>Ladies’ blouses and underwear (mill)</td>
<td>891.9 (27.9%) No data</td>
</tr>
<tr>
<td>Cement (mill tonnes)</td>
<td>51.6 (4.7%) +406%</td>
</tr>
<tr>
<td>Steel (mill tonnes)</td>
<td>33.9 (4.6%) +930%</td>
</tr>
<tr>
<td>Locks and Keys (mill)</td>
<td>271.7 (69.1%) No data</td>
</tr>
<tr>
<td>Electrical fuses (mill)</td>
<td>88.8 (12.7%) No data</td>
</tr>
</tbody>
</table>

### ENERGY BALANCE (mill tonnes coal equivalent)

#### Sources of energy output

- coal
- oil
- gas
- nuclear

#### Energy production and consumption

Oil is by far the most important of South America’s energy resources, and it is a major oil-exporting region. The potential for hydroelectricity is great, but has so far been developed only in Brazil.

The South American region possesses a wealth of natural resources. The continent has some of the world’s largest deposits of metals and significant reserves of oil and coal. In addition it has tracts of excellent farming land that makes it a significant producer of food for export all round the world. However, the development of resource-based and manufacturing industry to process these resources varies widely from country to country.

South America has been famous as a source of precious metals from the earliest days of the Spanish empire, when the wealth of its Andean gold and silver mines was the envy of Europe. Although these metals are now mined less prolifically (many Andean seams have long been exhausted, and Brazil is now the only major exporter of gold) others are now
being exploited. The continent has one-quarter of the world's copper reserves, mostly in Chile, but also in Peru.

Surinam has important reserves of bauxite, while Bolivia is an exporter of tin and zinc. A number of countries have reserves of iron ore, particularly Brazil, whose "Iron Quadrangle" in Minas Gerais in the east and huge reserves in the Carajas mountains in the Amazonian basin have raised it to the rank of the world's leading exporter. More than any other South American country, Brazil has developed support industries to exploit its resources. Increasing amounts of Brazilian iron ore are processed prior to export, while a sizable steelmaking sector has emerged. This, in turn, feeds the manufacturing industries producing vehicles and components. Venezuela has also developed significant steel and aluminum production, while there is some smelting of zinc, copper, lead and silver in Peru and Bolivia.

**Energy for export**

The region is well provided with energy resources, with more than half South American countries able to supply their own energy needs. The rich oilfields around Lake Maracaibo, the southern inlet of the Gulf of Venezuela, have allowed Venezuela to become one of the world's leading oil producers and a founder member of the Organization of Petroleum Exporting Countries (OPEC). Oil reserves are also present in Argentina, Colombia, Peru, Ecuador, Bolivia and Brazil. Many of these countries also have natural gas, and both Peru and Ecuador have petroleum-processing industries.

The continent is less well supplied with coal. Seams are mined in a number of countries, but it is only lately that substantial reserves have been discovered in Colombia. The coal complex in Guajira peninsula in the extreme northeast, which was first developed in the mid 1980s, promises to be one of the world's leading sources of coal. Uranium is found in Argentina and Brazil, both of which use it to generate nuclear power.

Lastly, South America has great potential for hydroelectricity, though the degree to which this has been realized varies greatly from country to country. The huge Itaipu and Tucuru complexes, both opened in 1984, have added so greatly to Brazil's electricity production that power generation far outstrips national needs. In the Andes, however, the resource remains far from fully exploited.

One of the region's most significant resources, which has led to important — if uneven - industrial development, is food production. The meat-canning industry of Argentina, Uruguay and Brazil dates from the early part of this century. Chile has long been a producer of quality wine, while it has benefited from its long coastline to develop one of the five largest fishing industries in the world.

**An orange juice coup**

Brazil boasts one of the region's leading success stories of the 1980s: the mass production of orange juice. A succession of frosts in Florida severely reduced the United States' production of concentrated orange juice. Brazil stepped in to make good some of the shortfall in world demand and since then has made a major investment of time, money and resources into developing this new product.
SPORADIC MANUFACTURING

Manufacturing is spread very unevenly throughout the South American region. The level of concentration ranges from Brazil, which has extensive and sophisticated industries, to Paraguay, where there are only a few factories, most of them concerned with agricultural processing. In the poorer countries of the region—those of the central and northern Andes (Colombia, Ecuador, Peru, Bolivia) and also Paraguay—manufacturing has mostly developed since 1945.

The bulk of manufacturing tends to be in textiles and food processing, though some other industries are represented. Multinational companies such as Ford and Renault have set up vehicle-assembly plants in Ecuador. The industrial sector in Peru is more varied, thanks partly to its larger market, and partly to government intervention in the early 1970s. In addition to its steel industry, the country began to produce chemicals, petroleum products, smelted metals, and engineering and electrical goods. However, many of these industries had difficulties when tariffs on imports were reduced in the late 1970s and early 1980s.

Changing systems of manufacturing

Throughout South America, small and medium size enterprises—many of which are “informal” and operate outside the regulations—predominate in numbers. However, large concerns (many of them owned by multinational companies), though far fewer, account for most of the production value. Unlike the Andean countries, Brazil, Argentina, Uruguay, Chile and Venezuela now have little artisan-based industry.

All of these countries, except Venezuela, have a history of manufacturing dating back to the last century. Between 1880 and 1914 coastal cities such as Buenos Aires in Argentina and Montevideo in Uruguay expanded rapidly, boosted by the development of their hinterlands and largescale immigration from Europe, until they were among the world's largest urban centers.

Such concentrated markets provided the basis for many industries such as food and textiles. In Argentina, for example, they accounted for over one-fifth of the country's total earnings by 1900. Many facilities for industrial growth, however, such as gas and water supplies, sewerage, electricity, tramways, railroads and ports, were developed by foreign-owned companies, and for some years local manufacturing did not extend beyond goods for the consumer market.

It was the Great Depression (1929–39) that radically changed this state of affairs. The sharp drop in demand for traditional exports (coffee in Brazil, copper in Chile, meat and grain in Argentina and Uruguay), meant that South American countries could no longer afford to import manufactured goods from Europe and North America. Throughout the region new industries sprang up making the kind of product that had previously been imported. At the same time, governments began to subsidize industrial growth and encourage manufacturing diversity. The 1940s and 1950s saw the foundations laid for future development, and industry grew apace during the 1960s and 1970s. Brazil and Argentina, in particular, saw great setbacks in the 1980s, but much of the new development is still in place.
with most governments of the region the regime of General Augusto Pinochet in Chile (between 1973 and 1989) reduced the role of the state in industry. The “shock treatment” of cutting tariffs and state subsidies produced a sharp decline in manufacturing, though there was regrowth later and by the 1990s the country had rebuilt its production of textiles, vehicles, chemicals and consumer goods.

Brazil still boasts the most diverse and sophisticated range of manufacturing in the region. As well as a consumer-goods sector large enough to supply the country’s ever-growing population, Brazil has developed a number of impressive high-technology industries. Turbines, generators, transformers and reactors for electricity production are made there, while Petrobras – the state petroleum company – has been able to use its expertise in deep-sea exploration to win contracts in the Middle East, providing drilling platforms and other equipment.

There is also a large weapons industry; the two state production companies ENGESA (military vehicles) and IMBEL (ordnance) allow Brazil to be a leading arms exporter to the developing world. The country has also developed a successful aerospace industry (EMBRAER), manufacturing a range of aircraft including the Tucano trainer and the Bandeirante small passenger jet. Since the early 1970s an extensive vehicle industry has developed. However, production is almost entirely in the hands of multinational companies, though domestic firms are prominent in the manufacture of components.

Liquid wealth (left) Barrels of petroleum are stacked high for export in the Terpel state petroleum factory, Colombia. Until quite recently, the emphasis of the region’s industry was on exporting raw materials. As a result, manufacturing was slow to develop, and remains patchy and sporadic, though every country is now making efforts to diversify its output.

Bobbing and weaving (right) Alpaca wool is a source of income for many small communities in Chile and Peru. The animals are sheared every two years, and each produces about 3 kg (6.5 lb) of very high quality wool, which is spun and woven by local workers. The sun breed gives a light, fluffy wool, often used in sleeping bags and parkas. The huacaya’s wool is coarser, ideal for making the ponchos that are worn throughout South America.

Manufacturing in the 1990s
Both Brazil and Argentina today have a wide range of industries that include vehicle production, pharmaceuticals, cosmetics, cement, synthetic fibers, and the production of consumer goods including washing machines, refrigerators and televisions. In Venezuela a number of consumer and metal-processing industries have been established, including aluminum production and steelmaking. Venezuela is now a significant producer of processed metal. In marked contrast

LOCAL INNOVATION - FUEL ALCOHOL IN BRAZIL

Brazil has been a major producer of sugar since the early colonial era. It was during the Great Depression of the 1930s, when the country’s coffee earnings slumped, that interest first arose in the use of sugar alcohol as a fuel, thus reducing reliance on costly imports of petroleum. The Institute for Sugar and Alcohol (IAA) was set up to develop methods of processing. Production and distribution plants were established with government subsidies, but despite the success of these efforts alcohol was used only on a limited scale, usually in the form of ethanol, which was blended with petroleum.

The oil price crisis of the 1970s reactivated interest. Fuel costs tripled at a time when Brazil had yet to develop any significant oil production and the number of vehicles in the country was rising rapidly. Alarmed by the cost of oil imports, the government set up the National Alcohol Program (PNA or “Proalcool”) in 1975, and sugar-cane production was once again subsidized. For the first time automobiles were manufactured to run solely on alcohol whereas before engines had had to be specially adapted. These measures were to prove effective, and by 1984 as much as 45 percent of Brazil’s fuel consumption was of ethanol alcohol. Although the program could reasonably claim considerable success, by the end of the decade it was beginning to come under pressure, with Brazil’s serious debt problems forcing severe reductions in state subsidies.
INDUSTRY AND THE STATE

The role played by the state has always been a distinctive feature of industry in South America. Governments have intervened in the whole evolution of their countries' manufacturing industry, both by the creation of import tariffs and directly through setting up large state corporations. Usually these corporations are established with foreign involvement, and they may dominate a whole industrial sector.

The origins of state intervention in the industries of the region lie in the 1930s. Before 1929 governments had made little effort to promote industry, but from the 1930s they began to adopt policies of greater intervention.

These were increased after 1945, especially in Argentina, where in the 1940s and 1950s the regime of Juan Perón (1895–1974) attempted to extend the country's industrial base, mainly at the expense of agriculture. From the 1960s even the government of Venezuela – which, uniquely in the region, had seen rapid growth in the Depression years as a result of its rising oil exports – was working to build up a manufacturing sector. State control of industry became most marked in the postwar period up to 1980, particularly in many countries experiencing military rule - specifically Brazil, Peru, Uruguay and Argentina. Chile, in struggling to reduce the state role in industry, was very much the exception.

The Triple Alliance

The cooperation between governments and foreign companies is often referred to as the "Triple Alliance" (the third and usually smallest part being local private companies). The arrangement has reaped important benefits for the region. By bringing in foreign expertise governments have been able to make use of technologies that were lacking in their own countries. Foreign investment also allowed the creation of an improved infrastructure of roads, airports, and electricity, all vital for further development.

The price of intervention

State intervention has had undoubted drawbacks. The strength of the Triple Alliance made it hard for local companies to compete and grow, and foreign ownership of industry has become extensive. In

The blue waters of Chile (right) Hydrometallurgy, or leaching, extracts metals from ore by using liquid solutions, often simply water. Sulfuric acid is here being used to separate copper from its oxide ores. The blue color is characteristic of copper leaching.

A modern assembly line (below) Brazil has the largest aircraft industry supplies most of the force's planes. Exports of civilian and military aircraft contribute significantly to Brazil's national income.

Brazil, where the Triple Alliance has been particularly important, close to half the country's industrial assets were in foreign hands by 1980, as well as almost all of the automobile industry. Nor has high technology spread outside the Triple Alliance sector. Most of the population continues to work in the numerous small enterprises that, added together, make up only a small part of national production.

In addition governments have not always shown themselves best suited to the task of directing industry. The Peronist regime in Argentina after 1946 has been accused of building up manufacturing at the expense of agriculture, to the detriment of the country. While some of Brazil's great state corporations have
CHILE'S COPPER BONANZA

Chile is estimated to have at least 25 percent of the world's copper reserves, and copper alone accounts for almost half the country's exports. Mining began in the early 19th century, and soon supplied some 46,000 tonnes a year, almost half of world production at that time. By the 1890s, however, technical developments in the United States had reduced Chile's market share to as little as 6 percent.

The copper mining industry in Chile was dominated by a few United States-owned companies until the 1950s, when the Chilean government began to take a more active role to ensure that the country reaped more of the benefits by reinvesting revenues in local refining plants. The nationalization of the industry in the early 1970s by the leftwing government under Salvador Allende (1908-73) was accompanied by expansion; a process that was extended still further and more rapidly by the politically opposed regime of General Pinochet, using both state and foreign investment. In 1991 the world's third largest copper mine was opened at La Escondida, with output planned to reach 760,000 tonnes a year by 1995 - equal to 4 percent of the world's copper production alone.

proved successful, others have provoked charges of corruption and incompetence. The nuclear program ground to a halt in 1985, having already cost $2.5 billion, and with only two of the eight planned power stations ever likely to be completed. It was military governments that took on much of this high level of debt, with the encouragement of Western banks, eager to lend the sums accrued after rises in the price of oil.

The Triple Alliance now seems to be in decline. Following the debt crisis and ensuing recession, the military regimes that had dominated the region had by the mid 1980s (1990 in the case of Chile) largely given way to elected regimes. At the same time there has been a marked turning away from the notion of state enterprise, with growing pressure in many countries for bureaucracies to be reduced and state assets to be privatized. Both in terms of industrial policies and politics, the region seems to be moving toward a European-North American model. The long experiment in state-run industry has certainly had its costs, both in terms of debt and unviable industries. At the same time it has led to the creation of an extensive and varied industrial base, which may prove no small asset when the economic climate improves.
From water to electricity

Interest in developing hydroelectric power from the water resources of South America dates back some decades - President Kubitschek of Brazil (1902-76) ordered a feasibility study for a project at Itaipu as early as 1956. Despite great potential in the region, it was some time before significant development began. One reason for this was the relatively low price of oil during the 1960s, and the fact that several South American countries were able to develop their own oil resources. At the same time foreign oil corporations discouraged the creation of alternative energy resources, and proposals for hydroelectric projects were often faced with stringent conditions by foreign banks.

All this changed during the 1970s, when oil prices rose sharply in reaction to conflict in the Middle East, action by the OPEC oil cartel and - in some cases - oil nationalization. South American countries without substantial domestic oil resources had incentives to seek cheaper alternative energy, and many decided to invest in the plant and construction necessary to tap into hydroelectric power.

One other factor was also important: the price rises in oil had caused the world's leading banks to build up large reserves, and they were suddenly willing to lend money to develop other methods of generating electricity. Consequently the 1970s and 1980s saw the development of numerous hydroelectric projects, with large schemes in Chile, Brazil and Argentina. Many of these were joint ventures, such as Yacyreta (Paraguay and Argentina) and Itaipu (Brazil and Paraguay).

Building the Itaipu dam
The Itaipu scheme, on the Parana River between Paraguay and Brazil, is the world's largest hydroelectric installation, producing more than 12,600 megawatts of power. Following lengthy negotiations between the two governments, the project was finally established in 1974. Construction started in 1976, the first turbines began turning in 1984, and the scheme was finally completed in 1991, three years behind schedule.

The project should supply 40 percent of Brazil's energy needs as well as most of those of Paraguay, which is set to become one of the world's leading electricity exporters. Thanks to Itaipu and other projects such as Tucurui in Amazonia, and also the development of offshore oil, Brazil is already self-sufficient in energy and exports the surplus.

The project is an example of the Triple Alliance of co-operation between government, foreign capital and expertise, and domestic concerns. It was set up by the Brazilian and Paraguayan governments through the government-owned Brazilian national electricity company, Centrais Eletricas Brasileiras (Eletrobras).

Turning water into light (left and above). Water builds up in a reservoir behind a dam, raising it to the height of the damworks, and is then piped down to a series of turbines. The water catches and pushes the turbines' blades, which spin to create energy. A generator driven by the turbines converts this energy into electricity. This is then passed to a transformer and changed into a high voltage direct current that is suitable for transmission over long-distance cables.
The flow of electricity (above) Brazil has plentiful rainfall and one of the most extensive river systems in the world. This makes hydroelectric powerhouses, such as Itaipu on the Paraná river, a significant source of Brazil’s electricity needs.

and the Administracion Nacional de Electricidad (ANDE), the Paraguayan state electricity board. Eletrobras raised most of the necessary finance from banks in Europe, the United States and Japan, together with a smaller proportion from Brazilian banks. At least 80 percent of the generators and other heavy equipment were to be Brazilian made. This requirement brought important contracts to Brazilian heavy industry, including Bar- della and Mecanica Pesada, and also the Brazilian subsidiaries of leading European multinationals, such as Siemens, Asea Brown Boveri (ABB), Alsthom and Voith. Most of the construction materials, such as steel and cement, were also from Brazilian sources, whether state-owned or private.

Although a considerable achievement, the Itaipu project has not been without problems. Costs soared during its construction, from $2 billion in 1972 to an estimated $12.2 billion by the time of its opening in 1991. One-third of this cost was merely servicing the accumulated debt. At the same time oil prices – the original impetus for the scheme – have fallen, and the recession (itself prompted by debts accumulated by projects such as Itaipu) has reduced the demand for electricity and cut the profits of the industry. Nevertheless, Eletrobras remains confident that the economic climate will improve at some time in the future, proving Itaipu and other similar projects to have been more than justified.
Eldorado's slum

To the first European settlers, the newly discovered lands of South America were an Eldorado where fabulous reserves of gold and other precious metals were believed to exist. The cry of "gold" was first heard in Brazil in 1695, and soon the gold rush was underway. Settlers and slaves moved in mass to the gold-rich interior from the agricultural coastal areas. By 1760 gold mining had reached maximum output, with Brazil supplying 80 percent of the world’s gold – over 900,000 kg (2 million lb) was produced in the 18th century.

The period that followed saw a decline in production and interest in the mines, with only individual prospectors left working the gold. In the past 50 years, spiraling inflation and poverty in Brazil forced millions of poor peasants to look anywhere for work and money. Many turned to the mines and a new migration to the interior began.

Conditions in the open-cast mines were and are very primitive. Without the aid of machinery or even tools, thousands of people fight for a small patch of ground to work. Others are beaten or robbed of their meager takings and some are pressed into a form of slavery. The Brazilian government has recently begun to take over, mechanize and regulate the free-for-all mines. But for the poor Brazilian the fight for a living continues.

Uphill struggleProspectors at the Sierra Pelada gold mine head toward an uncertain future as the Brazilian government takes over the once free-for-all mine.
A LAND OF PRECIOUS METALS

South America's position in the current world economy has been carved out by its colonial past. From the 15th century, the whole area was conquered by European powers - the west by the Spanish, Brazil by the Portuguese, Guyana by the British, and modern Surinam by the Dutch and French. The new colonies were exploited to produce wealth for the colonizers. Spain, for example, taxed its colonies heavily, levying one-fifth of the wealth of Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, Paraguay, Uruguay and Argentina, mainly in the form of gold and silver. In Brazil, cotton and sugar were the principal exports to Portugal, though gold also became important in the 18th century. In return, European countries supplied the colonies with manufactured products, a pattern of trade that was to dominate even after most of the region became independent during the 1820s.

Independent Exporting

Britain helped the fledgling republics gain their independence from Spain and Portugal because it wanted to trade directly with the new nations. By the end of the 19th century, South America was well integrated into the world economy. It exported agricultural produce and unrefined minerals and imported most of its manufactured goods, the majority from Britain, which was then the world's major industrial power. During the 20th century South America developed a wider range of exports. In addition to the established commodity trade in gold and silver, the region began to export iron ore, tin, bauxite and copper. Different kinds of agricultural products were also developed for international markets: wheat from Argentina, lamb and beef from Argentina and Uruguay, coffee from Brazil and Colombia, and fruit from Chile. Most important of all, oil was discovered in Venezuela in the 1920s, and in several other republics in subsequent years.

Expanding trade created considerable new wealth, but it was concentrated in the hands of a few. By 1914, Argentina and Uruguay were close to being among the world's richest countries and their economies were expanding very rapidly. Southern Brazil was also booming, stimulated by massive exports of coffee.
Profile of inflation (above) Inflation in South America spiraled out of control in some countries during the 1980s as a result of huge budget deficits related to the debt crisis. In 1985, Bolivia's inflation reached a staggering 11,752 percent.

Although agriculture continued to be a major employer, its contribution to the economy of the region shrank relative to industry throughout the postwar period. Despite rapid population growth, which averaged about 2.5 percent during this period, most countries were much more prosperous in 1980 than they had been in 1940. The new affluence was, however, spread unevenly: living standards in Venezuela, Argentina and southern Brazil were comparable with those in Italy or Spain; while Bolivia, Ecuador and Peru had per capita incomes little higher than many African countries.
BORROWED SUCCESS

By the 1980s South American industry had grown to the extent that the region was nearly self-sufficient in manufactured goods. The number of jobs had risen dramatically in this sector and industrial wages had increased, but employment opportunities could not keep pace with the region's high population growth. Many South Americans were forced to eke out a living in the informal sector, Street trades, smallscale manufacturing and domestic service employed large numbers at very low incomes.

In the rural areas, many export producers were discovering that it was no longer profitable to produce for the world market. Government taxes and distorted exchange rates were reducing the incentive to export. Largescale agricultural exporters such as Argentina and Uruguay were seeing their share of world trade fall rapidly. At the same time, the rate of industrial growth had also begun to slow; once manufacturing output could satisfy the domestic market, opportunities for new growth were limited.

Paying the piper
This situation might have continued unchanged for a number of years. Conditions were worrying but not catastrophic. However, the development of South America in the 1970s had been based on extensive borrowing. Transnational companies had invested heavily to develop manufacturing plants and to open up new mineral reserves. Foreign banks had been eager to lend large sums to local governments in an attempt to recycle the savings of Middle Eastern oil producers. Additional loans, from multinational institutions such as the World Bank and the Inter-American Development Bank, had been used to build up urban infrastructure. When exports failed to keep up with imports, many countries began borrowing again to finance the deficits on their balance of payments. After a sharp rise in worldwide interest rates in the late 1970s, few of the region's economies could service their overseas debts.

Since 1980, most South American countries have been forced to ask the International Monetary Fund (IMF) for additional time to repay their debts. In return, the IMF has stipulated that they restructure their economies by raising taxes, cutting public expenditure and balancing their national budgets. Governments have been encouraged to sell off their unprofitable enterprises, such as state airlines, railroads, banks and electricity companies. Local currencies have been devalued to make exports more competitive and imports more expensive. As a result, exports (particularly manufactured goods) increased, sometimes dramatically, and imports fell greatly in volume. Finally, governments have been required to reduce subsidies and other forms of intervention in the market. Countries that did not comply with the IMF's requests risked having future help and funds withheld.

The price of reform
There can be little doubt that some of the recommended changes were necessary. Exchange rates were unrealistic, political
Aluminum products (right) at a processing plant in Surinam. Both Surinam and Guyana have large deposits of bauxite - the ore from which aluminum is made. More and more of the region’s raw materials are now processed before export as protection against fluctuating commodity prices.

The drug war (left) Soldiers set fire to an illegal cocaine-making laboratory in rural Bolivia, where many poor communities rely on coca cultivation as their main source of income. The powerful drug barons, who make millions from the region’s massive drugs industry, are often beyond the reach of the law.

corruption was endemic and governments were operating many of their enterprises inefficiently. Under the new regime many inefficient state enterprises have been liquidated, saving tax-payers large sums of money.

However, the cost of restructuring has been steep, and standards of living have dropped accordingly. During the 1980s only Chile, Colombia and Paraguay were able to increase their per capita incomes, while all of the rest experienced decline. Sometimes the declines were dramatic: between 1981 and 1990, per capita incomes fell 30 percent in Peru, 28 percent in Guyana, 24 percent in Argentina, 23 percent in Bolivia and 20 percent in Venezuela. Inflation achieved spectacular rates: over 11,000 percent in Bolivia in 1985; almost 5,000 percent in Argentina in 1989; and over 8,000 percent in Peru in 1990.

Most of the urban population - middle class and poor alike - suffered badly. Real wages fell in 10 years in Peru to two-fifths of their earlier value. Years of progress were wiped out as nutrition levels declined and living standards fell to levels typical of the 1960s. By the early 1990s, confidence in government performance throughout the region was low.

The wealthy elite are less affected by these problems. In Brazil and elsewhere, many moved their capital out of local banks and deposited it in more stable financial institutions abroad. Among the wealthiest of all are the Colombian drug barons. Operating out of Colombia’s second city, Medellin, and increasingly out of its third city, Cali, they have developed a global industry in less than a decade. Their web of influence now stretches from local agriculture (farmers growing coca, from which cocaine is refined) into the higher realms of international banking. Profits are so great that it is difficult to find adequate outlets for laundering the money through outwardly respectable channels. The domestic and foreign pressure to stop the drugs trade is deeply unpopular with the poor farmers of Bolivia, Peru and Colombia, who have depended for generations on the production of coca.

**DEBT AND HYPERINFLATION IN BOLIVIA**

Landlocked mountainous Bolivia, always one of the poorest countries in the region, had a GDP per capita of less than $400 in the mid 1970s, and a national unemployment rate of 15 percent. In the mid 1980s Bolivia’s economy was further undermined by its foreign debt: the total amount of interest due on the country’s external debt amounted to half of its revenue from exports in 1984. To make matters worse, per capita incomes were falling and inflation reached 11,752 percent in 1985 - the highest in South America.

The new president in 1985, Dr Victor Paz Estenssoro, implemented a package of radical measures to deal with the crisis. Devaluing the currency and removing much of the protectionist duties on imports forced Bolivian industry to improve its efficiency in order to compete in the international market. The first steps were taken to privatize COMIBOL, the state mining corporation, and some of its largest mines were closed - the number of miners working for COMIBOL fell from 28,000 to 5,000 by the mid 1980s. Wages were frozen and, because of rapid inflation, their purchasing value fell by two-thirds between 1985 and 1986.

These drastic measures caused a turnaround in Bolivia’s economic fortunes. In 1987, inflation fell rapidly, dropping to around 14 percent, the lowest figure that decade. After six successive years of economic decline, the economy grew consistently after 1987. Export revenues started to increase and foreign capital began to flow into the country again. Whether or not economic growth can be sustained is uncertain, but unless economic progress is maintained the desperate poverty of so many Bolivians will continue unabated.

**Brazil’s balance of merchandise trade** Like most indebted countries, Brazil has had to run a visible trade surplus since mid-1980s. A high degree of self-sufficiency in manufactured goods goes a long way toward helping it to achieve this goal.

<table>
<thead>
<tr>
<th>Trading partners</th>
<th>Imports $20.4 bn</th>
<th>Exports $21.4 bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>48.3%</td>
<td>20.6%</td>
</tr>
<tr>
<td>Japan</td>
<td>3.8%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Germany</td>
<td>4.0%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>40.6%</td>
<td>10.5%</td>
</tr>
<tr>
<td>France</td>
<td>8.9%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Britain</td>
<td>5.1%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Argentina</td>
<td>8.9%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>6.3%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Italy</td>
<td>6.3%</td>
<td>9.2%</td>
</tr>
<tr>
<td>other countries</td>
<td>10.5%</td>
<td>25.5%</td>
</tr>
</tbody>
</table>

**Exports**

- 48.3% United States
- 20.6% Japan
- 5.0% Germany
- 4.0% Netherlands
- 9.2% France
- 4.0% Britain
- 8.9% Argentina
- 6.3% Saudi Arabia
- 6.3% Italy
- 25.5% other countries

**Imports**

- 48.3% United States
- 20.6% Japan
- 5.0% Germany
- 4.0% Netherlands
- 9.2% France
- 4.0% Britain
- 8.9% Argentina
- 6.3% Saudi Arabia
- 6.3% Italy
- 25.5% other countries
EVENING THE ODDS

In Latin America the gap between rich and poor is wider than almost anywhere else in the world, and is further complicated by racial differences. In Brazil the richest 20 percent of households (usually with the lightest complexion) have incomes 33 times higher than the poorest (and darkest) 20 percent. The size of this gap means that substantial economic growth is necessary if the poor are to experience any real improvements to their standards of living. Those who live in the countryside are the most exploited, especially the indigenous peoples. It is only in recent years that they have begun to organize themselves to petition and fight for land and welfare rights.

Land ownership has much to do with the unequal distribution of wealth. Since the Spanish and Portuguese arrived, the ownership of land has been concentrated in relatively few hands, with vast estates coexisting with large numbers of tiny, peasant-run farms. This pattern of ownership was deliberately set up to create a cheap labor force. Many indigenous people were enslaved; others had too little land to support their families and were forced to work for the major landowners for very low wages. It is only since industrial development in the 1940s that any alternative way of life has been possible for the rural and urban poor.

Escape to the cities

During the 1960s and 1970s urban life offered many poor families a route out of absolute poverty. On the whole it was the young and better educated who migrated, leaving behind the aging and less able to eke out an existence on tiny plots of land subject to soil erosion and overcropping. Migration has often been a forced choice as people sought to escape starvation or rural violence. But generally the movement of people from rural to urban areas reflected the desperately low standards of living in the countryside. Although an urban shanty town was hardly an ideal neighborhood, incomes, even from casual labor, were higher than in the countryside, and there was always the prospect of finding the security of work and a comparatively high wage in the industrial sector. Basic services such as water, electricity, schooling and healthcare were much more accessible, though still deficient in the shanty towns.

Industrialization created the revenue needed to improve welfare provision in the region, which varies greatly from country to country. Healthcare and education services are well established in Argentina, Chile and Uruguay, and this is reflected in the high life expectancy and

HOLDING DESPERATION AT BAY IN PERU

Peru began to experience a serious foreign debt crisis in 1976. The 1980s were characterized by "stagflation" (a stagnant economy and crippling inflation). A brief recovery from 1985 to 1987 occurred under the administration of President Alán García, which defaulted on Peru’s loan repayments. The banks responded by refusing to extend credit when it was desperately needed in 1988 and 1989. By the time President Alberto Fujimori took office in 1990, hyper-inflation had returned, and GDP had fallen to the levels of the 1960s.

Fujimori’s austerity measures, introduced to allow foreign debt repayments to resume, coincided with a recession. The number of people living in poverty has nearly doubled, from 7 million to 12 million - more than half the total population. In Lima, the capital, where one-third of all Peruvians live, it is estimated that 90 percent of residents are without steady employment. The price of staple foods such as milk and bread doubled overnight with the announcement of the austerity measures.

A variety of urban grass-roots organizations, mostly run by local women, are striving to keep desperation at bay. Neighborhood coordinators distribute free milk and operate public kitchens in Lima’s many shantytowns. With some foreign aid and much independent fundraising, the groups have managed to keep operating through even the worst months of crisis. In 1991, healthcare volunteers went door to door in one district to warn about a cholera epidemic, saving the lives of all but two of 40,000 residents. Although independent of the government, which offers no financial support, some of the neighborhood groups have been targeted by the terrorist group Shining Path. In February 1992 the terrorists murdered María Elena Moyano, the founder of a local women’s federation, while she attended a barbecue to raise funds for the free milk program.
low level of illiteracy in these countries. Peru and Bolivia have few financial resources and correspondingly few services.

State provision of education and healthcare is extremely variable across the region. Primary education is generally provided by the state; at the secondary level, private education becomes more important. Throughout South America, the middle and upper classes send their children to private schools and universities. The region has an extensive network of private hospitals, which only people with private means or employees covered by social security can afford to use; the public health system is accessible to everyone, but all too often lacks the staff, beds, drugs, and other resources needed to provide adequate care.

**Tightening the belt**

The debt crisis of the 1980s hit the urban poor hardest of all. The long-standing prosperity gap between urban and rural lifestyles narrowed as a result, but the crisis reduced inequality in the wrong way – by cutting living standards in the urban areas without raising them in the countryside. The economic reforms instituted throughout the region have improved the national economies – controlled by the very rich – at the expense of the poorest members of society.

Governments have cut back on food subsidies and bus and railroad fares have risen markedly. Healthcare, the provision of water and protection of the environment have all suffered neglect. Incomes have fallen relative to prices and in some cities the standard of living has declined to levels more typical of the 1950s. Malnutrition, never far away, has become common as household budgets have been cut. Schooling has suffered as education budgets have been cut and more families have been forced to push older children onto the labor market. More mothers are now going out to work; they earn little, just enough to make the difference between survival and starvation.
Chile's economic miracle?

In 1970, just before the debt crisis began to slow down South America's booming export trade, Chile elected its first socialist government to power. Led by Salvador Allende (1908-73), it introduced several radical economic reforms, redistributing rural land and nationalizing the foreign-owned copper industry. Within a few years, however, the economy was in trouble. Inflation was rising rapidly, the deficit on the balance of payments was growing and confidence in the country's economy was at a low ebb. Opposing political parties blamed each other, and in September 1973 the socialist government was removed by a military coup in which President Allende was killed. The regime that ruled for the next 16 years was led by General Augusto Pinochet. His government was characterized by an authoritarian style and scant respect for human rights. But his dictatorship became a vehicle for the transformation of the Chilean economy.

A copper-funded recovery
For many years the Chilean government had intervened heavily in the economy. It had established many state industries and protected private manufacturing from foreign competition. Revenue from the foreign-owned copper industry supported this structure until the copper companies were nationalized by Allende.

Pinochet's strategy was to open up the Chilean economy to outside competition, reduce the role of government and regulate the economy through the discipline of the market. Most state enterprises were sold - in 1992 only 20 remained in the government's hands. Import tariffs were sharply reduced, forcing the manufacturing sector to become more efficient so that it could compete with imported goods, and the power of the trade unions was curbed. Regular devaluation of the currency lowered the cost of Chile's goods in the international marketplace and encouraged exports.

The initial impact of all these measures was dramatic; the economy declined and unemployment rose. But once the initial

Stacks of copper (right) Chile is the world's largest producer of copper and is estimated to have 25 percent of the world's reserves. Although copper is still a major export earner in the 1980s, the opening up of the economy to foreign competition combined with plummeting commodity prices during the 1970s and 1980s have reduced its importance.

Fruits of success (below) Freshly picked grapes being sorted and packed. Land redistribution schemes under President Allende's socialist government encouraged the development of commercial farming and laid the foundations for a rapid expansion of agricultural exports during the 1980s.
trauma had been overcome, the economy began to grow, the rate of inflation fell and exports began to increase impressively. The government's long-standing fiscal deficit was reversed and from 1978 to 1989 the overall trend was toward recovery. GDP rose impressively – by 8.3 percent in 1979 and 7.8 percent in 1980 – and GNP nearly doubled over the decade.

However, Chile's overall economic recovery was interrupted by the worldwide recession of 1981 and subsequent internal problems. In 1981 copper prices fell to their lowest point since World War II. In 1982, major mistakes in setting the exchange rate led to a spectacular fall in GDP. Many companies went out of business and unemployment in Santiago rose to more than 30 percent; the national figure for 1983 was nearly 18 percent. As the world's most indebted nation per capita – debt swallowed more than three-quarters of export earnings in 1982 – Chile made an emergency appeal to the IMF and its creditors. This resulted in short-term loans and the rescheduling of another $3.4 billion worth of debt for the following year. By May 1985 austerity measures were announced as part of a deal with Chile's creditors.

The quest for longterm recovery
A major export drive led to impressive growth after 1983. Copper exports remained important but contributed only two-fifths of external revenues in 1987 compared with 73 percent in 1971. New export products were developed in the rural areas, particularly fruit and timber, and new manufactured goods, principally paper and cellulose, fishmeal, fish products and chemicals. It appears that the basis for future growth is solid.

Some of the claims made for the Pinochet economic miracle, however, have been excessive. The overall growth rate between 1973 and 1987 was only 2 percent – substantially undermined by the economically disastrous years of 1975 and 1982-83. And while incomes grew during the 1980s, distribution became very unequal. One estimate suggests that one-fifth of the population now receive 81 percent of the income. In terms of their purchasing power, wages in 1988 were 7 percent lower than they had been eight years earlier. Although infant mortality had not begun to rise yet, there was considerable concern in 1992 that malnutrition was once more on the increase.
The earliest humans in South America, perhaps as many as 30,000 years ago, were prehistoric nomadic hunters. Their descendants became settled farmers and craftsman about 8,000 years ago. The European expansion into the New World in the early 16th century rapidly transformed the social organization of the region. The Spanish and Portuguese, followed later by other nationalities, all added new languages, religions and customs to the cultural mix, as did millions of imported African slaves. Despite this ethnic diversity, South Americans are united by the Spanish language (understood if not actually spoken by most people outside Brazil, where Portuguese is the majority language), the Roman Catholic religion, and the twin popular obsessions of music and soccer.

<table>
<thead>
<tr>
<th>COUNTRIES IN THE REGION</th>
<th>Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, Uruguay, Venezuela</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPULATION</td>
<td></td>
</tr>
<tr>
<td>Over 150 million</td>
<td>Brazil</td>
</tr>
<tr>
<td>10 million–33 million</td>
<td>Argentina, Chile, Colombia, Ecuador, Paraguay, Peru, Venezuela</td>
</tr>
<tr>
<td>1 million–10 million</td>
<td>Bolivia, Paraguay, Uruguay</td>
</tr>
<tr>
<td>Under 1 million</td>
<td>Guyana, Surinam</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td></td>
</tr>
<tr>
<td>COUNTRIES with one official language</td>
<td>(Dutch) Surinam, (English) Guyana, (Portuguese) Brazil, (Spanish) Argentina, Chile, Colombia, Ecuador, Paraguay, Uruguay, Venezuela</td>
</tr>
<tr>
<td>COUNTRY with two official languages</td>
<td>Quechua, Spanish) Peru</td>
</tr>
<tr>
<td>COUNTRY with three official languages</td>
<td>Aymara, Quechua, Spanish, Bolivian</td>
</tr>
<tr>
<td>Other languages spoken in the region include Arawak, Carib, Jivaro, Lenguá, Mapuche, Sranang Tongo, Toba and numerous other indigenous languages</td>
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</tr>
<tr>
<td>RELIGION</td>
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<tr>
<td>COUNTRIES with one major religion</td>
<td>(RC) Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Surinam, Venezuela</td>
</tr>
<tr>
<td>COUNTRIES with more than one major religion</td>
<td>(A, N, P, RC) Uruguay, IH, IM, P, RC Guyana, Surinam</td>
</tr>
</tbody>
</table>

Key: A=Atheist, H=Hindu, I=Indigenous religions, M=Muslim, N=Nonreligious, P=Protestant, RC=Roman Catholic

A HISTORY OF CONQUESTS

When Spanish and Portuguese explorers reached South America in the 16th century they found a marked contrast between the Amerindian populations who lived in the highlands of the Andes and those who lived in the lowlands - and these differences still hold good today. The highlands were dominated by the Incas, who had rapidly expanded their empire by conquest in the previous century and controlled a territory that stretched from what is known today as Ecuador through the length of Peru and into central Chile; an extent of nearly 4,000 km (2,500 mi). Their southward expansion was halted by the Mapuche Indians who held back the Inca armies, as they later would the Spanish.

The Inca empire was highly centralized, with a complex social structure. Its villages and large urban centers contained well-constructed massive stone buildings, and were linked by an excellent network of mountain roads. In the absence of wheeled transportation, goods were carried on people’s backs or on llamas. The Quechua language acted as the lingua franca of the Inca empire, uniting its linguistically diverse people. There was no writing, but records were kept by means of the quipu, an abacolike device. In lowland areas – the savannas of central South America and the forested Amazon basin – Amerindian society was far more fragmented, with innumerable groups lacking a common language or culture. Communication was possible only by river. There were virtually no buildings made of stone, nor any settlements on the scale of the Inca cities.

European colonization

European settlement patterns enlarged these Amerindian differences. Rivalry between the colonizing powers of Spain and Portugal, who divided the continent between them, drove the Portuguese to push the frontiers of their empire in Brazil westward, deep into the South American lowland interior. This ensured that what was to become the largest, most populous and economically most powerful country on the continent was Portuguese- rather than Spanish-speaking; to this day Brazilians are regarded as a race apart by Spanish-speaking South America.
European cultural influences, however, were not confined to the Iberian countries alone: Britain, France and the Netherlands all established footholds on the northeast coast in the 17th century. Since the 19th century, migrants from many other European countries have settled throughout South America. Between 1850 and 1940 some 4 million Italians migrated there, the majority attracted to the coffee plantations of southern Brazil and the burgeoning cities of Uruguay, Argentina and Chile. There are small, but economically important, communities of Anglo-Argentines and Anglo-Chileans — reminders of the decades after independence in the 19th century when Britain dominated South American trade — and significant German populations exist in Paraguay and southern Brazil.

Amerindian languages (above) The mosaic of languages indicates the complexity of pre-Columbian society. Although many of them are vanishing, indigenous languages are still prevalent in the Amazon Basin. Quechumaran (designating both Quechua, spoken by the Incas, and Aymara) is still widely spoken by inhabitants of the Andes.

Colonial heritage (left) The magnificent architecture of a Roman Catholic church in La Paz, Bolivia, is a lasting reminder of Spanish colonial rule. Over half the country's population is pure Amerindian; most are practicing Roman Catholics, though some blend this with a continued belief in some of their traditional deities.

Other traditions
The number of African slaves transported to South America to provide labor on European-owned plantations was ten times higher than the number shipped to the United States, but higher death rates ensured that only about 12 percent of South Americans today are black, roughly the same proportion as in the United States. They are concentrated in the old plantation zones of northeastern Brazil and along the Caribbean coast. Their impact on popular South American culture has been highly visible.

Early in the 20th century, a quarter of a million Japanese, mostly small farmers, were attracted to Brazil's open spaces. Every South American country also hosts an Arab minority, whose trading skills underlie an economic importance out of all proportion to their size.
INTERWEAVING CULTURES

South American society is the product of the interweaving Amerindian, European and African traditions, but there are marked cultural variations between the different countries, and between the life of the cities and of the countryside. These differences have been molded over the centuries by geographic and economic factors that have shaped the history of settlement in the region.

Festivals and cults
The missionary efforts both of the Spanish and Portuguese conquerors ensured that Roman Catholicism became the dominant religion of the region. For example, in the week before Ash Wednesday, which marks the beginning of the Christian season of abstinence, most of the continent erupts into carnival, with spectacular parades, music and characteristic dances such as the samba. But Christianity is not the only religion. Most characteristic of South America is a form of religion known as candomble in Brazil and santaria in Spanish-speaking South America, formed by the blending of West African religious beliefs with those of Roman Catholicism. The Virgin Mary, for example, is transformed into Iemanjá, goddess of the sea, who is represented in many cult houses by images of the Virgin. Such Afro-American cults have millions of adherents, from all ethnic groups, most of whom remain practicing Roman Catholics as well. In the Andean countries of Colombia, Ecuador, Peru, Bolivia and Chile, gods that the Incas would have recognized are still worshipped in traditional ceremonies. In Peru and Bolivia, for example, miners still worship Tio, which literally translates as “Uncle”, and represents both the Inca god of the Earth and the Christian devil. Equally ancient beliefs and myths, with their attendant ceremonies, survive in the animistic religions of the lowland Amerindians.

Questions of identity
South America is the most urbanized continent in the developing world, with some 60 percent of its population living in cities. Nowhere is the intriguing mix of South American diversity and homogeneity more evident than in its urban...
Football (soccer) in South America has a hold on the popular imagination that is unrivaled anywhere in the world. The largest football stadiums, the most fanatical supporters in the world, and a very distinctive Latin American style of play combine to give the region a supremacy in the sport that is matched only in a few European countries.

The game was first imported to the region by British railroad engineers at the turn of the century; to this day the British influence is obvious in team names such as Newells Old Boys, Racing Club and Corinthians. By the 1920s regional football leagues had been established in Argentina, Brazil, Chile and Uruguay. Right from the beginning football was a mass spectator sport: over 100,000 people watched Uruguay defeat Argentina 4-2 in the first World Cup Final in Montevideo in 1930. Since then South American teams have won the World Cup – the sport’s premier

<table>
<thead>
<tr>
<th>Undivided loyalty</th>
<th>Argentinian emigrants to the United States retain links with their homeland through undiminished support for the national football team during the 1986 World Cup final trophy, contested every four years – on seven occasions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>South American football has two main centers: the river Plate countries (Argentina and Uruguay) and Brazil. Spanish and Italian migrants dominated the early years of the game in the former countries, and players have developed a powerful, muscular style of play that is closely related to the European game, albeit with a level of skill and tactical subtlety unknown outside Italy. But Brazil, the winner of three World Cups, has produced some of the most memorable football of all, and in the player known worldwide just as Pelé, probably the most skillful player of the ball ever seen, it has a national hero and international star.</td>
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</table>

centers. The metropolis of São Paulo – the continent’s largest city – has a population of some 15 million. It is an ethnic melting pot, in which many languages are present. In the Japanese barrio of Liberdade, for example, old people still speak Japanese among themselves, but their sons and daughters use the drawling Portuguese of native Brazilians, in distinguishable from that spoken by the descendants of Italian, Spanish and Portuguese migrants. In the teeming life of the city, other aspects of cultural identity, such as music, have become hybridized, to create a distinctively Brazilian identity.

In rural areas, by contrast, it has been relatively easier for many ethnic groups to preserve a separate cultural identity. Fiercely guarding their languages, rituals and common history, and sheltered by their geographical isolation and deep attachment to the land, they have resisted absorption into national cultures they perceive as alien or hostile. Many of these groups are Amerindians, both highland and lowland, but some are descendants of Africans and Europeans. There are, for example, many small rural black communities in the northern Amazon basin. These were originally established by African slaves who escaped into the interior from plantations along the coast and rivers. Many elements of African culture, particularly its religion, music, cuisine, and rich tradition of oral and written literature, have entered the popular culture of South America.

With the opening up of the savanna grasslands of South America to cattle during the 19th century a new way of life, celebrated in art and literature, came into being, that of the gaucho, or South American cowboy. The gaucho way of life still survives, more or less intact, on the huge cattle ranches of northern Argentina, Uruguay and southern Brazil. Gauchos are almost exclusively the descendants of European immigrants, with a sprinkling of Indian blood. A similar, cattle-based subculture is to be found in the extensive savanna areas of Venezuela, Colombia and northern Brazil, exemplified by the llaneros, the cowboys of the Venezuelan interior.

At the farthest extreme of rural life are the peoples of the Amazon basin. This vast area has been transformed since the 1960s by highway and dam construction for hydroelectric power schemes, leading to the destruction of vast tracts of rainforest. The indigenous Amazonians, Amerindian and non-Amerindian alike, are struggling to preserve their way of life – based on fishing and the extraction of forest products such as rubber – from large-scale exploitation of the rain forest.
A CHANGING SOCIETY

The rapid pace of socioeconomic change, most visible in the very large numbers that are migrating from the countryside to the city everywhere in the continent, has transformed South America in recent decades. Yet, in many important respects, it is still a prisoner of its past, grappling in the 1990s with issues familiar to generations of South Americans reaching back to colonial times: how to maintain minority rights and identities in national states that may be hostile to them; how to organize and control the ownership of land; and how to ensure that there is a reasonable division of the region’s natural resources and wealth.

Life in the cities
In all the cities of South America cultural and economic differences between the educated, Westernized middle class and the mass of poor people living in shanty towns or favelas are all too visible. Nevertheless, across the continent the urban poor have responded in a number of similar ways to defend their livelihoods and improve their lot. The first line of defense is the extended family, which is the basic unit of social organization and provides a network of related members who can offer mutual support. Then there is religion: Roman Catholic parishes, Afro-American cult houses and Protestant congregations offer their members a group identity and form a basis for community action.

Foremost in encouraging urban action have been the Roman Catholic “base communities,” which came out of the “liberation theology” movement that seeks to apply religious faith by aiding the poor and oppressed through involving them in community affairs. It is led at the local level by parish priests who organize residents’ associations to pressure politicians to give them the facilities they need: health centers, street lighting and sewage disposal. Although South American slums seem shockingly poor to outsiders, the high level of community organization that is also a part of slum life means that a poor city dweller is nearer to schools, hospitals and jobs than most rural peasants.

Urban growth and the continuation of land tensions in the countryside have both provided fertile grounds for new social movements. Many are religious: evangelical Christian sects flourish, and new religions appear, such as the Santo Daime cult, based on Amerindian beliefs, which initially radiated out from western Amazonia to the great cities of southern Brazil. But other movements are political, and take the form of populism, stoked up by politicians who try to imitate the mystical language and imagery of popular religion in order to present themselves as the saviors of the people. So long as the social conditions that encourage it remain, populism will be South America’s main form of politics, both in the cities and in rural areas.

Intergroup dissension
There are deep divisions between urban and rural populations, the most dramatic of which are perhaps to be found in the Andean countries. Elites of largely European descent cluster in the cities, where Spanish is the dominant language. In the surrounding rural areas the population are Quechua- and Aymara-speaking Amerindians, who live in small communities clustered around the silver and tin mines, or survive as landless subsistence farmers. Here the smoldering cultural divide that exists between city and countryside, nourished by ethnic divisions and economic inequality, often
flares up to produce guerrilla movements and aggressive peasant rebellions.

One such movement in Peru is called the Shining Path. Nominally communist, on one level the Shining Path is a highly politicized campaign by the economically disadvantaged, pressing for a larger share of national resources. On another, it is a social movement of rural, Quechua-speaking, highland Amerindians who violently reject domination by an urbanized, Spanish-speaking Roman Catholic state, centered in Lima. In this respect the insurrection, which began in highland Peru in the 1970s, can be seen as a modern counterpart to the periodic Inca rebellions against Spanish rule that took place in the 17th and 18th centuries.

In Surinam, "bush blacks", the descendants of escaped slaves, live in remote villages in the interior of the country, where they form a numerical majority. They are dependent on subsistence farming and fishing, and are struggling to preserve their independence from the Creole-dominated government of the coastal area. Ethnic and racial divisions are evident elsewhere in South America: in Bolivia, for example, tension is high between kollas, the highland Amerindians, and cambas, the descendants of European settlers in the lowlands.

Although open racial discrimination is illegal throughout the continent, both blacks and Amerindians are often limited to marginal participation in the economic and political life of their countries. Everywhere in the continent, compared to the national average, blacks earn less and die earlier, and the same is true of many Amerindian groups. However, the formation of political parties and pressure groups such as the Union of Indigenous Peoples in Brazil - a national Amerindian organization lobbying to defend land rights - gives cause to hope that the future for ethnic minorities in South America may improve.

SYMBOLS OF DOMESTICITY

Life for most women in South America is much more restricted than it is for those in the countries of Western Europe and the United States. They have still to achieve significant political and economic power, yet, ironically, property-owning women were voting in South American elections in the 19th century long before European women had been enfranchised. In this respect they were the beneficiaries of the political liberalism that fueled the independence movements of South America.

Working counter to these ideas, however, has been the narrow view of women that the Roman Catholic church imposes. The numerous cults of the Virgin present a sanctified image of motherhood and domesticity, and this makes it difficult for women to break out to create an independent role for themselves. Women tend to marry early by European and North American standards, and have more children; the church successfully manages to restrict the availability of family planning. South Americans are generally deeply conservative on social issues, whatever their political complexion, and most men believe that a woman's place is in the home.

Moreover, South American women have sometimes been able to exploit their positions as wives and mothers, by speaking up and fighting against political repression in ways not open to their menfolk. During Argentina's "dirty wars" (1976-83), the Mothers of the Plaza de Mayo in Buenos Aires, protesting against the disappearance of their sons, issued a challenge that the country's military rulers found it hard to ignore, coming from mothers.
PEOPLES AND CULTURES

The fate of the Amerindians

The indigenous peoples of South America suffered disastrously from their first contacts with Europeans. Although the Indian populations of the Andes have since recovered, the lowland Amerindians still number just 3 million - less than a fifth of precolonial levels. Land belonging to the Amerindians was appropriated by the European settlers, and systematic attempts were made to break down their cultures, often with great cruelty: some early settlers even argued that Amerindians had no souls and could therefore be treated as animals.

Nor has this process been restricted to the colonial era. In the Amazon basin, many ethnic groups are suffering the disastrous effects of intrusion into their traditional homelands, with increased mortality as a result of introduced diseases, and rapid destruction of the forests on which they depend for subsistence. Their traditional religion and cosmology are being undermined by Christian evangelists of all denominations. A particularly poignant modern example are the Yanomami Indians, some 20,000 of whom living in northern Brazil and southern Venezuela make up the largest population of lowland Amerindians in South America. Their lands have been invaded by gold miners and missionaries, some 10 percent of the population has died of infectious diseases since 1985, and only in recent years have some efforts been made by governments and relief agencies to help.

Nevertheless, Amerindian cultures, languages and religions have survived, and have left an imprint on modern South American culture out of all proportion to the size of the contemporary Amerindian population. Critical to this process was the independence movement from Spain and Portugal in the 19th century. Resistance to European rule led South Americans to want to create a separate cultural identity from their European masters, and Amerindian culture was consequently invested with a new symbolic importance: names, folk heroes and imagined aspects of Amerindian culture were all annexed by the movement.

Surge of creativity

Non-Amerindians celebrated their discovery of an indigenous culture in a surge of novels, plays and operas with Amerindian heroes. The Brazilian José de Alencar (1829-77) wrote the novel Iracema in 1865...
and named it after its Amerindian heroine, who became a symbol of selfless love and harmony with nature. Another novel The Guarani (1857), a paean to the first inhabitants of the pampas, subsequently provided the libretto for a popular opera that is still regularly performed in the theaters of Asunción in Paraguay and Montevideo in Uruguay.

In towns and cities across the continent, streets are named after Amerindian ethnic groups and squares are dominated by statues of Amerindians, always portrayed as highly idealized representations of the “Noble Savage”. Even today, social movements are linked to Amerindian history and culture. A Peruvian guerrilla movement calls itself Tupac Amaru after an Inca king who led resistance to the Spanish. The flute and drum music of the Andean Indians is now reaching a far wider audience, as South Americans turn to what they see as pure forms of Amerindian expression in reaction against the culture of the West.

The appropriation of Amerindian symbols, however, did little to protect the Amerindian people themselves from the continued seizure of their land and erosion of their culture. Many of the ethnic groups who gave their names to streets and squares are now extinct. Practical concessions have been few; for example, the teaching of reading and writing in Amerindian languages, rather than the enforced learning of Spanish or Portuguese, has only recently become the norm in lowland South America.

In many parts of the region the idealization of the Amerindian as the “Noble Savage” has restricted rather than liberated. The accepted image of Amerindian culture paints it as quintessentially rural, with Amerindians living in harmony with their natural surroundings. This makes it particularly difficult for the many urbanized Amerindian groups to maintain a distinctive identity. Yet in the still frequent land conflicts in the Amazon basin, the even older European view of the Amerindian as “Ignoble Savage”, ignorant, non-Christian, and an obstacle to economic development, resurfaces in cultural clashes in which the Amerindian is always the loser.

Music of the high Andes The haunting, spacious sound of Andean music is based on the traditional instruments of pan flutes and drums, harps, violins and close vocal harmonies were adapted from the music of the European colonists.
Although impressive urban civilizations had been developed by the indigenous peoples of South America before the Spanish and Portuguese invasion at the beginning of the 16th century, cities are a more recent phenomenon in South America than in the Middle East, China and some parts of Europe. Today, however, the major cities of South America are among the most populous in the world. The shift from a predominantly rural to a predominantly urban population has only occurred over the last 50 years, and cities have expanded very rapidly to cope with the enormous influx of people from the countryside. For vast numbers of urban dwellers, life is hard. Incomes and standards of living declined throughout the 1980s and the majority now live in overcrowded and poorly serviced housing.

**COUNTRIES IN THE REGION**

Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, Uruguay, Venezuela

**POPULATION**

| Total population of region (millions) | 296.6 |
| Population density (persons per sq km) | 17.0 |
| Population change (average annual percent 1960–1990) | |
| Urban | +4.1 |
| Rural | +0.6 |

**URBAN POPULATION**

As percentage of total population

| 1960 | 43.2 |
| 1990 | 76.1 |

Percentage in cities of more than 1 million | 12.1 |

**TEN LARGEST CITIES**

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>São Paulo</td>
<td>16,832,000</td>
</tr>
<tr>
<td>Rio de Janeiro</td>
<td>11,141,000</td>
</tr>
<tr>
<td>Buenos Aires</td>
<td>11,126,000</td>
</tr>
<tr>
<td>Lima</td>
<td>6,234,000</td>
</tr>
<tr>
<td>Santiago</td>
<td>4,856,000</td>
</tr>
<tr>
<td>Bogota</td>
<td>4,185,000</td>
</tr>
<tr>
<td>Belo Horizonte</td>
<td>3,446,000</td>
</tr>
<tr>
<td>Caracas</td>
<td>3,247,000</td>
</tr>
<tr>
<td>Salvador</td>
<td>2,362,000</td>
</tr>
<tr>
<td>Fortaleza</td>
<td>2,169,000</td>
</tr>
</tbody>
</table>

1 denotes capital city

**COLONIAL SETTLEMENTS**

More than 3,000 years before Europeans reached South America at the end of the 15th century, people in the northern and central Andes had become settled farmers. Sophisticated systems of irrigation enabled them to produce agricultural surpluses, and this supported the rise of several urban-based empires. The greatest was that of the Inca. In the 100 years before their defeat at the hands of the Spanish they built many cities of stone including Machu Picchu and Cuzco in Peru. The Spanish used the vast walls of the Inca city as the foundations for their own city.

From the very earliest days of their conquest the Spanish and Portuguese used towns and cities as a means of establishing control over their newly acquired territories. Some cities were built on existing sites – both Quito, the capital of
The imprint of conquest (left) The ancient town of Cuzco is perched high up in the Andes mountains in Peru. Planned in the shape of a puma with the Sacsahuaman fortress as its head, Cuzco served as the Incan empire's capital. But its importance and population (around 200,000) declined after the Spanish set up their colonial capital in Lima. The Incan temples were pulled down and replaced with the cathedrals and administrative buildings of the conqueror.

Ecuador, and Cuzco were already important towns when the Spanish occupied them. Many more were founded as new settlements. Nearly all the continent's capitals and major cities began as important administrative centers within the Spanish and Portuguese empires.

The cities built by the Spanish were very distinctive in form. They marked out a central square, and built a church or cathedral on one side and administrative offices on another. The remaining sides were occupied by the houses of the ruling elite: military officers, bureaucrats and church dignitaries. The streets that spread out from the main square were laid out in a rectilinear pattern: those highest in the social hierarchy lived closest to the center. The Portuguese followed less rigid principles of urban design - the main square was not so regular in shape, the streets did not always follow a grid-iron pattern. Nevertheless, in both cases the city was made the nerve center for the colonization and subjugation of the Amerindian peoples.

Coastal developments
Most of these colonial cities were built on or near the coasts, and this long remained an enduring feature of the South American settlement pattern. Urban development only very gradually moved inland, deterred in part by an inhospitable climate and dense vegetation of the Amazon basin. Until the mid 20th century the few towns that grew up in the interior were river trading ports such as Manaus, 1,600 km (1,000 mi) from the coast, or in mining areas. In Brazil, it was not until a new capital, Brasilia, was built closer to the center of the country that a great wave of settlement was unleashed in the Amazon region.

Even if most of South America's cities were established in the 15th and 16th centuries, urbanization is undoubtedly a 20th-century phenomenon. In 1900 the vast majority of South Americans still lived in the countryside. Only in Argentina and Uruguay did more than one-third of the population live in the cities, a consequence of rapid immigration to these countries from Spain and Italy. Elsewhere urbanization did not occur extensively until population growth and economic development accelerated during the 1930s and 1940s.

Control of the major epidemic diseases improved life expectancy throughout the region, but especially in the poorer countries. In Colombia, for example, it rose from 34 years in 1930 to 64 years in the early 1980s. While death rates fell, fertility rates remained fairly constant.

As a result, South America's population of 76 million in 1930 had risen to 110 million by 1950, and by 1985 had grown to 275 million - a fourfold increase. Pressure on farmland was exacerbated by unequal landholding systems and more and more people were encouraged to leave the land. The vast movement of migrants to the cities had begun.
THE DRAW OF THE CITIES

The period of rapid population rise in South America was also a time of accelerated economic growth. Early industrial development, which started in the late 19th century, had mostly been concentrated in the southern countries of South America. Initially, the large cities, Buenos Aires (Argentina), Rio de Janeiro and São Paulo (both in Brazil) benefited. By the 1940s and 1950s, however, cities and towns in the smaller Andean countries, such as Peru and Bolivia, were experiencing a sustained burst of industrial expansion. Industry created jobs, helped to improve urban services such as health and housing provision and transportation systems, and raised living standards for most urban dwellers.

In rural areas, poverty was endemic. Unfair landholding systems meant that many peasant farmers were without land. Others possessed land, but plots were frequently subdivided by inheritance and many had become too small to support individual families. In places vast estates owned by absentee landlords occupied whole valley floors, while the bulk of the population were forced to farm the much less productive hillsides. Few villages possessed electricity or sanitary water supplies. Schools were mostly inadequate, secondary education unknown, and decent healthcare a dream.

The search for a better life
Life in the cities was by no means easy. However, the burgeoning economies of the cities offered those with some skills a variety of opportunities to improve their way of life. A man who knew how to drive could earn a decent living as a bus driver, a bricklayer could get much more remunerative work in the city, someone who could read and write might find employment in a government office. Even an unskilled daughter might find work – middle-class urban families were eager to train young girls to be domestic servants.

The desire for a better life thus drew more and more people to the cities in search of jobs. In about 1940 two out of three South Americans lived in the countryside. By the 1980s this had been reversed: two out of three South Americans were urban dwellers. In some parts of the region, the figure was much higher. In Argentina, for example, 83 percent of Argentina’s population lived in the cities; the figures for Chile and Venezuela were 81 percent and 79 percent respectively. Only in Bolivia, Ecuador and Paraguay was the urban population smaller than that of the country.

Most migrants moved to the nearest large town or city, usually no more than 160 km (100 mi) away, where they were much more likely to have relatives or to know villagers who had already settled there and could help them find work. The largescale movement of population in the past 50 years has led to the creation of shantytowns which may house up to 20,000 people within only 50 km (30 mi) of Lima. Lima, the capital of Peru, is typical of the story of urban growth throughout the region. Founded in 1535 by the Spanish on a site about 13 km (8 mi) from the Pacific coast, the city was chosen as the administrative capital of the Spanish empire in South America in preference to the old Inca capital of Cuzco. Nevertheless its growth was slow until the mid 19th century. Then, helped by an export boom in cotton, sugar and guano, it prospered and expanded. Export taxes were concentrated in the hands of the city’s ruling elite, and this centralization of wealth and power led rapidly to its eclipse of the country’s provincial cities and small towns.

When Peru began to industrialize in the 1930s and 1940s, most companies established factories in Lima, as it contained the largest market for goods, services, and raw materials. Lima’s industrial growth has been rapid, and today the city is the largest in South America. Lima’s expansion has been accompanied by a decrease in its traditional rural life, which has been affected by the economic and political changes that have occurred in the country.

LIMA – FIRST CITY OF PERU

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Past days of glory An elaborately carved wooden balcony on a church in the center of Lima is a reminder of the golden period when the city was the capital of the Spanish viceroyalty in South America and controlled the silver trade from Peru’s mines.

key services such as water and electricity, and possessed its own port. Anyone hoping to make his way in national life could only do so by moving to the capital, as it was here that all the most important jobs and access to political influence were to be found.

In 1850 Lima was only twice as big as the country’s second largest city. By 1940 it was eight times and by 1972 twelve times larger. Today it has more than 6 million inhabitants. Three out of ten Peruvians live in Lima, and it contains some two-thirds of Peru’s manufacturing employment.
1940s consequently affected all medium to large towns in the region. There was scarcely a city with more than 50,000 inhabitants that did not experience a mass influx of country people at this time. Consequently, all medium to large towns in the region. There was scarcely a city with more than 50,000 inhabitants that did not experience a mass influx of country people at this time.

However, the pull of some cities was stronger than that of others. The largest cities, such as Buenos Aires, São Paulo and Lima grew fastest because they contained most industrial activity. Political power was centered in the region’s capitals, and government offices came to employ ever larger numbers of workers. The emergence of a new middle class in cities such as Buenos Aires and Rio de Janeiro led to increased commercial activity and diversification of the city’s economic base.

Once industry and commerce were established in a large city, vested interests emerged to defend their position and to ensure that the city’s leading role was not threatened by competition from other urban centers. More job opportunities, better provision of basic services such as electricity and sewerage, better roads and distribution of goods to and from these centers ensured that they continued to expand, while growth in the smaller centers stagnated.

As a result, in nearly every country in South America the largest city, which is nearly always the capital, has come to dominate the pattern of settlement in, and the economic, political and social life of, the entire nation. By the 1990s, as many as one in two Uruguays lived in Montevideo, one in three Argentinians in Buenos Aires and a similar proportion of Chileans in Santiago.

The recent growth of some South American cities has been quite spectacular. Today the region contains some of the world’s largest metropolitan areas. The most striking example of staggering growth is São Paulo. Its population of 2.8 million in 1950 had risen to an official level of 10 million by the 1980s, and by the early 1990s had soared to 16 million. Similar explosive growth is seen in a city such as Caracas, the capital of Venezuela. With fewer than 700,000 inhabitants in 1950, its population in the 1980s was over 3 million and still rising.
SOCIALLY SEGREGATED CITIES

A striking feature of most South American cities is the very sharp social stratification that defines their residential areas. At the heart of the large cities is a modern central business district similar to those of North American and many European cities, with prestigious office blocks and enjoying the full range of urban services and amenities. Rapid transit systems bring the center in touch with affluent suburbs on the edges of the city, and very often grand avenues lined with exclusive shops, theaters, restaurants, offices and expensive apartment blocks lead from the central district to the most elite areas of low-density housing.

The people living here are very well off - they may be lawyers or doctors, run businesses, or be employed in the higher ranks of the government and civil service. Their spacious bungalows and villas are set far apart from each other in well-tended grounds. In addition, a much more numerous group of middle to low income earners lives in the older residential districts that ring the central core. Although solidly built and adequate, their houses lack modern conveniences. Many middle-income earners cannot afford a car, so they rely on overcrowded buses and trains for the journey to and from white-collar jobs in the cities’ downtown commercial centers.

Living on the margins

By far the biggest urban group of all are those working for desperately low wages who are crowded into slums near the city centers - abandoned properties that have been divided up to provide shelter for many families - or into the shanty towns that occupy every inch of available land on the city fringes. It was the prospect of jobs and a better life that attracted the flood of rural migrants to the cities between 1950 and 1980. Living conditions for most people probably improved during these years. However, during the 1980s when the region’s governments struggled to repay enormous international debts, wages fell relative to rising prices, and most families became substantially poorer.

Although rates of unemployment are climbing in some cities - in 1991 urban unemployment hovered round 11 percent in Venezuela and 9 percent in Argentina - work still exists for the majority. But hours are long and exacting, and most jobs are very badly paid. Such workers
LAND INVASION AND THE POLITICIANS

Many of Venezuela’s self-help housing settlements have been built on land owned by the municipal or state authorities. Land invasions are rarely violent, and are often organized by politicians seeking the votes of potential settlers. On the day proposed for the invasion, the politicians try to ensure that the police are preoccupied elsewhere. Sometimes, however, they may fail to arrange the promised protection, especially when the authorities are unwilling to lose a particularly valuable piece of land.

On other occasions settlers have attempted to occupy privately owned land. If the owner has sufficient influence, he may persuade the police to intervene to repel the invaders. In 1970 in Valencia, Venezuela’s third largest city, a Peasant League invaded some private land and was vigorously opposed for three years. Repressive action against the settlement ceased only when the police overreacted, and two settlers were killed.

Nevertheless, because the settlement was on private land it received no support from the authorities. Nothing was provided in the way of services for several more years; the roads were unpaved, electricity was stolen from the mains, and water was purchased from tankers. It was not until the eve of the election in 1978 that the settlement finally received piped water – a clear attempt on the part of the government party to win settlers’ votes.

cannot afford healthcare for their families, diet is inadequate, most struggle to survive. With men unable to increase their wages despite working longer and longer hours, wives and children contrive to augment family incomes in a variety of ways. They sell chewing gum on street corners, they clean shoes, they wash cars, they recycle all kinds of scrap. The informal sector is very often highly organized. Dealers employ whole teams of young boys to scour garbage dumps for anything of value, and street vendors jealously guard the best pitches.

Self-help settlements

Low wages have an impact on nearly all elements of urban life, but most obviously on housing. The shanty towns that have grown up around the major cities, known as favelas in Brazil’s major cities, campamentos in Santiago, barriadas in Lima and ranchos in Caracas, are overcrowded and poorly serviced. Typically these self-help housing areas are established when settlers occupy land belonging to someone else (as usually happens in Brazil, Peru and Venezuela). Elsewhere land invasions are not generally permitted, and other forms of land occupation are used; for example, plots of land may be purchased without services or planning permission.

Whatever methods of occupation are used, all self-help settlements tend to develop on sites that are not wanted by other social groups: on patches of polluted land close to factories and industrial sites, on dried up riverbeds that are liable to flood, beside open sewers, or on steep hillsides that are susceptible to landslides. Once the settlements have been established, the city authorities will probably get round to providing basic services such as water and electricity, but it may take years.

In some cities in South America, up to half the total population lives in houses they have built themselves in self-help settlements. But not all poor families live in their own self-help home; in cities such as Caracas and Bogotá about half of all households rent or share accommodation, some in old buildings near to the city center. Rented accommodation may also be found in some of the better organized and longer established self-help settlements: once they have been able to improve their housing, land invaders frequently become landlords.
Bogotá – just making it work

Bogotá is Colombia’s capital and largest city. Founded by the Spanish in 1538, it was planned in the customary way with a grid-iron pattern of streets around a large central square, the Plaza Bolivar, that contained the cathedral and main government offices. Bogotá’s story is the familiar South American one of gradual increase for four centuries followed by explosive growth in the last 50 years. In 1938 its population was 358,000; by 1990 it exceeded 4 million.

Unlike many other South American capitals, however, it does not totally dominate the country. Located high in the Andes far from the coast, communication was difficult, and other manufacturing centers such as Medellin and Cali also developed. Major ports grew up along the Caribbean coast. Bogotá today contains tire, pharmaceutical and chemicals industries, and it houses most of the country’s large banks and finance houses. Today railroads connect it with the Caribbean coast, and it is the hub of air travel in Colombia.

Bogotá’s rapid expansion was initially caused by heavy migration from the surrounding countryside. Most people came from districts within a two-hours’ bus ride of the city. The majority of migrants were young and started families after arriving in the city. Thus natural increase soon became the driving force for Bogotá’s continued growth. Today, however, fertility rates are declining. The average Colombian woman now has less than 4 children, compared to 6.7 during the early 1950s.

In the past, the rich elite of Bogotá lived in areas to the north of the city, and the poor to the south. This rigid divide is starting to break down as urban sprawl increases, but there is no mistaking the rich parts of town from the less affluent. The elite inhabit well-serviced, spacious suburbs that are scattered with large, detached houses, each designed in a different style. The poor, by contrast, are crowded into settlements that are rarely pleasing to the eye.

Land invasions are not permitted in Bogotá. Instead, the poor buy plots without legal title in settlements that lack services and planning permission. Settlers are rarely displaced by the city authorities, and considerable confidence exists in the system. Occupiers design their own homes and often construct them as well. Electricity and water are
eventually supplied to most homes because the authorities would rather sell the services than have them pirated.

**Services at full stretch**

Waste disposal, however, is a major problem. The sewerage system covers less than a third of Bogotá, and sewage is deposited directly into rivers, creating a major health risk. Little is provided in the way of public healthcare, and only the very sick gain entry to hospitals. Traffic congestion and air pollution are increasing. Automobiles, however, are a luxury still reserved for the rich — most people travel to work by bus, on vehicles that are desperately overcrowded.

Despite its problems, Bogotá is a city that works. It is not easy to live in the city, especially for those who are poor. Some people do go hungry, yet the majority are in no sense undernourished. Some people do sleep on the streets, yet the vast majority live in houses that at least keep out the rain and the cold. Most homes possess electricity, and nearly every household just about affords its own television set. Bogotá could, undoubtedly, be run more efficiently. Yet the fact that it has managed to absorb an increase of 3 million people in a little over 30 years without breaking down suggests that the administration must be getting something right.
Within two years of the discovery of the New World by Christopher Columbus, Pope Alexander VI had divided South America between Spain and Portugal (in the Treaty of Tordesillas, 1494). This arrangement gave Spain the right to all land west of a line approximating to the 50 degree line of longitude, and Portugal the land to the east of it. By 1800 a vast Spanish empire had been created in the west and center of the subcontinent, stretching from Venezuela to Argentina, and a Portuguese empire in Brazil, by far the largest state in the region. Britain, France and the Netherlands had established colonies on the coast south of the river Orinoco (today Guyana, French Guiana and Surinam). Large tracts of the Amazon basin and areas farther to the south were still uncolonized, though Christian missions had been established.

### The Struggle for Power

The movement for independence in South America took place between 1808 and 1826, encouraged by the example given by the War of Independence in North America against Britain (1775–83). In Brazil, demands for political autonomy were met by the Portuguese royal family, who had fled there from Napoleon’s armies, and an independent empire was established in 1822.

By contrast, Spain responded to its South American colonies’ desire for freedom with violent repression. Politically weak at home, however, it was unable to resist the strength of the movement that swept across the subcontinent. By 1830 two colonial empires in South America had become 10 independent states.

Three colonies still remained. British Guiana (which became a British colony only in 1814, having been seized from the Dutch) gained its independence as the Cooperative Republic of Guyana in 1966. It is a member of the British Commonwealth. Neighboring Surinam, formerly Dutch, became fully independent in 1975. French Guiana is an overseas department of France. The Falkland/Malvinas Islands, with its dependencies of the South Georgia and Sandwich islands, is a British colony. Argentina has long contested claims to sovereignty there.

### Power and Patronage

Independence brought no significant change in political structure to the former Spanish and Portuguese colonies. Indeed, divisions that had existed earlier between a privileged minority and an impoverished peasant and worker population, often racially and linguistically separated from the ruling class, became even sharper after independence. The South American rulers handed out patronage in the form of land or position, and whole countries were run like private estates.

Political instability was always endemic – Bolivia had some sixty revolutions in the first century of independence, and Colombia twenty civil wars – and remains so to this day. Toward the end of the 19th century the scramble by European and North American investors to share in the exploitation of South America’s agricultural and mineral resources created ever more dramatic extremes of wealth and poverty, increasing the tendency toward instability, especially during times of economic recession. When revenues fell compliance could not be rewarded, and rulers either lost their political support, or resorted to force to stay in power. Those states whose economies were more stable did see some attempt to introduce democratic forms of government. By the beginning of the 20th century, for example, universal male suffrage and a secret ballot were operating in Argentina, but real political power remained in the hands of the great landowners. In Brazil, beneath the trappings of democracy, the army provided the ruling force. In Venezuela there was no pretense – the wealth generated there by oil flowed straight into the hands of a dictator, Juan Gomez, whose regime (1908–35) was noted for the savagery of its
Abuse of human rights is high in the region. The "mothers of the disappeared" appeal to the Argentinian government for news of their children who vanished during the "dirty war" of 1976-83, when thousands were killed.

secret police. Only in Uruguay – where the population was mostly of European origin – and Chile did democracy become more than a form of words.

The rise of populism
Whatever their style of government, all the states of South America were increasingly dependent on the United States for economic support. The devastating effects of the Great Depression of 1929 on their export-based economies, followed by World War II, led to the rise of populist leaders, such as Getulio Vargas (1883-1954) in Brazil and Juan Perón (1894–1974) in Argentina. Having broken the power of the landowning aristocracy, they won popular support by offering paternalistic programs that rewarded the workers with higher wages.

Perón was elected president of Argentina in 1946. The enormous popularity of his wife Eva (1919–52), a former actress, was to contribute to his own charismatic leadership. Industrialization was encouraged under his regime, and social welfare programs were introduced. Banks, transport and public utilities were nationalized. Perón's populist policies worked only
in favorable economic circumstances. As expansion declined, prices fell, and his regime become more repressive; political opponents were imprisoned, and civil liberties suppressed. In 1955 he was overthrown by a military coup, backed by the church and the landowners. After 1959, following the success of the Cuban revolution, Marxist-led guerrilla groups pressed for social change throughout South America. The armed forces, in the interests of national security, seized control of the state apparatus set up by the populists. In 1964 there were army coups in Brazil and Bolivia, followed by Argentina (1966) and Peru (1968). Finally, in 1973 the military seized control in the two South American states in which democratic institutions had seemed most firmly planted, Chile and Uruguay. In Chile, President Salvador Allende Gossen (1908–73) – the world’s first democratically elected Marxist leader – was murdered in a military overthrow engineered by General Augusto Pinochet Ugarte. In Uruguay an increasingly right-wing and repressive government was replaced by the army, which instead of restoring a democratic form of government imposed its own brutal rule.

CONSTITUTIONALISM IN A TIME OF CHANGE

The 1970s were a decade of militarist rule in South America: only Colombia and Venezuela were without military regimes during this period. Perón was allowed to return briefly to power in Argentina in 1973, but the attempt to restore populist policies, carried on by his second wife Isabel after his death in 1974, was once again ended in 1976 by a military coup and Congress was dissolved.

South America’s governments were in many respects merely a continuation of the traditional ruling interests in the region, combining political conservatism and repressive methods of government with economic policies that encouraged foreign capital investment and increased state expenditure. The military rulers themselves thus laid the foundations of the crippling debts that were to contribute to their downfall.

The return of constitutionalism
Most of South America had returned to civilian rule by the mid 1980s. Ecuador (1979), was followed by Peru (1980), Bolivia (1982), Argentina (1983), Uruguay and Brazil (1985), and Paraguay (1993).

In 1988 55 percent of Chile’s electorate voted in a referendum to reject a further term of office by General Pinochet leading to the election of a Christian Democrat, Patricio Aylwin as president in 1990. Eduardo Frei succeeded Aylwin as president in 1993 in the first democratic handover of power since 1970.

When Carlos Menem was sworn in as president of Argentina in July 1989, it marked that country’s first democratic change of government in over sixty years. Argentina’s economic crisis (including a 30-day state of emergency, after rioting following price measures and high inflation) forced him to take office five months sooner than the constitution allowed for the transfer of power. In 1990, his decision to restore diplomatic relations with Britain, ruptured since the Falklands/Malvinas war in 1982, was the cause of an unsuccessful army revolt.

The last remaining military dictatorship in South America, Paraguay, was superseded in 1993 when the country’s first fully democratic elections resulted in victory for the ruling Colorado Party headed by Juan Carlos Wasmosy.
The trappings of democracy  The lists of voters are closely checked, but only one name—that of Alfredo Stroessner—appears on the ballot paper to elect Paraguay's president. After winning power in 1954, Stroessner was "re-elected" seven times before his removal by the army in 1989. At that time only one party—the Colorado Party—was officially recognized. It remained the ruling party, though a multiparty system was restored in 1989.

A federal constitution  Brazil is a federal republic, with 23 constituent states, 3 territories and a federal district (Brasilia). The two-chamber national assembly consists of a 69-member senate elected for eight years and a 487-member chamber of deputies elected for four years. Executive power is exercised by the president, elected directly by universal suffrage for a 5-year term, who appoints and leads the cabinet.

The transition to democracy  Crowds in Brazil demonstrate in support of Tancredo Neves, leader of the Liberal Party Front (PFL) in 1985. Elected by Congress as Brazil's first civilian president for 21 years, Neves died before taking office. He was succeeded by the vice president, José Sarney. In 1987 the PFL ended its coalition with Sarney.

THE DRUG BARONS

The Indians of the Andes have long chewed coca leaves, from which cocaine is produced, to reduce hunger pangs and as a source of vitamins and minerals. Only recently have they grown these plants to supply the international market for illicit drugs—a development that must be looked at in the context of South America's economic recession and the decline in trade.

The opening up of land in the 1970s on the eastern slopes of the Andes provided isolated, fertile areas where the coca bush could be secretly planted and cultivated. By the end of the 1980s Colombia had about 25,000 hectares (62,500 acres) given over to its production, Bolivia 50,000 hectares (125,000 acres) and Peru 100,000 hectares (250,000 acres). Profits from illicit drug exports make a major contribution to the economies of these countries; the laundering of drug money involves many of their financial institutions.

The growth of the trade in narcotics has created a new oligarchy that undermines the authority of national governments. In Peru the left-wing terrorist group known as the Shining Path strengthened its grassroots support by negotiating with the drug traffickers to obtain better prices for the peasants whose livelihood is dependent on coca-growing. The investment of drug profits in real estate by the powerful drug barons in Colombia means that one-tenth of the country's productive land is in their hands, and they have won popular support by building housing for the poor.

Recognition that this was an international problem came in 1989 when the United States and other world governments responded to Colombia's desperate appeal for financial and policing aid to curb the activities of the barons. Their intimidatory campaigns, with bombings and assassinations, which undercut the ability of government to protect its people, continued.

Strains and stresses  South America's new democracies are fragile. They are often threatened by the economic strains imposed by international debt repayments. These have led to the imposition of austerity programs that have increased the unpopularity of governments. The pressures are particularly severe in the rapidly growing major cities of the region, where organized labor is strong, and rising prices and unemployment have led to strikes and food riots. In Argentina, a 30-day state of emergency was declared after price measures to curb soaring inflation led to violent rioting.

In Brazil, the right-wing policies of José Sarney failed to cope with the country's social and economic problems. It led in 1988 to the election of a woman member of the Socialist Workers Party as mayor of São Paulo, the largest city in the southern hemisphere. In 1989 Fernando Collor won power in the first direct presidential elections since the military coup of 1964 with a promise to renegotiate the foreign debt and root out corruption. However, his anti-inflationary measures incurred even greater unpopularity, and in 1992 he was charged with corruption and removed from office.

The left-wing Shining Path guerrillas posed an increasing threat to order in Peru. In 1990 the Social Democrat Alan García Pérez (president since 1985) was defeated in elections by Alberto Fujimori, who suspended the constitution in 1992. The leader of the Shining Path was arrested, yet terrorist attacks did not abate, and the army was implicated in its war against the guerrillas in deals with the barons of the cocaine trade to supply weapons and airstrips. As in Bolivia and Colombia, the drug barons have created an alternative elite, and attempts to control them are met with intimidation and bribes.

In the newest independent state of the region, Surinam, democracy is also very fragile. A military coup in 1980 was soon followed by successive coups and counter-coups (six in all between 1980 and 1983). After the deaths in custody of 15 opposition leaders in 1982, the Netherlands' government suspended grant aid to its former colony. Civilian government was restored with the holding of elections in November 1987 but guerrilla warfare continued and the army still exercised a powerful control.

Street sellers  Bolivian farmers sell their crop of coca leaves at a local market.
GETTING ON NEIGHBORLY TERMS

During the 19th century, and well into the present one, the international relations of the South American states were governed by its economic role as a world supplier of raw materials — food and grain from Argentina, silver from Bolivia, rubber from Brazil, nitrates from Chile. Foreign investment, particularly from Britain, northwestern Europe and the United States, into South American mines, agriculture, railroads and ocean transport was extensive. But the rapid expansion of its export-based economies, which were often reliant on a single product, made the region particularly vulnerable to fluctuations in world demand. The effects of the Great Depression of 1929 were devastating here as elsewhere, severing supplies of foreign capital and lowering prices obtained for many products.

The pattern of external dependency has continued. Rapid industrial growth during and after World War II, when South America was cut off from foreign sources of consumer goods, increased reliance upon imported capital, technology and finance, with the effect of creating enormous foreign debts. The penetration of foreign subsidiaries into national industries, and the rise of the multinational corporations, caused many governments to redefine their international relations in the 1970s and 1980s. The presence of foreign interests also increased domestic social tension. In Brazil, for example, the destruction of the rainforest by multinational companies began to arouse protest, particularly from threatened Indian communities.

The best hope of breaking the cycle of dependency and of speeding up social and economic development was by creating closer links between the states of the region. Cooperation between them had always proved difficult in the past, largely because settlement was generally limited to coastal areas.

Indianans in the Amazon protest in 1988 against plans to build a massive dam for hydroelectricity that will destroy their lands and livelihood. In 1992, Rio de Janeiro hosted the UN-sponsored Earth Summit that sought international cooperation on the environment.

Obstacles to integration

Overland transport routes between the countries of the region are still few and far between, and communication remains easier with traditional trading partners overseas than with neighbors. Additional friction arises from long-standing rivalries between states for leadership of the region, and jealousy of the largest, non-Spanish speaking state, Brazil. Border disputes were, and still are, frequent.

THE FALKLANDS/MALVINAS WAR

British claims to the remote and sparsely populated Falkland Islands (named after Lord Falkland, treasurer of the British navy at the end of the 17th century), 480 km (300 mi) off the coast of Argentina, date back to the earliest British settlement in 1765. They are vigorously contested by the Argentinians, who know them as the Islas Malvinas. During the 1960s discussions were held over the sovereignty issue, but Britain insisted on the islanders’ right to self-determination: they have always opposed cession.

On 22 March 1982 a group of Argentinian scrap metal merchants raised the Argentinian flag on South Georgia, a dependency of the Falkland Islands. On 2 April Argentinian troops occupied the Falkland Islands themselves, expelling the British governor.

Britain at once brought economic, diplomatic and military pressure to bear against the Argentinians. Resolution 502 of the United Nations Security Council called for the withdrawal of the Argentinian troops and peaceful settlement of the dispute. Almost every state of South America supported the Argentinian action, but Argentina failed to win the backing of the United States, despite invoking the Rio Treaty, which provides for members of the OAS to give military assistance to one another. By 22 April, when the British naval task force reached the area, United States’ support had tilted decisively in favor of its “special relationship” with Britain.

Military operations began at the beginning of May with the sinking of the Argentinian cruiser General Belgrano. On 21 May British troops landed at San Carlos, and by 15 June the Argentinian garrison at Port Stanley, the islands’ capital, had surrendered.

Argentina’s action in initiating the conflict was taken by General Leopoldo Galtieri, who at that time headed the military regime, to divert attention from economic crises and to bid for popular support. Defeat discredited the government: Galtieri was removed from power and later sentenced to 12 years’ imprisonment for his mismanagement of the war, which led to the loss of over a thousand lives.
A nation unites National flags wave proudly as people in Buenos Aires take to their cars to celebrate Argentina's invasion of the Falkland/Malvinas Islands in 1982. The war diverted attention from the military junta's problems, but defeat hastened its downfall.

The Spanish empire in South America had been divided into administrative regions (viceroyalties and captaincies). These formed the territorial bases of the new states at the beginning of the 19th century. Boundaries were drawn through unpopulated areas and were often based on inaccurate maps. Subsequent border disputes, particularly between Argentina and Chile, and Ecuador and Peru, frequently erupted into armed conflict. After losing a war with Chile (1879-84) Bolivia had to give up its coastal territories and valuable mineral-rich lands, and further territory was lost to Paraguay after the Chaco war of 1932-35.

Many borders are still unsettled. In 1981 Peru and Ecuador almost went to war over disputed territory. Five-eighths of Guyana's territory (the province of Essequibo) is claimed by Venezuela.

Closer ties

It is against this background that the states of South America have tried to develop closer regional ties. The Latin American Free Trade Area (LAFTA), set up by the Treaty of Montevideo in 1960, aimed to encourage industrial development on a coordinated regional basis. Talks began between Argentina, Brazil, Chile and Uruguay in 1958, and the other countries of the region (plus Mexico) soon joined. Venezuela was the last, in 1972.

Trade between LAFTA states still amounts to only about 10 percent of total regional trade. The more developed economies of Argentina and Mexico, followed by Brazil, have benefited most from membership of LAFTA, and this was resented by the poorer countries. The Andean Pact, created in 1969 between Bolivia, Colombia, Ecuador, Peru and Venezuela within the framework of LAFTA, foresaw the creation of a real economic union with not merely the liberalization of trade, but also joint industrial planning and the harmonization of economic policies.

In 1980 the Latin American Integration Association (ALADI) replaced LAFTA; this change was an attempt to revitalize efforts to bring about the economic integration of the region.

All the states of the region are members of the Organization of American States (OAS). This was founded in 1948, though its pan-American origins go back to the 19th century. Its aims include the improvement of both social and economic cooperation throughout Latin America, but with its quarters in Washington DC it is seen to be heavily influenced by United States' interests, and its neutrality has been called into question. Its weakness and disunity were demonstrated during the Falklands/Malvinas conflict in 1982.
Chile: the suppression of human rights

In 1973 General Augusto Pinochet Ugarte replaced the democratically elected government of Salvador Allende Gossen in Chile with a military regime that was authoritarian and brutal in its repression of discontent. Allende’s victory three years earlier had brought into power one of the world’s first elected Marxist governments, and implementation of its radical program of economic and social change, including nationalization of the country’s largest industries, agrarian reform and a program of exchange and commodity control, had led to an increase in unrest and growing violence.

Pinochet was determined to destroy the very fabric of democracy that had allowed the Allende government to come to power. This involved destroying or reorganizing anything considered to be an expression of support for the previous government. Estimates of the numbers of political killings in the first few months of the Pinochet regime range from 5,000 to 30,000; political detentions numbered about 65,000. A state of emergency was declared, which allowed the establishment of military courts and detention without trial.

As a result, Chile came to symbolize human rights atrocities in South America. Yet its record was no worse than those of the suppressive regimes in power in Brazil (1964–85) or Uruguay (1972–85), nor of the perpetrators of the so-called “dirty war” in Argentina (1976–83), in which thousands of men, women and children—adjudged left-wing opponents of the military junta—“disappeared”. What was unusual in the case of Chile was the amount of information about state repression that was circulated at the time, not only within the country but also throughout the world by church groups opposed to human rights abuses—particularly the “Vicarate of Solidarity” and the “Relatives of the Detained”.

Despite the government’s use of terror tactics, opposition and protest grew throughout the 1980s, to be greeted with mass arrests. In November 1984 Pinochet decreed a state of siege and used government forces to smash demonstrations and arrest opposition leaders. The campaign of protest and bombings continued, and in September 1986 an assassination attempt on Pinochet brought brutal government response: strict censorship was reintroduced and right-wing death squads again became active.

The publicity surrounding Chile’s use of repression reached new heights, and even began to damage the government’s international reputation so that it was forced to comply with international safeguards on human rights. In September 1987 Pinochet signed a United Nations convention outlawing torture. Despite this, it was only a year later that the UN general assembly condemned the Chilean government for its violation of human rights for the thirteenth consecutive year.

The “transition to democracy”

The constitution approved by Pinochet in 1980 set the framework for Chile’s “transition to democracy” by allowing for presidential elections to be held every eight years. In addition, no president could serve more than one term. In 1988 a referendum was held to extend Pinochet’s term as president by a further eight years: the answer was a decisive rejection by the Chilean people.

The first election under the new constitution took place in 1989 and was won
Beneath the heel of authority

For nearly two decades the army in Chile wielded unlimited power and political protest was severely restricted. In the early days of its repressive regime thousands of people were killed and tortured, and many more detained without trial.

A resounding No

Given the chance to decide whether or not to extend Pinochet’s term of office in 1988, 55 percent of the 7 million voters taking part in the referendum turned him down. A year later they rejected his choice of candidate to succeed him and voted in a center-left president.

by Patricio Aylwin, the leader of the Christian Democrats who headed a center-left coalition, and who pledged to restore democracy. Before the election, Pinochet had moved to secure a role for himself in any future elected government by confirming his intention of remaining as commander in chief of the army for an indefinite period, and announcing conditions with which the civilian government would be expected to comply. These included the right of the military to oversee political development through a strong National Security Council and to control general defense policy.

Many feared that the presence of Pinochet and his supporters in high military posts would give only the semblance of democracy to Chile’s elected government and that the military fist would remain within the civilian glove. However, in 1993 Eduardo Frei, the presidential candidate of the ruling coalition achieved a landslide electoral victory, winning 58 percent of the vote, the largest popular backing of any Chilean leader since 1931. Frei promised to introduce constitutional reform, including recovering for the president the power to appoint and remove senior military officers.

IT IS NOT SURPRISING, THEREFORE, THAT OVERALL POPULATION DENSITIES ARE LOW (ABOUT 17 PEOPLE PER SQ KM OR 44 PER SQ MI), AND THAT LARGE AREAS OF UNMODIFIED NATURAL VEGETATION REMAIN — ALMOST HALF THE CONTINENT IS STILL FORESTED. UNTIL RECENT DECADES THE GREATEST HUMAN IMPACT WAS CONFINED TO SOUTHEASTERN BRAZIL, THE PAMPAS OF ARGENTINA AND URUGUAY, CENTER CHILE, THE ANDES, AND THE COASTLANDS FROM PERU TO COLOMBIA. HOWEVER, THE PATTERN HAS BEEN CHANGING RECENTLY AS DEVELOPMENT HAS SPREAD INTO THE OFTEN VULNERABLE ENVIRONMENTS OF THE HINTERLAND.

UNEXPECTEDLY, HUMAN USE OF THE LAND AND ITS RESOURCES WAS MOSTLY LIMITED TO HUNTER-GATHERING AND SIMPLE FARMING. THE INCAS, WHO PRACTICED INTENSIVE FARMING IN THE ANDES, WERE AN EXCEPTION. THEY TERRACED THE MOUNTAIN SLOPES AND CHANNELED SEASONAL RAINFALL ALONG STONE AQUEDUCTS TO IRRIGATE THE PLANTS. THEY EVEN DIVERTED WATER FROM SOME 50 STREAMS TO DEVELOP IRREGULAR OASES IN THE COASTAL DESERT OF PERU, GROWING MAIZE AND OTHER CROPS.

THE SCRAMBLE FOR RESOURCES

WITH THE ARRIVAL OF SPANISH AND PORTUGUESE SETTLERS IN THE 16TH CENTURY, HOWEVER, EXPLOITATION OF THE CONTINENT’S RESOURCES INTENSIFIED. THE EUROPEAN SETTLERS ESTABLISHED AN EXTRACTIVE ECONOMY BASED ON PRECIOUS METALS. SILVER WAS MINED AT POTOSI IN BOLIVIA AND GOLD AND DIAMONDS IN MINAS GERAIS, BRAZIL, WITH LESHER MINING CENTERS DEVELOPING IN CHILE, COLOMBIA, AND ECUADOR. COMMERCIAL AGRICULTURE AND RANCING DEVELOPED
to supply the mines and towns, and to provide exports. Natural vegetation was cleared and replaced by plantations of a single crop such as sugar cane and by vast cattle ranches. In northeastern Brazil, central Chile, the Peruvian coast and the Andean valleys, farms took the form of large landholdings (latifundia).

In the 19th century the temperate grasslands of the pampas became grazing lands for cattle and sheep or were used to grow cereals. From the 1880s even the cold, dry plateau of Patagonia in southern Argentina was turned into sheep pasture. In tropical regions, more forested land was cleared as the demand for coffee and other plantation crops increased. Open-cast mining also developed, the surface of the land being stripped away so that ores such as copper could be extracted.

In the 20th century agricultural change came about through intensification and expansion. Farming, particularly for cash crops, has involved large units of production, mechanization and increased use of fertilizers and pesticides. Although yields and output have improved, pollution has also increased and the need for rural labor has been reduced. Meanwhile, the agricultural frontier has advanced far into the Amazon rainforest. Following the construction of the Transamazon Highway and associated roads since the 1970s, landless farmers have migrated to the region and begun to clear the forest for subsistence agriculture.

Rapid urbanization has been widespread as migrants from degraded rural areas have moved to the cities. In all of the South American countries except Bolivia, Paraguay and the Guianas, at least one-quarter of the population lives in cities of over 1 million inhabitants, and in such areas pollution – particularly of water – is a growing problem. Major development schemes have included large open-cast mines and some of the biggest hydroelectric dams in the world. These schemes are seen as essential for economic advance, but they also have a major impact on the environment.
ENVIRONMENTAL ISSUES

PRESSES OF DEVELOPMENT

Most of the major environmental issues facing South America stem from the continent's struggle for economic development. The goals of providing food, jobs, basic services and export revenue have often clashed with the well-being of the landscape and its resources.

As is the case elsewhere in the world, intensive cash crop production usually entails an increase in the application of fertilizers and pesticides, which seep into rivers causing pollution problems for the wildlife and people who use the water. Organic waste from Brazil's sugar-cane crop, when dumped into watercourses, has also contaminated water supplies. The area planted with sugar cane more than doubled to 4 million ha (10 million acres) in the 1980s through the country's drive to produce cane alcohol as a substitute for imported petrol.

The increasing demands made on existing farmland and new marginal plots by subsistence and commercial farmers has increased soil erosion. Lack of either the knowledge or the means to conserve soil particularly affects the smallholders who work the thin soils and steep slopes of the high Andes, as well as the slash-and-burn cultivators who clear plots for farming in the forested foothills and lowlands. The clearance of trees from remote upland areas in the Colombian Andes so that illicit drug crops can be grown has also created severe erosion problems. In Patagonia, overgrazing of sheep pasture has led to soil deterioration across 5 million ha (12.5 million acres).

Into the forest

The greatest advance of agriculture into virgin land has been in the Brazilian rainforest. Both ranchers and squatters have contributed to the potent image of the burning forest by clearing land for livestock and crops. Brazil's environment agency claimed forest losses of 24,000 sq km (9,500 sq mi) in 1988-89, 14,000 sq km (5,500 sq mi) in 1989-90 and below 14,000 sq km (5,500 sq mi) in 1990-91. Aside from the conservation and soil erosion issues, forest burning is seen as one of the contributors to worldwide global warming. Carbon dioxide, one of the so-called "greenhouse gases" is soaked up when the trees are alive, but released when they are cut down and burned.

For the continent as a whole, the estimated forest area in 1990 was about 8.6 million sq km (3.3 million sq mi). This represented a reduction of 15 percent since 1980 (against losses of 5 percent in Africa and 9 percent in Asia). Agriculture, urbanization and commercial lumbering are largely responsible. Wood also remains a significant source of fuel. In Brazil, it provided one-fifth of primary energy during the 1980s.

Inundation and pollution

Environmental controversy has accompanied many of the enormous hydroelectric developments and mineral extraction projects launched in South America. Dam schemes have caused great loss of land and displacement of local people by flooding, and they create breeding sites for disease carriers such as mosquitoes. The Itaipu project on the river Paraná between Paraguay and Brazil inundated 1,460 sq km (560 sq mi) of land and expunged the spectacular Guaira Falls.

The search for oil in eastern Ecuador has caused extensive river pollution and spurred deforestation. A single drilling site may occupy only 5 ha (12.5 acres) but access roads open up the forest to settlers. In Brazilian Amazonia, thousands of people extract gold from surface deposits and rivers. The mercury they use to settle the gold during panning washes into streams and has accumulated in fish, a major source of food in the region. The effects in humans can include liver, kidney and brain damage, as well as birth defects.
The ravages of disease are intimately linked with the quality of the environment for millions of poor South American people who lack adequate sanitation and clean water. This link became evident in January 1991, when there was an outbreak of cholera in coastal Peru. Cholera is carried by bacteria in water, and in areas of poor sanitation quickly spreads through contaminated drinking supplies and through fish, shellfish and vegetables washed in infected water. The coastal fishing communities of Peru provided an ideal breeding ground for cholera. Within one month of the first case, 32,000 more were recorded, including 139 fatalities. The epidemic quickly spread along the coast, and by April there were cases in Ecuador, Colombia, Chile and Brazil. By mid 1992 the number of deaths throughout South and Central America had reached 4,000.

Dramatic though the rapid spread of cholera has been, another illness, Chagas disease, is responsible for even more deaths throughout South America every year. Less well known than cholera, this disease is carried by a blood-sucking insect that is common in poor, rural homes, especially those with mud-brick walls and dirt floors; each occupant may suffer up to 25 bites per night. An estimated 500,000 people become infected with Chagas disease every year in Brazil, Bolivia, Paraguay, Uruguay, Argentina, Chile and Peru. Tens of thousands die from the associated fevers and longterm effects such as heart disease.

Combating disease Women from the slums of Lima, Peru, learning about the transmission of cholera and other diseases. Most urban residents do not have access to clean water or adequate sanitation facilities.

Industrial growth has been a high priority in South America, but it has brought pollution from fumes, noise and waste. One of the largest industrial concentrations is Cubatao, near Sào Paulo in southeastern Brazil – a site hemmed in by mountains that slow the dispersal of pollutants in the atmosphere. Its factories include steel mills, oil refineries, and fertilizer and cement works, which together emit thousands of tonnes of sulfur dioxide, nitrous oxides and hydrocarbons. The severe pollution causes health problems, including respiratory illness in local children, and damages rivers and vegetation. Despite a 6-year program of environmental improvement, states of emergency are still called in the area when pollution levels are very high, and production has to be shut down.

Rapid urban expansion has also generated severe problems – uncontrolled urban sprawl, shortages of clean water and drainage, and congestion. In Santiago, Chile, pollution from vehicles, factories and domestic fires masks the view of the Andes some 60 km (37 mi) away.

The shanty towns that have grown up in many of the region’s major cities face added threats. Commonly located on hillsides, ravines and tidal flats, they are especially vulnerable to flooding and landslides. In Rio de Janeiro, southeastern Brazil, torrential rainstorms occasionally flood the hillside shanties, spreading effluent and rubbish, causing disease and even washing dwellings away. In 1988 300 people died and at least 10,000 lost their homes following heavy rains.
DEMANDS AND ACTION

South America faces crucial decisions regarding the management of its lands. From both inside and outside the continent, there is increasing pressure for environmental factors to be taken into account during the planning of future development, and for action to be taken to redress existing problems.

The "Great Drought" of 1877, in which an estimated 500,000 people in northeastern Brazil lost their lives, perhaps provides the first example in the region of an environmental hazard being met by direct action: water storage reservoirs were built and irrigated agriculture extended to avert further disaster. Periodic drought remains a scourge in this area. In 1970 a particularly severe drought prompted the government to plan the Transamazon Highway and its agricultural colonies, to encourage people to migrate from the northeast.

South America has a good record in creating national parks. Chile was a pioneer in 1926, followed by Brazil, Venezuela and Argentina in the 1930s, and others more recently. However, the mere designation of a national park is not enough to ensure the conservation of the habitats within it. Funds are needed to maintain parks and other natural reserves, and to protect them against incursions by squatters and miners. Protected areas in South America are generally given low priority in the allocation of scarce capital, and conservation programs may be expendable in areas that are found to contain mineral reserves or oil.

Programs to conserve soil and timber have been slower to get under way, partly because of a lack of knowledge regarding the consequences of exploitation. Most countries now have basic soil surveys that provide information on soil quality, potential use and management. An important consequence of Brazil's program to develop the Amazon was an aerial survey that provided information for detailed maps, and resulted in the compilation of reports on soil, vegetation, land use and land-use potential.

In northern Argentina attempts are being made to regenerate the semiarid Chaco thorn forest and savanna, which were devastated by several decades of tree felling, charcoal burning and cattle

TIME FOR ACTION

With an overall population density of fewer than 3 people per sq km (8 per sq mi), the Guianas — the three territories of Guyana, Surinam and French Guiana — have yet to suffer environmental damage on a scale seen in other countries. Most of their land is still covered in dense virgin tropical rainforest. But population growth, road-building and mineral exploration now make them highly vulnerable to change. Many conservationists argue that now is the time to safeguard the environment, before disruption becomes widespread. There are already plans to create a 4,000 sq km (1,600 sq mi) reserve of remote and pristine rainforest in Guyana for conservation, genetic research and some sustainable forestry. However, this is threatened by the construction of a road between Manaus in northern Brazil and Georgetown on the Guyanese coast that will open the area to migrant farmers and miners.

At present, French Guiana, an overseas department of France, has no protected zones whatsoever. Although its population is small (about 100,000, mostly concentrated along the coast), incursions by hunters, often in areas opened up by forestry, have already depleted local wildlife. The World Wide Fund for Nature is pressing for France to start protecting the rainforests in French Guiana. It is campaigning for the creation of nature reserves and for strict control over logging, hunting and road building, and is promoting the idea of a "European Tropical Park" run by the European Commission.
herding. Controlled grazing has improved the quality of the grassland and permitted the regeneration of the natural woodland. The trees are used for their hardwood timber and tannins.

Some countries have embarked on extensive reforestation programs, mainly for commercial purposes. In Brazil *Eucalyptus* trees have been planted in the southeastern state of Minas Gerais to supply charcoal for blast furnaces, and *Araucaria* pines planted for timber in Paraná, in the south. In southern Chile tax incentives have encouraged commercial planting in excess of 60,000 ha (150,000 acres) a year.

**Industrial and urban clean-up**

In recent years there have also been moves to counter some of the environmental problems of industry and urban growth. In 1992 the United States-owned Southern Peru Copper Corporation (responsible for 60 percent of Peru's copper output) proposed to invest heavily in a program to improve the handling of mine waste and smelter gases at its two mines, and sewage disposal from one of its mining settlements. In eastern Ecuador, an oil leak that polluted lakes and rivers and killed fish in the Cuyabeno National Park prompted the Ecuadorian government and the oil companies concerned to sign an agreement to improve environmental management.

In 1991, flooding of the Brazilian city of São Paulo by the river Tietê, heavily polluted by major industries, sewage and shanty town garbage, prompted a 3-year plan to regulate polluters and provide new sewerage and water treatment facilities. Many South American cities are trying to improve other basic services. "Self help" improvement schemes operate in many cities, whereby efforts are being made to provide settlement areas with water, drainage and electricity.

**A global concern**

On an international level, there have been proposals for "debt-for-nature" swaps, in which part of the considerable foreign debts owed by South American countries are cancelled by the indebted countries on condition that the money be spent to finance environmental projects. However, such schemes have been criticized for making only a limited contribution to reducing debt, while reawakening the vexed issue of foreign control over national territory and resources.

In February 1992 the eight Amazonian Pact countries (Venezuela, Guyana, Surinam, Brazil, Bolivia, Peru, Ecuador and Colombia) signed the Declaration of Manaus, which requested money and technical help from the developed countries to protect the rainforest. It claimed that such environmental problems required new forms of assistance from the "super-rich" countries such as the United States, Japan and Germany, including freer trade, increased financial aid and better access to technology.
The Grande Carajás project

Environmental controversy has surrounded one of South America's biggest ever development schemes. The Grande Carajás project, proposed by the Brazilian government in 1980 as a major regional plan for eastern Amazonia, affects 895,000 sq km (350,000 sq mi) or one-tenth of Brazil's total area, and it involves the development of mining, forestry, agriculture, industry, hydroelectricity and transportation. The key elements are four "mega-projects" - the Carajás iron ore mine, the Tucurui hydroelectric plant, and aluminum smelting at Barcarena and São Luis. The huge mining concession - covering 4,290 sq km (1,710 sq mi), of which 500 sq km (200 sq mi) was used for the mine site and planned town - preceded the Grande Carajás project.

Open-cast mining has a poor image in environmental terms because of its direct damage to the land surface. However, World Bank assistance to the Grande Carajás project incorporated environmental conditions, and since 1972 the mining company responsible for the scheme has fostered a research program and management strategy for the mine area as well as the region surrounding its 900 km (560 mi) railroad link to the coast. This research involved surveys of the area's terrain, its rivers and drainage, wildlife,
Making inroads A new road (left) and unfinished rail link (right) slice through virgin rainforest to the Carajás mines. Such construction work opens the way to destruction of large tracts of the Amazonian rainforest as settlers clear plots beside the road, gradually moving away from it as plot fertility diminishes.

Archaeology and its indigenous peoples. Strategies were then formulated for conservation, the acquisition of forest reserves, landscaping, pollution control and the protection of Amerindian lands.

Hidden dangers Other elements of the Grande Carajás project have been subject to more intense criticism. The giant Tucurui dam, which when fully complete will house the world's fourth largest hydroelectric plant, has flooded 2,400 sq km (925 sq mi) of rainforest and displaced 20,000 people. Since the reservoir was created, it has become a breeding ground for huge numbers of mosquitoes, greatly increasing the threat of malaria in the region.

Lesser industrial schemes included 25 blast furnaces using Carajás ore and charcoal. Plans to plant eucalypts for charcoal production have foundered because of doubts about their ecological viability in the lowland rainforest region. Only four furnaces had come into operation by 1990 and they have continued to use charcoal from forest trees. Although much of the timber is surplus from cleared land and sawmills, there are fears that the demand for charcoal will generate wider deforestation in the future. The heaviest deforestation would result from proposals to develop agriculture and ranching over 70,000 sq km (27,000 sq mi) of eastern Amazonia, but to date these proposals have not been implemented.

In spite of careful planning, additional environmental pressures have arisen in the Grande Carajás region from the unplanned arrival of thousands of migrants at the project sites. Settlements were created at the Carajás mine and Tucurui site for the workers required and their families, but no provision was made for the huge number of people who arrived spontaneously seeking work. The population of the Tucurui site, for example, grew from 800 in 1974 to 85,000 in 1985. The railroad and new highways required by the project have also opened up land to migrant peasants, who have cleared forested areas for farming, caused river pollution, and come into conflict with the Amerindian population.
Acid rain Rain or any other form of PRECIPITATION that has become more acidic by absorbing waste gases (for example, sulfur dioxide and nitrogen oxides) discharged into the ATMOSPHERE.

Acid soil Soil that has a pH of less than 7; it is often PEATY.

Added value A higher price fetched by an article or RESOURCE after it has been processed. For example, crude oil has added value when it has been refined.

Agricultural economy An economy where most people work as cultivators or PASTORALISTS.

AIDS Acquired Immune Deficiency Syndrome, a disease that damages the body's natural immune system and therefore makes people more susceptible to disease. The Human Immunodeficiency Virus (HIV) is the name given to one of the viruses that can lead to AIDS.

Air pollution The presence of gases and suspended particles in the air in high enough concentrations to harm humans, other animals, vegetation or materials. Such pollutants are introduced into the atmosphere principally as a result of human activity.

Alkaline soil Soil that has a pH of more than 7, chalk or limestone soils.

Alpine (1) A treeless ENVIRONMENT found on a mountain above the tree line but beneath the limit of permanent snow. (2) A plant that is adapted to grow in the TUNDRA-like environment of mountain areas.

Amphibian An animal that lives on land but whose life cycle requires some time to be spent in water, eg, the frog.

Apartheid A way of organizing society to keep different racial groups apart. Introduced in South Africa by the National Party after 1948 as a means of ensuring continued white political dominance, it is now being dismantled.

Aquifer An underground layer of permeable rock, sand or gravel that absorbs and holds GROUNDWATER.

Arctic The northern POLAR region. In biological terms it also refers to the northern region of the globe where the mean temperature of the warmest month barely reaches 10°C (50°F). Its southern boundary roughly follows the northern tree line.

Arid (of the climate) Dry and usually hot. Arid areas generally have less than 250 mm (10 inches) of rain a year. Rainfall is intermittent and quickly evaporates once it falls to the ground. Little moisture remains in the soil, so plant life is sparse.

Atmosphere The gaseous layer surrounding the Earth. It consists of nitrogen (78 percent), oxygen (21 percent), argon (1 percent), tiny amounts of carbon dioxide, neon, ozone, hydrogen and krypton, and varying amounts of water vapor.

Atoll A circular chain of CORAL reefs enclosing a lagoon. Atolls form as coral reefs fringing a volcanic island, as sea levels rise or the island sinks a lagoon is formed.

Autonomy The condition of being self-governing, usually granted to a subdivision of a larger STATE or to a territory belonging to it.

Balance of payments A statement of a country's transactions with all other countries over a given period.

Balance of power A theory of political stability that is based upon the distribution of power among the ruling STATES.

Basalt A fine-grained IGNEOUS ROCK. It has a dark color and contains little silica. Ninety percent of lavas are basaltic.

Bible The book of scriptures of CHRISTIANITY and JUDAISM. The Jewish bible contains many books in common with the Christian version describing historical events and prophetic teachings, but the latter also includes accounts of the life and teachings of Jesus Christ.

Biodegradable (of a substance) easily broken down into simpler substances by bacteria or other decomposers. Products made of organic materials such as paper, woolens, leather and wood are biodegradable; many plastics are not.

Biodiversity The number of different species of plants and animals found in a given area. In general, the greater the number of species, the more stable and robust the ECOSYSTEM is.

Biomass The total mass of all the living organisms in a defined area or ECOSYSTEM.

Biosphere The thin layer of the Earth that contains all the living organisms and the ENVIRONMENT that supports them.

Biotechnology Technology applied to biological processes, including genetic engineering, the manipulation of the genetic makeup of living organisms.

Birthrate The number of births expressed as a proportion of a population. Usually given as the annual number of live births per 1,000 population (also known as the crude birthrate).

Black economy The sector of the economy that avoids paying tax.

Bloc A group of countries closely bound by economic and/or political ties.

Boreal Typical of the northern climates lying between the ARCTIC and latitude 50°N, characterized by long cold winters and short summers. Vegetation in these regions is dominated by BOREAL FOREST.

Boreal forest The name given to the CONIFEROUS FORESTS or TAiga of the northern hemisphere.

Brown coal A peat-like material, also known as lignite, which is an immature form of coal. It has a lower energy content than more mature forms of coal.

Buddhism A religion founded in the 6th and 5th centuries BC and based on the teachings of Siddhartha Gautama; it is widely observed in southern and Southeast Asia.

Bureaucracy The body of STATE officials that carry out the day-to-day running of government. It may also refer to a system of administration marked by the inflexible application of rules.

Capital Variously refers to machinery, investment funds or a particular employment relationship involving waged labor.

Capitalism A political and economic system based on the production of goods and services for profitable exchange in which labor itself is bought and sold for wages. Capitalist economies can be more or less regulated by governments. In a capitalist mixed economy the government will own some of the country's utilities and industries as nationalized companies. This will also act as a major employer of labor.

Cash crop A crop grown for sale rather than for subsistence.

Castle (1) (among people) A system of rigid hereditary social divisions, normally associated with the Hindu caste system in India, where an individual is born into the caste of his or her parents, must marry within it, and cannot leave it. (2) (among insects) A system within a single colony where there are different types of functional individual, usually distinguished by morphology, age or sex, for example, queens, workers and drones are distinct castes within a beehive.

Caucasian (1) A racial classification based on white or light skin color. (2) An inhabitant of the Caucasia region or the Indo-European language of this people.

Cereal A cultivated grass that has been selectively bred to produce high yields of edible grain for consumption by humans and livestock. The most important are wheat (Triticum), rice (Oryza sativa) and maize (Zea mays).

CFCs (chlorofluorocarbons) Organic compounds made up of atoms of carbon, chlorine and fluorine. Gaseous CFCs used as aerosol propellants, refrigerant gases and solvent cleaners are known to cause depletion of the OZONE LAYER.

Christianity A religion based on the teachings of Jesus Christ and originating in the 1st century AD from JUDAISM. Its main beliefs are found in the BIBLE and it is now the world's most widespread religion, divided into a number of churches and sects, including Roman Catholicism, Protestantism and Orthodox churches.

CITES (Convention on International Trade in Endangered Species) An international agreement signed by over 90 countries since 1973. SPECIES (FAUNA and FLORA) placed in Appendix I of CITES are considered to be in danger of EXTINCTION, and trade is prohibited without an export permit. Signatory countries have to supply data to the World Conservation Union, which monitors IMPORTS AND EXPORTS. Appendix II of CITES would be threatened with extinction if trade is not regulated.

City-state An independent state consisting of a single city and the surrounding countryside needed to support it. Singapore is an example of a modern city-state.

Class (1) A group of people sharing a common economic position, for example large landowners, waged-laborers or owners of small businesses. (2) (in zoology and botany) A rank in the taxonomic hierarchy coming between phylum and order. See CLASSIFICATION.

Classification A system of arranging the different types of living organisms according to the degree of similarity of their inherited characteristics. The classification system enables organisms to be identified and may also reveal the relationships between different groups. The internationally accepted classification hierarchy groups organisms first into divisions, then phyla, classes, orders, families, genera, species and subspecies.

Cocoa One of the ingredients of chocolate, cocoa is derived from cocoa beans, which are the seeds of the Theobroma cacao. They are found in yellowish pods that grow directly from the trunk. The tree is native to tropical America, but is cultivated mainly in west Africa.

Collectivization The organization of an economy (typically communist) through control of work and income through agencies of the state. See COMMUNISM.

Colonialism The political practice whereby a foreign country is occupied for settlement and economic exploitation.

Colony (1) A territory under the sovereignty of a foreign power. (2) (in zoology) A group of individual animals or plants that are physiologically connected to each other. (3) A distinct localized population of animals, for example termites, seabirds etc.

COMECON The Council for Mutual Economic Assistance, formed in 1947 as an organization to further trade and economic cooperation between communist countries. It had 10 members before its collapse in 1991 – the former Soviet Union, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, East Germany, Mongolia, Cuba and Vietnam.

Commonwealth A loose association of STATES that are former members of the British Empire with the British monarch at its head.

Communist A social and economic system based on the communal ownership of property. It usually refers to the state-controlled social and economic system that formerly existed in the former Soviet Union and some Eastern Bloc countries and in the People’s Republic of China. See SOCIALISM.
Confiterous forest A forest of mainly coniferous, or cone-bearing trees, frequently with evergreen needle-shaped leaves and found principally in the TEMperate ZONES and tropical regions. The timber they produce is known as softwood.

Conservation The use, management and protection of NATURAL RESOURCES so that they are not degraded, depleted or wasted and in order to maintain their sustainable use and ecological diversity. See SUSTAINABILITY.

Constitution The fundamental statement of laws that defines the way in which a country is governed.

Consumer goods Goods that are acquired for immediate use, such as foodstuffs, radios, televisions and washing machines.

Continental climate The type of climate associated with the interior of continents. It is characterized by wide daily and seasonal ranges of temperature, especially outside the TROPICS, and by low rainfall.

Continental drift The theory that today's continents, formed by the breakup of prehistoric supercontinents, have slowly drifted to their present positions. The theory was first proposed by Alfred Wegener in 1912.

Continental shelf An extension of a continent, forming a shallow, sloping shelf covered by sea.

Convention on International Trade in Endangered Species See CITES.

Coral A group of animals related to sea anemones and living in warm seas. Individuals, called polyps, combine to form a colony.

Council for Mutual Economic Assistance See COMECON.

Culture (1) The beliefs, customs and social relations of a people. (2) The assumptions that a people makes in interpreting the world around them.

Cyclone A center of low atmospheric pressure. Tropical cyclones are known as HURRICANES or typhoons.

Dead lake (or Dead river) An area of water in which dissolved oxygen levels have fallen as a result of acidification, overgrowth of plants, or high levels of pollution be the extent that few or no living things are able to survive.

Debt The financial obligations owed by a country to the rest of the world, usually repayable in US dollars. Total external debt includes public, publicly guaranteed, and private long-term debt.

Decisive (of plants, trees, a forest etc) dropping their leaves in the winter or in the dry season.

Decolonization The transfer of government from a colonial power to the people of the COLONY at the time of political independence.

Deforestation The felling of trees and clearing of forested land, which is then converted to other uses.

Delayed runoff See RUNOFF.

Delta A large accumulation of sediment, often fan-shaped, deposited where a river enters the sea or a lake. The flow of the river slows down on entering calmer waters and it is not able to transport the sediment it carries. Often the flow of the river splits into many channels, known as distributaries, creating new routes for the water and its load.

Democracy A form of government in which policy is made by the people (direct democracy) or on their behalf (indirect democracy). Indirect democracy usually takes the form of competition among political parties at elections.

Desert A very ARID area with less than 25 cm (10 in) rainfall a year. In hot deserts the rate of evaporation is greater than the rate of PRECIPITATION, and there is little vegetation.

Desertification The creation of dessert-like conditions usually caused by a combination of overgrazing, soil EROSION, prolonged DROUGHT and climate change.

Developed country Any country characterized by high standards of living and a sophisticated economy, particularly in comparison to DEVELOPING COUNTRIES. A number of indicators can be used to measure a country's wealth and material well-being. For example, the GROSS NATIONAL PRODUCT, the PER CAPITA consumption of energy, the number of doctors per head of population and the average life expectancy.

Developing country Any country that is characterized by low standards of living and a SUBSISTENCE economy. Sometimes called third WORLD countries, they include most of Africa, Asia and Central and South America.

Dictator A leader who concentrates the power of the state in his or her own hands.

Divide see WATERSHED.

Dominant species The most numerous or prevailing species in a community of plants or animals.

Dormancy A period during which the metabolic activity of a plant or animal is reduced to such an extent that it can withstand difficult environmental conditions such as cold or drought.

Drought An extended period in which rainfall is substantially lower than average and the water supply is insufficient to meet demand.

EC see EUROPEAN COMMUNITY.

Ecology (1) The study of the interactions of living organisms with other and with their ENVIRONMENT. (2) The study of the structure and functions of nature.

Ecosystem A community of plants and animals and the ENVIRONMENT in which they live and react with each other.

Effluent Any liquid waste discharged into the ENVIRONMENT as a by-product of industry, agriculture or sewage treatment.

Emission A substance discharged into the air in the form of gases and suspended particles, from automobile engines and industrial smokestacks, for example.

Empire (1) A political organization of STATES and territories in which one dominates the rest. (2) The territory that constitutes such a group of states.

Endangered species A SPECIES whose population has dropped to such low levels that its continued survival is insecure.

Endemic species SPECIES that is native to one specific area, and is therefore often said to be characteristic of that area.

Environment (1) The external conditions - climate, geology and other living things - that influence the life of individual SPECIES or ECOSYSTEMS. (2) The surroundings in which all animals and plants live and interact with each other.

Erosion The process by which exposed land surfaces are broken down into smaller particles or worn away by water, wind or ice.

Ethnic group A group of people sharing a social or cultural identity based on language, religion, customs and/or common descent or kinship.

European Community (EC) An alliance of Western European nations formed to agree common policies in the areas of trade, aid, agriculture and economics. The six founder members in 1957 were France, West Germany, Belgium, Holland, Luxembourg and Italy. A further three - Britain, Ireland and Denmark joined in 1973, Greece in 1981 and Spain and Portugal in 1986. East Germany became a member when it was reunited with West Germany in 1990.

Evolution The process by which SPECIES develop their appearance, form and behavior through the process of NATURAL SELECTION, and by which new species or varieties are formed.

Exotic (of an animal or plant) Not native to an area but established after being introduced from elsewhere, often for commercial or decorative purposes.

Exports Goods and services sold to other countries, bringing in foreign exchange.

Extinction The loss of a local population of a particular SPECIES or even the entire species. It may be natural or be caused by human activity.

Family A taxonomic term for a group of related plants or animals. For example, the family Felidae (cat family) includes the lion, the tiger and all the smaller cats. Most families contain several GENERA, and families are grouped together into orders. See CLASSIFICATION.

Famine An acute shortage of food leading to widespread malnutrition and starvation.

Fault A fracture or crack in the Earth along which there has been movement of the rock masses.

Fauna The general term for the animals that live in a particular region.

Feudalism (1) A type of society in which landlords collect dues from the agricultural producers in return for military protection. (2) A hierarchical society of mutual obligations that preceded CAPITALISM in Europe.

First World A term sometimes used to describe the advanced industrial countries.

Fjord A steep-sided inlet formed when a glaciated U-shaped valley is drowned by the sea. See GLACIATION.

Flora (1) The general term for the plant life of a particular region. (2) A book that lists and describes the plants of a given area.

Fossil fuel Any fuel, such as coal, oil and NATURAL Gas, formed beneath the Earth's surface under conditions of heat and pressure from organisms that died millions of years ago.

Free trade A system of international trade in which goods and services are exchanged without TARIFFS, QUOTAS or other restrictions.

GATT The General Agreement on Tariffs and Trade, a treaty that governs world imports and exports. Its aim is to promote FREE TRADE, but at the moment many countries impose TARIFFS to favor their own industries and agricultural produce.

GDP See GROSS DOMESTIC PRODUCT.

Genus (pl genera) A level of biological CLASSIFICATION of organisms in which closely related SPECIES are grouped. For example, dogs, wolves, jackals and coyotes are all grouped together in the genus Canis.

Ghetto A slum area in a city that is occupied by an ETHNIC minority. The word originally referred to the part of a city in medieval Europe to which Jews were restricted by law.

Glaciation (1) The process of GLACIER and ice sheet growth. (2) The effect of these on the landscape.

Glacier A mass of ice formed by the compaction and freezing of snow and which shows evidence of past or present movement.

Global warming The increase in the average temperature of the Earth that is believed to be caused by the GREENHOUSE EFFECT.

GNP See GROSS NATIONAL PRODUCT.

Greenhouse effect The effect of certain gases in the ATMOSPHERE, such as carbon dioxide and METHANE, in absorbing solar heat radiated back from the surface of the Earth and preventing it from escaping into space. Without these gases the Earth would be too cold for living things, but the burning of FOSSIL FUELS for industry and transportation has caused atmospheric levels of these gases to increase, and this is believed to be a cause of GLOBAL WARMING.

Green Revolution The introduction of high-yielding varieties of seeds especially rice and wheat and modern agricultural techniques to increase agricultural production in DEVELOPING COUNTRIES. It began in the early 1960s.

Gross Domestic Product (GDP) The total value of a country's annual output of goods and services, with allowances being made for depreciation. Growth in GDP is usually expressed in constant prices, to offset the effects of inflation. GDP is a
very useful guide to the level of economic activity in a country.

Gross National Product (GNP) A country's GROSS DOMESTIC PRODUCT plus income from abroad.

Groundwater Water that has percolated into the ground from the Earth's surface, filling pores, cracks and fissures. An impermeable layer of rock prevents it from moving deeper so that the lower levels become saturated. The upper limit of saturation is known as the WATER TABLE.

Growing season The period of the year when the average temperature is high enough for plants to grow. It is longest at low latitudes and altitudes. Most plants can grow when the temperature exceeds 5°C (42°F).

Habitat The external ENVIRONMENT to which an animal or plant is adapted and in which it prefers to live, usually defined in terms of vegetation, climate or altitude -- eg grassland habitat.

Hard currency A currency used by international traders because they think it is safe from devaluation.

Hardwood Any timber from broadleaf trees such as oak, ash and beech. Hardwoods are generally stronger and less likely to rot than wood from cone-bearing trees, which is known as SOFTWOOD.

Hinduism A body of religious practices originating in India in the 2nd millennium BC, that emphasizes ways of living rather than ways of thought. Its beliefs and practices are based on the Vedas and upas and are closely intertwined with the culture of the people of India.

HIV (Human Immunodeficiency Virus) See AIDS.

Hunter-gatherers People who obtain their food requirements by hunting wild animals and gathering the berries and fruits from wild plants.

Hurricane A tropical CYCLONE, usually found in the Caribbean and western North Atlantic.

Hybrid An animal or plant that is the offspring of two genetically different individuals. Hybrid crops are often grown because they give higher yields and are more resistant to disease.

Ice age A long period of geological time in which the temperature of the Earth falls and snow and ice sheets are present throughout the year in mid and high latitudes. There have been many ice ages in the Earth's history.

Igneous rock Rock formed when magma (molten material within the Earth's crust) cools and solidifies.

Imperialism The process whereby one country forces its rule on another country, frequently in order to establish an EMPIRE.

Imports Goods and services purchased from other countries.

Import substitution industry Any industry that has been set up (mainly in THIRD WORLD countries) to manufacture products that used to be imported. Import substitution industries are normally simple ones with an immediate local market such as the manufacture of cigarettes, soap and textiles. They are protected during their start-up phase by high TARIFFS on foreign rivals.

Indigenous peoples The original inhabitants of a region, generally leading a traditional way of life.

Islam A religion based on the revelations of God to the prophet Muhammad in the 7th century AD, which are contained in the Quran. Islam is widely practiced throughout North Africa, the Indian Subcontinent, the Middle East and parts of Southeast Asia.

Judaism A religion founded in 2000 BC among the ancient Hebrews and practiced by Jews; it is monotheistic (believing in a single God) and its main beliefs are contained in the HEBREW BIBLE.

Jute (Corchorus capsularis or C. olitorius) A fiber crop cultivated in Asia, used to make ropes, sacks, hessian, carpet backing and tarpaulin.

Labor force The economically active population, including the armed forces and the unemployed. Full-time homemakers and unpaid caregivers are not included.

Leaching The process by which water washes nutrients and minerals downward from one layer of soil to another, or into streams.

Left-wing A general term to denote antiestablishment political views, specifically used as a label for socialist or communist parties. See COMMUNISM, SOCIALISM.

Legislature The branch of government responsible for enacting laws.

Limestone A sedimentary rock formed under the sea and consisting mainly of calcium carbonate. It is used as a building stone and in the manufacture of cement.

Literacy Usually defined as the ability to read and write a simple sentence.

Low income economy The poorest countries in the world, where the average PER CAPITA income was between $610 and $2,565 in 1990.

Mammal A vertebrate animal belonging to the CLASS Mammalia, having a four-chambered heart, fur or hair, and feeding its young on milk secreted by the mammary (nipples). With the exception of monotremes, mammals do not lay eggs, but give birth to live young.

Mangrove A dense forest of shrubs and trees growing on tidal coastal mudflats and estuaries throughout the tropics.

Maquis The typical vegetation of the Mediterranean coast, consisting of aromatic shrubs, laurel, myrtle, rock rose, broom and small trees such as olive, fig and holm oak.

Maritime climate A generally moist climate, determined mainly by proximity to the sea. The sea heats up and cools down more slowly than the land, reducing variations in temperature so that the local climate is much milder than further inland.

Market economy An economy in which most economic activities are transacted by private individuals and firms in largely unregulated markets.

Marxism The system of thought derived from the 19th-century political theorist Karl Marx, in which politics is interpreted as a struggle between economic CLASSES. It promotes communal ownership of property and its production, is practised, so is popularly known as COMMUNISM.

Mediterranean climate Any climate similar to that of the Mediterranean region: wet winters and hot, dry summers.

Methane A gas produced by decomposing organic matter that burns without releasing pollutants and can be used as an energy source. Excessive methane production from vast amounts of animal manure is believed to contribute to the GREENHOUSE EFFECT.

Migrant workers Part of the LABOR FORCE which has come from another country, or another part of the same country, looking for temporary employment.

Monetarism An economic philosophy that sees inflation as the main cause of economic growth and proposes a direct relationship between the rate of growth of the money supply of a country and its subsequent rate of inflation.

Monsoon (1) The wind systems in the TROPICS that reverse their direction according to the seasons, when they blow onshore they bring heavy rainfall. (2) The rain caused by these winds.

Montane The zone at middle altitudes on the slopes of mountains, below the ALPINE zone.

Nation A community that believes it consists of a single people, united culturally and geographically, and sharing a common territory. Sometimes used interchangeably with STATE.

Nationalism An ideology that assumes all NATIONS should have their own STATE, a NATION-STATE, in their own territory, the national homeland.

Nation-State A STATE in which the inhabitants all belong to one NATION. Most states claim to be nation-states; in practice almost all of them include minority groups.

Natural gas A Fossil FUEL in the form of a flammable gas that occurs naturally in the Earth. It is often found in association with deposits of petroleum.

Natural resources RESOURCES created by the Earth's natural processes including mineral deposits, FOSSIL FUELS, soil, air, water, plants and animals. Most natural resources are harvested by people for use in agriculture, industry and economic activities.

National selection The process by which organisms not well suited to their ENVIRONMENT are eliminated by predation, parasitism, competition, etc. In this way, those that are left are better able to breed and pass on their genes to the next generation.

Nomad A member of (usually pastoral) people that move seasonally from one place to another in search of food, water or pasture for their animals. See PASTORALIST.

Nonrenewable resource A NATURAL RESOURCE that is present in the Earth's makeup in finite amounts (coal, oil etc) and cannot be replaced once reserves are exhausted.

OECD (Organization for Economic Cooperation and Development) An organization set up in 1961 to promote the economic growth of its (now 24) rich member countries.

One-party system A political system in which there is no competition to the government PARTY at elections (eg communist and military regimes) and all but the government party is banned.

OPEC The Organization of Petroleum Exporting Countries, a cartel that represents the interests of 11 of the chief petroleum exporting countries. It is able to exercise a degree of control over the price of the product.

Ozone layer A band of enriched oxygen or ozone found in the upper atmosphere. It absorbs harmful ultraviolet radiation from the Sun. This heat creates a cap for the earth's weather systems.

Pangaea The supercontinent that was composed of all the present-day continents and therefore included both Gondwanaland and Laurasia. It existed between 250 and 280 million years ago. See also CONTINENTAL DRIFT.

Parasite An organism that lives on or in another organism of a different SPECIES and derives nutrients from it, giving nothing beneficial in return.

Parliamentary democracy A political system in which the LEGISLATURE (parliament) is elected by all the adult members of the population and the government is formed by the PARTY that commands a majority in the parliament.

Party An organized group seeking political power to implement an agreed set of policies.

Pastoralist A person following a way of life based on tending herds of animals such as sheep, cattle, goats or camels; often NOMADIC, it involves moving the herds according to the natural availability of pasture and water.

Peat Soil formed by an accumulation of plant material incompletely decomposed due to low temperature and lack of oxygen, usually as a result of WATERLOGGING.

Per capita Per head.

Permafrost Soil and rock that remains permanently frozen, typically in the POLAR regions. A layer of soil at the surface may melt in summer, but the water that is released is unable to drain away through frozen subsoil and refreezes in colder conditions.

Pesticide Any chemical substance used to control the pests that can damage crops, such as insects and rodents. Often used as a general term for herbicides, insecticides and fungicides.
GLOSSARY

pH A measurement on the scale 0-14 of the acidity or alkalinity of a substance.
Plateau A large area of level, elevated land. When bordered by steep slopes it is called a tableland.

Polar regions The regions that lie within the lines of latitude known as the ARCTIC and Antarctic circles, respectively 66°30' north and south of the Equator. At this latitude the sun does not set in midsummer nor rise in midwinter.

Polder An area of level land at or below sea level obtained by land reclamation. It is normally used for agriculture.

Poverty line A measure of deprivation that varies from country to country. In LOW-INCOME ECONOMIES the poverty referred to is an absolute poverty, where a certain percentage of the population lacks sufficient food to eat and resources to provide for shelter. In the advanced industrial world people are often considered to be in poverty if they earn less than 60 percent of the average wage. Their basic needs will be met by local welfare systems but they suffer poverty relative to their compatriots.

Prairie The flat grassland in the interior of North America between 30°N and 55°N, much of which has been plowed and is used to grow cereal crops.

Precipitation Moisture that reaches the Earth from the ATMOSPHERE, including mist, dew, rain, sleet, snow and hail.

Predator An animal that feeds on another animal (the PREY).

President A head of state, elected in some countries directly by the people and in others by members of the LEGISLATURE. In some political systems the president is chief executive, in others the office is largely ceremonial.

Prey An animal that a PREDATOR hunts and kills for food.

Productivity (1) A measure of economic output in relation to the quantity of economic inputs (labor, machines, land, etc) needed for production. (2) The amount of weight (or energy) gained by an individual, a SPECIES or an ECOSYSTEM per unit of area per unit of time.

Quota A limit imposed on the amount of a product that can be imported in a given time.

Radioactivity The emission of alpha-, beta-, and gamma particles from atomic nuclei. This is greatest when the atom is split, as in a nuclear reactor. Prolonged exposure to radioactive material can cause damage to living tissue, leading to cancers and ultimately death.

Rainforest Forest where there is abundant rainfall all year round and no dry season. The term is often associated with tropical rainforests, where growth is lush and very rapid, but there are also rainforests in TEMPERATE ZONES. Rainforests probably contain half of all the Earth's plant and animal species.

Refuge A place where a SPECIES of plant or animal has survived after formerly occupying a much larger area. For example, mountain tops are refuges for ARCTIC SPECIES left behind as the GLACIERS retreated at the end of the last ICE AGE.

Resource Any material, source of information or skill that is of economic value to industry and business.

Roman empire An EMPIRE founded in the year 27 BC from the Roman Republic, which began about 509 BC in present-day Italy. At its height it controlled the Mediterranean, large parts of western Europe and the Middle East. In the 5th century it divided, the eastern half becoming the Byzantine empire.

Runoff Water produced by rainfall or melting snow that flows across the land surface into streams and rivers. Delayed runoff is water that soaks into the ground and later emerges on the surface as springs.

Salinization The accumulation of soluble salts near or at the surface of soil, caused by an arid climate. Salinization can also occur when water used for irrigation evaporates; eventually the land becomes so salty that it is worthless for cultivation.

Savanna A HABITAT of open grassland with scattered trees in tropical and subtropical areas. There is a marked dry season and too little rain to support large areas of forest.

Second World A term sometimes used to describe the developed socialist countries (including the former Soviet Union and former Soviet bloc).

Semiarid land Any area between an ARID desert and a more fertile region where there is sufficient moisture to support a little more vegetation than can survive in the DESERT. Also called semidesert.

Separatism A political movement in a state that supports the secession of a particular minority group, within the territory, from that state.

Service industries Industries that supply services to customers or to other sectors of the economy; typically banking, transport, insurance, education, healthcare, retailing and distribution.

Shanty town An area of very poor housing consisting of ramshackle huts and other simple dwellings often made from waste materials and with inadequate services.

Shifting cultivation A method of farming prevalent in tropical areas in which a piece of land is cleared and cultivated until its fertility is diminished. The farmer then abandons the land, which restores itself naturally.

Slash-and-burn farming A method of farming in tropical areas where the vegetation cover is cut and burned to fertilize the land before crops are planted. Often a feature of SHIFTING CULTIVATION.

Socialism An economic system and political ideology based upon the principle of equality between people, the redistribution of wealth and property and equal access to benefits such as healthcare and education.

Softwood The wood from coniferous trees.

Solar energy The radiant energy produced by the Sun that powers all the Earth's natural processes. It can be captured and used to provide domestic heating or converted to produce electrical energy.

Specialization (in natural history) The evolutionary development of a SPECIES, leading to narrow limits of tolerance and a restricted role (or niche) in the community.

Species The basic unit of CLASSIFICATION of plants and animals. Species are grouped into GENUS and variations may be categorized into SUBSPECIES in descending order of hierarchy.

State The primary political unit of the modern world, usually defined by its possession of sovereignty over a territory and its people.

Steppe An open grassy plain with few trees or shrubs. Steppe is characterized by low and sporadic rainfall, and experiences wide variations in temperature during the year.

Subsistence A term applied to systems in which producers can supply their own needs for food, shelter, etc but have little or no surplus to trade.

Subspecies A rank in the CLASSIFICATION of plants and animals between SPECIES and variety. It is often used to denote a geographical variation of a species.

Subtropical The climatic zone between the TROPICS and TEMPERATE ZONES. There are marked seasonal changes of temperature but it is never very cold.

Succession The development and maturation of an ECOSYSTEM through changes in the types and abundance of SPECIES. When it reaches maturity it stabilizes in a climax.

Sustainability The concept of using the Earth's NATURAL RESOURCES to improve people's lives without diminishing the ability of the Earth to support life today and in the future.

Tableland See PLATEAU.

Taiga The Russian name given to the CONIFEROUS FOREST and PEATLAND belt that stretches around the world in the northern hemisphere, south of the TUNDRA and north of the DECIDUOUS forests and grasslands.

Tariff A tax imposed on imported goods or services.

Taxonomy The scientific classification of organisms.

Temperate zone Any one of the climatic zones in which there are winters and summers, and which extends to latitudes below the tropics and the farthest parts of the polar regions.

Terrestrial (of a plant, animal etc) spending its entire life cycle on the land.

Third World A term first used to refer to ex-COLONIES that were neither fully capitalist (FIRST WORLD) nor fully socialist (SECOND WORLD). Now used to refer to the poorer, less industrialized countries of the developing world.

Tribe A group of people united by a common language, religion, customs and/or descent and kinship; often used to describe the social groups of peoples who have no developed STATE or government and whose social organization is based on ancestry and extended family systems.

Tropics The area of the Earth lying between the Tropic of Cancer (23°30' N) and the Tropic of Capricorn (23°30' S). They mark the lines of latitude farthest from the Equator where the Sun is still found directly overhead at midday in midsummer.

Tundra The level, treeless land lying in the very cold northern regions of Europe, Asia and North America, where winters are long and cold and the ground beneath the surface is permanently frozen. See also PERMAFROST.

Upper-middle-income economy Any country where average per capita income was between $2,566 and $7,619 in 1990.

Urbanization (1) The process by which the proportion of a country's population living in towns or cities grows, while the rural population diminishes. (2) The process of city formation and growth.

Water table The uppermost level of underground rock that is permanently saturated with GROUNDWATER.

Waterlogging The complete saturation of land by water.

Watershed The boundary line dividing two river systems. It is also known as a water-parting or divide, particularly in the United States, where the word watershed refers to a river basin (the area drained by a river and its tributaries).

Welfare State A social and economic system based on STATE provision of, and responsibility for, such things as healthcare, pensions and unemployment benefit. These services are financed by general contributions from the working population, and access is intended to be equally available to all, free of charge. It originated in Britain at the start of the 20th century and became widespread in Europe after World War II.

Wetlands A HABITAT that is waterlogged all or enough of the time to support vegetation adapted to these conditions.
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