



# Dictionary of Geographical terms

## Using the Dictionary

**Geographical terms** in the dictionary are arranged alphabetically. **Bold** words in an entry identify key terms which are explained in greater detail within separate entries of their own. Important terms which do not have separate entries are shown in *italic* and are explained in the entry in which they occur.

### A

**abrasion** The wearing away of the landscape by rivers, **glaciers**, the sea or wind, caused by the load of debris that they carry. *See also* **corrasion**.

**abrasion platform** *See* **wave-cut platform**.

**accuracy** A measure of the degree of correctness.

**acid rain** Rain that contains a high concentration of pollutants, notably sulphur and nitrogen oxides. These pollutants are produced from factories, power stations burning **fossil fuels**, and car exhausts. Once in the **atmosphere**, the sulphur and nitrogen oxides combine with moisture to give sulphuric and nitric acids which fall as corrosive rain.

**administrative region** An area in which organizations carry out administrative functions; for example, the regions of local health authorities and water companies, and commercial sales regions.

**adult literacy rate** A percentage measure which shows the proportion of an adult population able to read. It is one of the measures used to assess the level of development of a country.

**aerial photograph** A photograph taken from above the ground. There are two types of aerial photograph – a vertical photograph (or ‘bird’s-eye view’) and an oblique photograph where the camera is held at an angle. Aerial photographs are often taken from aircraft and provide useful information for map-making and surveys.

*Compare* **satellite image**.

**afforestation** The conversion of open land to forest; especially, in Britain, the planting of coniferous trees in upland areas for commercial gain. *Compare* **deforestation**.

**agglomerate** A mass of coarse rock fragments or blocks of lava produced during a volcanic eruption.

**agribusiness** Modern **intensive farming** which uses machinery and artificial fertilizers to increase **yield** and output.

Thus agriculture resembles an industrial process in which the general running and managing of the farm could parallel that of large-scale industry.

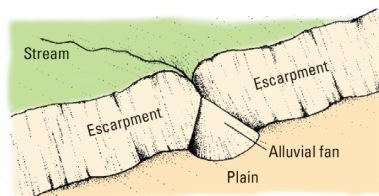
**agriculture** Human management of the **environment** to produce food. The numerous forms of agriculture fall into three groups:

**commercial agriculture**, **subsistence agriculture** and **peasant agriculture**. *See also* **agribusiness**.

**aid** The provision of finance, personnel and equipment for furthering economic development and improving standards of living in the **Third World**. Most aid is organized by international institutions (e.g. the United Nations), by charities (e.g. Oxfam) (*see* **non-governmental organizations** (NGOs); or by national governments. Aid to a country from the international institutions is called **multilateral aid**. Aid from one country to another is called **bilateral aid**.

**air mass** A large body of air with generally the same temperature and moisture conditions throughout. Warm or cold and moist air masses usually develop over large bodies of water (**oceans**). Hot or cold and dry air masses develop over large land areas (**continents**).

**alluvial fan** A cone of **sediment** deposited at an abrupt change of slope; for example, where a post-glacial stream meets the flat floor of a **U-shaped valley**. Alluvial fans are also common in arid regions where streams flowing off **escarpments** may periodically carry large loads of sediment during **flash floods**.



*alluvial fan*

**alluvium** Material deposited by a river in its middle and lower course. Alluvium comprises **silt**, sand and coarser debris eroded from the river's upper course and transported downstream. Alluvium is deposited in a graded sequence: coarsest first (heaviest) and finest last (lightest). Regular floods in the lower course create extensive layers of alluvium which can build up to a considerable depth on the **flood plain**.

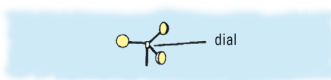
**alp** A gentle slope above the steep sides of a glaciated valley, often used for summer grazing. *See also* **transhumance**.



*alp*

**analysis** The examination of the constituent parts of a complex entity.

**anemometer** An instrument for measuring the velocity of the wind. An anemometer should be fixed on a post at least 5m above ground level. The wind blows the cups around and the speed is read off the dial in km/hr (or knots).



*anemometer*

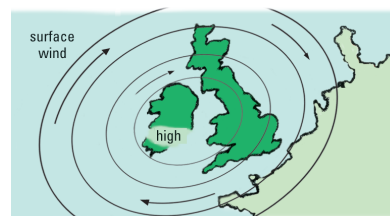
**annotation** Labels in the form of text or graphics that can be individually selected, positioned or stored in a database.

**antarctic circle** Imaginary line that encircles the South Pole at **latitude** 66° 32'S.

**anthracite** A hard form of **coal** with a high carbon content and few impurities.

**anticline** An arch in folded **strata**; the opposite of **syncline**. *See* **fold**.

**anticyclone** An area of high atmospheric pressure with light winds, clear skies and settled **weather**. In summer, anticyclones are associated with warm and sunny conditions; in winter, they bring frost and fog as well as sunshine.



*anticyclone*

**API (application programming interface)** A set of interfaces, methods, procedures and tools used to build or customise a software program.

**aquifer** *See* **artesian basin**.

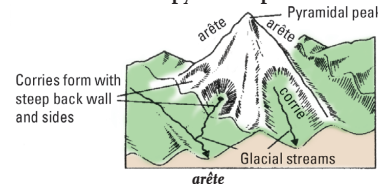
**arable farming** The production of cereal and root crops – as opposed to the keeping of livestock.

**arc** A coverage feature class representing lines and polygon boundaries.

**archipelago** A group or chain of islands.

**arctic circle** Imaginary line that encircles the North Pole at **latitude** 66° 32'N.

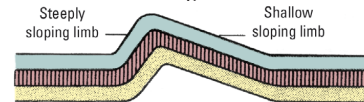
**arête** A knife-edged ridge separating two **corries** in a glaciated upland. The arête is formed by the progressive enlargement of corries by **weathering** and **erosion**. *See also* **pyramidal peak**.



*arête*

**artesian basin** This consists of a shallow **syncline** with a layer of **permeable rock**, e.g. chalk, sandwiched between two impermeable layers, e.g. clay. Where the permeable rock is exposed at the surface, rainwater will enter the rock and the rock will become saturated. This is known as an **aquifer**. Boreholes can be sunk into the structure to tap the water in the aquifer.

**asymmetrical fold** Folded **strata** where the two limbs are at different angles to the horizontal.



*asymmetrical fold*

**atlas** A collection of maps.

**atmosphere** The air which surrounds the Earth, and consists of three layers: the **troposphere** (6 to 10km from the Earth's surface), the **stratosphere** (50km from the Earth's surface), and the **mesosphere** and **ionosphere**, an ionised region of rarefied gases (1000km from the Earth's surface). The atmosphere comprises oxygen (21%), nitrogen (78%), carbon dioxide, argon, helium and other gases in minute quantities.

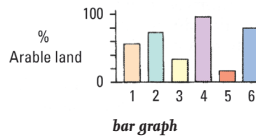
**attrition** The process by which a river's load is

eroded through particles, such as pebbles and boulders, striking each other.

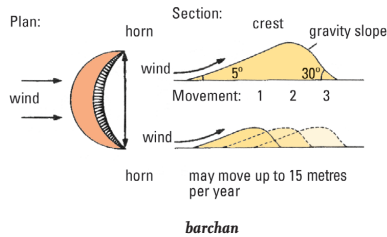
## B

**backwash** The return movement of seawater off the beach after a wave has broken. See also **longshore drift** and **swash**.

**bar graph** A graph on which the values of a certain variable are shown by the length of shaded columns, which are numbered in sequence. Compare **histogram**.



**barchan** A type of crescent-shaped sand dune formed in desert regions where the wind direction is very constant. Wind blowing round the edges of the dune causes the crescent shape, while the dune may advance in a downwind direction as particles are blown over the crest.



**barograph** An aneroid **barometer** connected to an arm and inked pen which records pressure changes continuously on a rotating drum. The drum usually takes a week to make one rotation.

**barometer** An instrument for measuring atmospheric pressure. There are two types, the **mercury barometer** and the **aneroid barometer**. The mercury barometer consists of a glass tube containing mercury which fluctuates in height as pressure varies. The aneroid barometer is a small metal box from which some of the air has been removed. The box expands and contracts as the air pressure changes. A series of levers joined to a pointer shows pressure on a dial.

**barrage** A type of dam built across a wide stretch of water, e.g. an estuary, for the purposes of water management. Such a dam may be intended to provide water supply, to harness wave energy or to control flooding, etc. There is a large barrage across Cardiff Bay in South Wales.

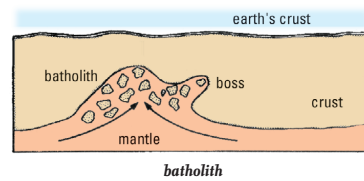
**basalt** A dark, fine-grained extrusive **igneous rock** formed when **magma** emerges onto the Earth's surface and cools rapidly. A succession of basalt **lava flows** may lead to the formation of a **lava plateau**.

**base flow** The water flowing in a stream which is fed only by **groundwater**. During dry periods it is only the base flow which passes through the stream channel.

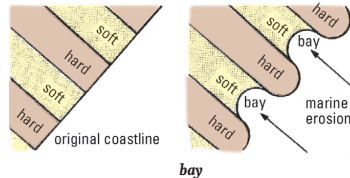
**base map** Map on which thematic information can be placed.

**batholith** A large body of igneous material intruded into the Earth's **crust**. As the batholith slowly cools, large-grained **rocks** such as **granite** are formed.

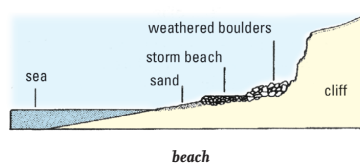
Batholiths may eventually be exposed at the Earth's surface by the removal of overlying rocks through **weathering** and **erosion**.



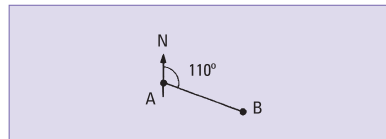
**bay** An indentation in the coastline with a **headland** on either side. Its formation is due to the more rapid **erosion** of softer rocks



**beach** A strip of land sloping gently towards the sea, usually recognized as the area lying between high and low tide marks.



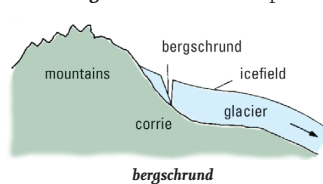
**bearing** A compass reading between 0 and 360 degrees, indicating direction of one location from another.



**Beaufort wind scale** An international scale of wind velocities, ranging from 0 (calm) to 12 (hurricane).

**bedrock** The solid rock which usually lies beneath the soil.

**bergschrand** A large **crevasse** located at the rear of a **corrie** icefield in a glaciated region, formed by the weight of the ice in the corrie dragging away from the rear wall as the **glacier** moves downslope.



**biodiversity** The existence of a wide variety of plant and animal species in their natural environment.

**biogas** The production of methane and carbon dioxide, which can be obtained from plant or crop waste. Biogas is an example of a renewable source of energy (see **renewable resources**, **nonrenewable resources**).

**biomass** The total number of living organisms, both plant and animal, in a given area.

**biome** A complex community of plants and animals in a specific physical and climatic region. See **climate**.

**biosphere** The part of the Earth which contains living organisms. The biosphere contains a variety

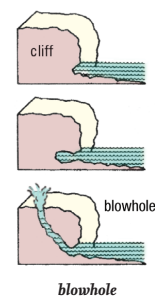
of **habitats**, from the highest mountains to the deepest oceans.

**birth rate** The number of live births per 1000 people in a population per year.

**bituminous coal** Sometimes called house coal – a medium-quality **coal** with some impurities; the typical domestic coal. It is also the major fuel source for **thermal power stations**.

**block mountain** or **horst** A section of the Earth's **crust** uplifted by faulting. Mt Ruwenzori in the East African Rift System is an example of a block mountain.

**blowhole** A crevice, **joint** or **fault** in coastal rocks, enlarged by marine **erosion**. A blowhole often leads from the rear of a cave (formed by wave action at the foot of a **cliff**) up to the cliff top. As waves break in the cave they erode the roof at the point of weakness and eventually a hole is formed. Air and sometimes spray are forced up the blowhole to erupt at the surface.

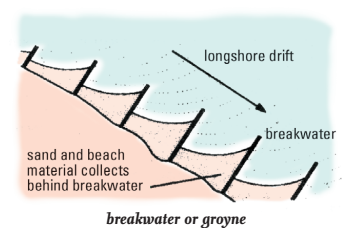


**bluff** See **river cliff**.

**boreal forest** See **taiga**.

**boulder clay** or **till** The unsorted mass of debris dragged along by a **glacier** as **ground moraine** and dumped as the glacier melts. Boulder clay may be several metres thick and may comprise any combination of finely ground 'rock flour', sand, pebbles or boulders.

**breakwater** or **groyne** A wall built at right angles to a beach in order to prevent sand loss due to **longshore drift**.



**breccia** Rock fragments cemented together by a matrix of finer material; the fragments are angular and unsorted. An example of this is volcanic breccia, which is made up of coarse angular fragments of **lava** and **crust** rocks welded by finer material such as ash and **tuff**.

**buffers** Memory devices for temporarily storing data.

**bush fallowing** or **shifting cultivation**

A system of **agriculture** in which there are no permanent fields. For example in the **tropical rainforest**, remote societies cultivate forest clearings for one year and then move on. The system functions successfully when forest **regeneration** occurs over a sufficiently long period to allow the soil to regain its fertility.

**bushfire** An uncontrolled fire in forests and grasslands.

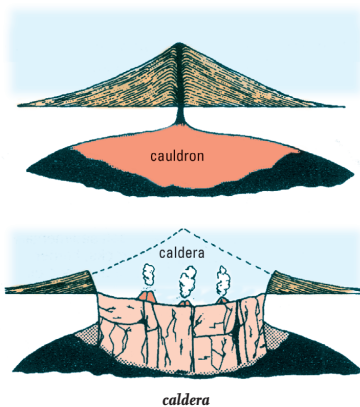
**business park** An out-of-town site accommodating offices, high-technology companies and light industry. *Compare science park.*

**butte** An outlier of a **mesa** in arid regions.

## C

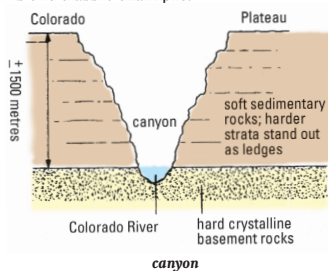
**cache** A small high-speed memory that improves computer performance.

**caldera** A large crater formed by the collapse of the summit cone of a **volcano** during an eruption. The caldera may contain subsidiary cones built up by subsequent eruptions, or a crater lake if the volcano is extinct or dormant.



**canal** An artificial waterway, usually connecting existing **rivers**, **lakes** or **oceans**, constructed for navigation and transportation.

**canyon** A deep and steep-sided river valley occurring where rapid vertical **corrosion** takes place in arid regions. In such an **environment** the rate of **weathering** of the valley sides is slow. If the **rocks** of the region are relatively soft then the canyon profile becomes even more pronounced. The Grand Canyon of the Colorado River in the USA is the classic example.



**capital city** Seat of government of a country or political unit.

**cartogram** A map showing statistical data in diagrammatic form.

**cartography** The technique of drawing maps or charts.

**catchment** 1. In **physical geography**, an alternative term to **river basin**.

2. In **human geography**, an area around a town or city – hence 'labour catchment' means the area from which an urban workforce is drawn.

**cavern** In **limestone** country, a large underground cave formed by the dissolving of limestone by subterranean streams.

*See also stalactite, stalagmite.*

**cay** A small low **island** or bank composed of sand and coral fragments. Commonly found in the Caribbean Sea.

**CBD (Central Business District)** This is the central zone of a town or city, and is characterized by high accessibility, high land values and limited space. The visible result of these factors is a concentration of high-rise buildings at the city centre. The CBD is dominated by retail and business functions, both of which require maximum accessibility.

**CFCs (Chlorofluorocarbons)** Chemicals used in the manufacture of some aerosols, the cooling systems of refrigerators and fast-food cartons. These chemicals are harmful to the **ozone** layer.

**chalk** A soft, whitish **sedimentary rock** formed by the accumulation of small fragments of skeletal matter from marine organisms; the rock may be almost pure calcium carbonate. Due to the **permeable** and soluble nature of the rock, there is little surface **drainage** in chalk landscapes.

**channel** *See strait.*

**chernozem** A deep, rich soil of the plains of southern Russia. The upper **horizons** are rich in lime and other plant nutrients; in the dry **climate** the predominant movement of **soil** moisture is upwards (*contrast with leaching*), and lime and other chemical nutrients therefore accumulate in the upper part of the **soil profile**.

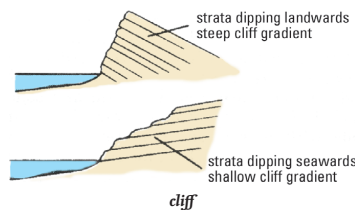
**chloropleth map** *See shading map.*

**choropleth** A symbol or marked area on a map which denotes the distribution of some property.

**cirrus** High, wispy or strand-like, thin **cloud** associated with the advance of a **depression**.

**clay** A soil composed of very small particles of **sediment**, less than 0.002 mm in diameter. Due to the dense packing of these minute particles, clay is almost totally impermeable, i.e. it does not allow water to drain through. Clay soils very rapidly waterlog in wet weather.

**cliff** A steep rockface between land and sea, the profile of which is determined largely by the nature of the coastal rocks. For example, resistant rocks such as **granite** (e.g. at Land's End, England) will produce steep and rugged cliffs.

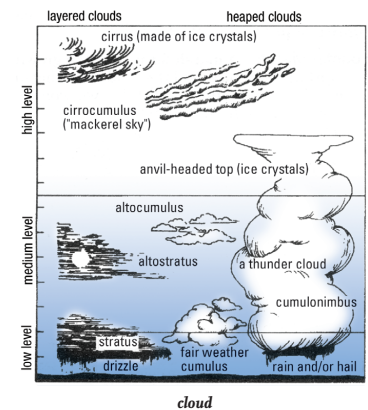


**climate** The average atmospheric conditions prevailing in a region, as distinct from its **weather**. A statement of climate is concerned with long-term trends. Thus the climate of, for example, the Amazon Basin is described as hot and wet all the year round; that of the Mediterranean Region as having hot dry summers and mild wet winters. *See extreme climate, maritime climate.*

**clint** A block of **limestone**, especially when part of a **limestone pavement**, where the surface is composed of clints and **grykes**.

**cloud** A mass of small water drops or ice crystals formed by the **condensation** of water vapour in the

**atmosphere**, usually at a considerable height above the Earth's surface. There are three main types of cloud: **cumulus**, **stratus** and **cirrus**, each of which has many variations.



**CMYK** A colour model that combines cyan, magenta, yellow and black to create a range of colours.

**coal** A **sedimentary rock** composed of decayed and compressed vegetative matter. Coal is usually classified according to a scale of hardness and purity ranging from **anthracite** (the hardest), through **bituminous coal** and **lignite** to **peat**.

**cold front** *See depression.*

**commercial agriculture** A system of **agriculture** in which food and materials are produced specifically for sale in the market, in contrast to **subsistence agriculture**. Commercial agriculture tends to be capital intensive. *See also agribusiness.*

**Common Agricultural Policy (CAP)**

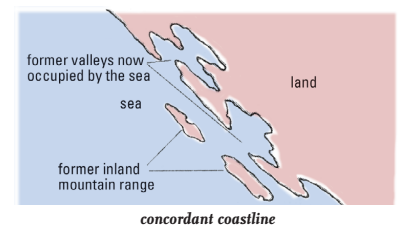
The policy of the European Union to support and subsidize certain crops and methods of animal husbandry.

**common land** Land which is not in the ownership of an individual or institution, but which is historically available to any member of the local community.

**communications** The contacts and linkages in an **environment**. For example, roads and railways are communications, as are telephone systems, newspapers, and radio and television.

**commuter zone** An area on or near to the outskirts of an urban area. Commuters are among the most affluent and mobile members of the urban community and can afford the greatest physical separation of home and work.

**concordant coastline** A coastline that is parallel to mountain ranges immediately inland. A rise in sea level or a sinking of the land cause the valleys to be flooded by the sea and the mountains to become a line of islands. *Compare discordant coastline.*



**condensation** The process by which cooling vapour turns into a liquid. **Clouds**, for example, are formed by the condensation of water vapour

in the **atmosphere**.

**coniferous forest** A forest of **evergreen** trees such as pine, spruce and fir. Natural coniferous forests occur considerably further north than forests of broad-leaved **deciduous** species, as coniferous trees are able to withstand harsher climatic conditions. The **taiga** areas of the northern hemisphere consist of coniferous forests.

**conservation** The preservation and management of the natural **environment**. In its strictest form, conservation may mean total protection of endangered species and habitats, as in nature reserves. In some cases, conservation of the man-made environment, e.g. ancient buildings, is undertaken.

**continent** One of the earth's large land masses. The world's continents are generally defined as Asia, Africa, North America, South America, Europe, Oceania and Antarctica.

**continental climate** The climate at the centre of large landmasses, typified by a large annual range in temperature, with precipitation most likely in the summer.

**continental drift** The theory that the Earth's continents move gradually over a layer of semi-molten rock underneath the Earth's **crust**. It is thought that the present-day continents once formed the supercontinent, **Pangaea**, which existed approximately 200 million years ago. *See also* **Gondwanaland**, **Laurasia** and **plate tectonics**.

**continental shelf** The seabed bordering the continents, which is covered by shallow water – usually of less than 200 metres. Along some coastlines the continental shelf is so narrow it is almost absent.

**contour** A line drawn on a map to join all places at the same height above sea level.

**conurbation** A continuous built-up urban area formed by the merging of several formerly separate towns or cities. Twentieth-century **urban sprawl** has led to the merging of towns.

**coombe** *See* **dry valley**.

**cooperative** A system whereby individuals pool their **resources** in order to optimize individual gains.

**coordinates** A set of numbers that defines the location of a point with reference to a system of axes.

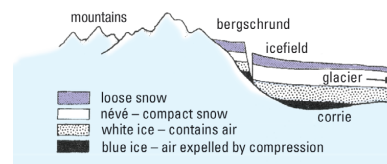
**core** 1. In **physical geography**, the core is the innermost zone of the Earth. It is probably solid at the centre, and composed of iron and nickel.

2. In **human geography**, a central place or central region, usually the centre of economic and political activity in a region or nation.

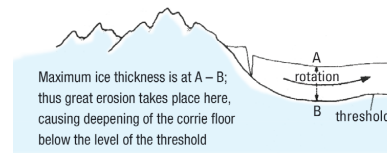
**corrasion** The abrasive action of an agent of **erosion** (rivers, ice, the sea) caused by its load. For example the pebbles and boulders carried along by a river wear away the channel bed and the river bank. *Compare* with **hydraulic action**.

**corrie, cirque or cwm** A bowl-shaped hollow on a mountainside in a glaciated region; the area where a valley **glacier** originates. In glacial times the corrie contained an icefield, which in cross section appears as in diagram *a* above. The shape of the corrie is determined by the rotational erosive force of ice as the glacier moves downslope

(diagram *b*).



(a) A corrie in glacial times.

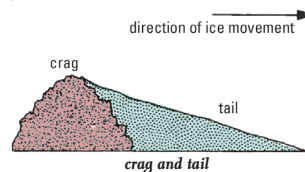


(b) Erosion of a corrie.

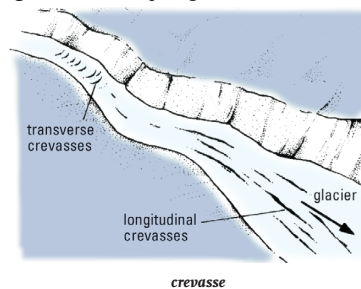
**corrosion** Erosion by solution action, such as the dissolving of **limestone** by running water.

**crag** Rocky outcrop on a valley side formed, for example, when a **truncated spur** exists in a glaciated valley.

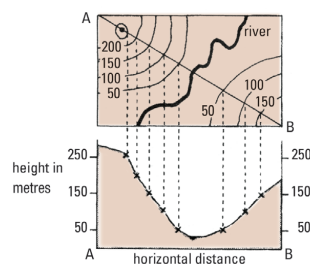
**crag and tail** A feature of lowland **glaciation**, where a resistant rock outcrop withstands **erosion** by a **glacier** and remains as a feature after the **Ice Age**. Rocks of volcanic or metamorphic origin are likely to produce such a feature. As the ice advances over the crag, material will be eroded from the face and sides and will be deposited as a mass of boulder clay and debris on the leeward side, thus producing a 'tail'.



**crevasse** A crack or fissure in a **glacier** resulting from the stressing and fracturing of ice at a change in **gradient** or valley shape.



**cross section** A drawing of a vertical section of a line of ground, deduced from a map. It depicts the **topography** of a system of **contours**.



cross section Map and corresponding cross section.

**crust** The outermost layer of the Earth, representing only 0.1% of the Earth's total volume. It comprises continental crust and oceanic crust, which differ from each other in age as well as in

physical and chemical characteristics. The crust, together with the uppermost layer of the **mantle**, is also known as the **lithosphere**.

**culvert** An artificial drainage channel for transporting water quickly from place to place.

**cumulonimbus** A heavy, dark **cloud** of great vertical height. It is the typical thunderstorm cloud, producing heavy showers of rain, snow or hail. Such clouds form where intense solar radiation causes vigorous convection.

**cumulus** A large **cloud** (smaller than a **cumulonimbus**) with a 'cauliflower' head and almost horizontal base. It is indicative of fair or, at worst, showery **weather** in generally sunny conditions.

**cut-off** *See* **oxbow lake**.

**cyclone** *See* **hurricane**.

## D

**dairying** A **pastoral farming** system in which dairy cows produce milk that is used by itself or used to produce dairy products such as cheese, butter, cream and yoghurt.

**dam** A barrier built across a stream, river or **estuary** to create a body of water.

**data** A series of observations, measurements or facts which can be operated on by a computer programme.

**data capture** Any process for converting information into a form that can be handled by a computer.

**database** A large store of information. A GIS database includes data about spatial locations and shapes of geographical features.

**datum** A single piece of information.

**death rate** The number of deaths per 1000 people in a population per year.

**deciduous woodland** Trees which are generally of broad-leaved rather than **coniferous** habit, and which shed their leaves during the cold season.

**deflation** The removal of loose sand by wind **erosion** in desert regions. It often exposes a bare rock surface beneath.

**deforestation** The practice of clearing trees.

Much deforestation is a result of development pressures, e.g. trees are cut down to provide land for agriculture and industry. *Compare* **afforestation**.

**delta** A fan-shaped mass consisting of the deposited load of a river where it enters the sea. A delta only forms where the river deposits material at a faster rate than can be removed by coastal currents. While deltas may take almost any shape and size, three types are generally recognized, as shown in the diagram overleaf.

**DEM (Digital elevation model)**

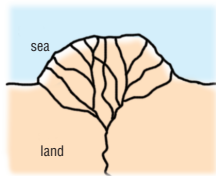
Representation of the relief of a topographic surface.

**denudation** The wearing away of the Earth's surface by the processes of **weathering** and **erosion**.

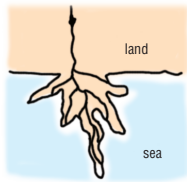
**depopulation** A long-term decrease in the population of any given area, frequently caused by economic migration to other areas.

**deposition** The laying down of **sediments** resulting from **denudation**.

Arcuate delta, e.g. Nile. Note bifurcation of river into distributaries in delta



Bird's foot delta, e.g. Mississippi

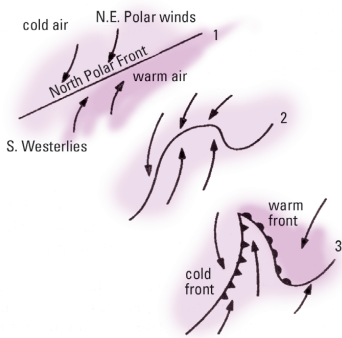


Estuarine delta, e.g. Amazon

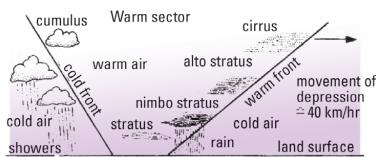


delta

**depression** An area of low atmospheric pressure occurring where warm and cold air masses come into contact. The passage of a depression is marked by thickening cloud, rain, a period of dull and drizzly weather and then clearing skies with showers. A depression develops as in the diagrams below.



depression The development of a depression.



**desert** An area where all forms of precipitation are so low that very little, if anything, can grow.

- Deserts can be broadly divided into three types, depending upon average temperatures:
- (a) **hot deserts**: occur in tropical latitudes in regions of high pressure where air is sinking and therefore making rainfall unlikely. See **cloud**.
  - (b) **temperate deserts**: occur in mid-latitudes in areas of high pressure. They are far inland, so moisture-bearing winds rarely deposit rainfall in these areas.
  - (c) **cold deserts**: occur in the northern latitudes, again in areas of high pressure. Very low temperatures throughout the year mean the air is unable to hold much moisture.

**desertification** The encroachment of desert conditions into areas which were once productive. Desertification can be due partly to climatic change, i.e. a move towards a drier climate in some parts of the world (possibly due to **global**

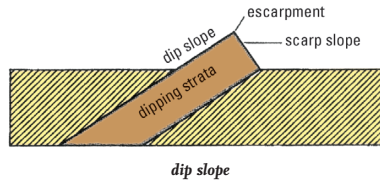
**warming**), though human activity has also played a part through bad farming practices. The problem is particularly acute along the southern margins of the Sahara desert in the Sahel region between Mali and Mauritania in the west, and Ethiopia and Somalia in the east.

**developing countries** A collective term for those nations in Africa, Asia and Latin America which are undergoing the complex processes of modernization, **industrialization** and **urbanization**. See also **Third World**.

**dew point** The temperature at which the atmosphere, being cooled, becomes saturated with water vapour. This vapour is then deposited as drops of dew.

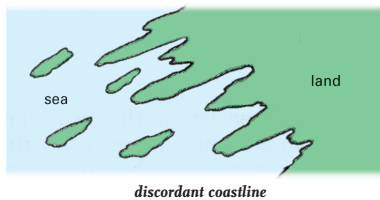
**digitising** Translating into a digital format for computer processing.

**dip slope** The gentler of the two slopes on either side of an escarpment crest; the dip slope inclines in the direction of the dipping strata; the steep slope in front of the crest is the **scarp slope**.



**discharge** The volume of run-off in the channels of a river basin.

**discordant coastline** A coastline that is at right angles to the mountains and valleys immediately inland. A rise in sea level or a sinking of the land will cause the valleys to be flooded. A flooded river valley is known as a **ria**, whilst a flooded glaciated valley is known as a **fjord**. Compare **concordant coastline**.



**distributary** An outlet stream which drains from a larger river or stream. Often found in a **delta** area. Compare **tributary**.

**doldrums** An equatorial belt of low atmospheric pressure where the **trade winds** converge. Winds are light and variable but the strong upward movement of air caused by this convergence produces frequent thunderstorms and heavy rains.

**domain name** That part of an internet address which identifies a group of computers by country or institution.

**dormitory settlement** A village located beyond the edge of a city but inhabited by residents who work in that city (see **commuter zone**).

**drainage** The removal of water from the land surface by processes such as streamflow and infiltration.

**drainage basin** See **river basin**.

**drift** Material transported and deposited by glacial action on the Earth's surface. See also **boulder clay**.

**drought** A prolonged period where rainfall falls below the requirement for a region.

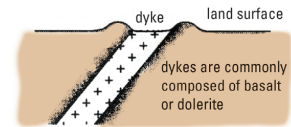
**dry valley** or **coombe** A feature of **limestone** and **chalk** country, where valleys have been eroded in dry landscapes.

**dune** A mound or ridge of drifted sand, occurring on the sea coast and in deserts.

**dyke** 1. An artificial **drainage** channel.

2. An artificial bank built to protect low-lying land from flooding.

3. A vertical or semi-vertical igneous intrusion occurring where a stream of **magma** has extended through a line of weakness in the surrounding **rock**. See **igneous rock**.



Metamorphosed zone: surrounding rocks close to intrusion are 'baked'

**dyke** Cross section of eroded dyke, showing how metamorphic margins, harder than dyke or surrounding rocks, resist erosion.

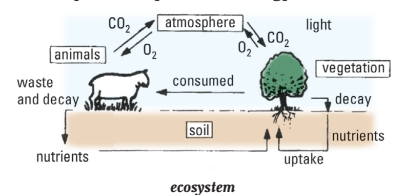
## E

**earthquake** A movement or tremor of the Earth's crust. Earthquakes are associated with plate boundaries (see **plate tectonics**) and especially with subduction zones, where one plate plunges beneath another. Here the crust is subjected to tremendous stress. The rocks are forced to bend, and eventually the stress is so great that the rocks 'snap' along a **fault** line.

**eastings** The first element of a **grid reference**. See **northing**.

**ecology** The study of living things, their interrelationships and their relationships with the **environment**.

**ecosystem** A natural system comprising living organisms and their **environment**. The concept can be applied at the global scale or in the context of a smaller defined environment. The principle of the ecosystem is constant: all elements are intricately linked by flows of energy and nutrients.



**El Niño** The occasional development of warm ocean surface waters along the coast of Ecuador and Peru. Where this warming occurs the tropical Pacific trade winds weaken and the usual up-welling of cold, deep ocean water is reduced. El Niño normally occurs late in the calendar year and lasts for a few weeks to a few months and can have a dramatic impact on weather patterns throughout the world.

**emigration** The movement of population out of a given area or country.

**employment structure** The distribution of the workforce between the **primary**, **secondary**, **tertiary**

and **quaternary sectors** of the economy. Primary employment is in **agriculture**, mining, forestry and fishing; secondary in manufacturing; tertiary in the retail, service and administration category; quaternary in information and expertise.

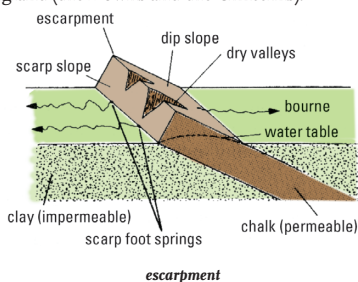
**environment** Physical surroundings: **soil**, vegetation, wildlife and the **atmosphere**.

**equator** The great circle of the Earth with a **latitude** of 0°, lying equidistant from the poles.

**erosion** The wearing away of the Earth's surface by running water (rivers and streams), moving ice (**glaciers**), the sea and the wind. These are called the *agents* of erosion.

**erratic** A boulder of a certain rock type resting on a surface of different geology. For example, blocks of **granite** resting on a surface of carboniferous **limestone**.

**escarpment** A ridge of high ground as, for example, the **chalk** escarpments of southern England (the Downs and the Chilterns).



**esker** A low, winding ridge of pebbles and finer **sediment** on a glaciated lowland.

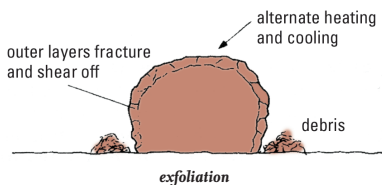
**estuary** The broad mouth of a river where it enters the sea. An estuary forms where opposite conditions to those favourable for **delta** formation exist: deep water offshore, strong marine currents and a smaller **sediment** load.

**ethnic group** A group of people with a common identity such as culture, religion or skin colour.

**evaporation** The process whereby a substance changes from a liquid to a vapour. Heat from the sun evaporates water from seas, lakes, rivers, etc., and this process produces water vapour in the **atmosphere**.

**evergreen** A vegetation type in which leaves are continuously present. Compare **deciduous woodland**.

**exfoliation** A form of **weathering** whereby the outer layers of a **rock** or boulder shear off due to the alternate expansion and contraction produced by diurnal heating and cooling. Such a process is especially active in **desert** regions.



**exports** Goods and services sold to a foreign country (compare **imports**).

**extensive farming** A system of **agriculture** in which relatively small amounts of capital or labour investment are applied to relatively large areas of land. For example, sheep ranching is an extensive

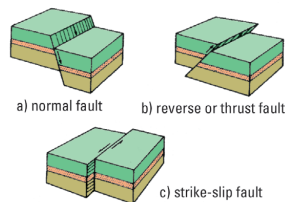
form of farming, and yields per unit area are low.

**external processes** Landscape-forming processes such as **weather** and **erosion**, in contrast to internal processes.

**extreme climate** A climate that is characterized by large ranges of temperature and sometimes of rainfall. Compare **temperate climate**, **maritime climate**.

## F

**fault** A fracture in the Earth's crust on either side of which the **rocks** have been relatively displaced. Faulting occurs in response to stress in the Earth's crust; the release of this stress in fault movement is experienced as an **earthquake**. See also **rift valley**.

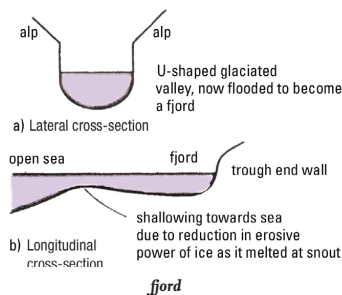


**fault** The main types.

**feature class** A collection of features with the same properties, attributes and spatial reference.

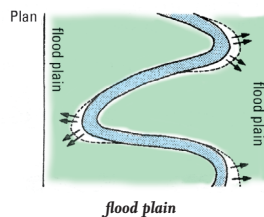
**fell** Upland rough grazing in a **hill farming** system, for example in the English Lake District.

**fjord** A deep, generally straight inlet of the sea along a glaciated coast. A fjord is a glaciated valley which has been submerged either by a post-glacial rise in sea level or a subsidence of the land.

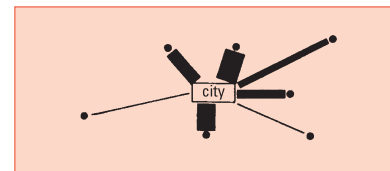


**flash flood** A sudden increase in river **discharge** and overland flow due to a violent rainstorm in the upper **river basin**.

**flood plain** The broad, flat valley floor of the lower course of a river, levelled by annual flooding and by the lateral and downstream movement of **meanders**.



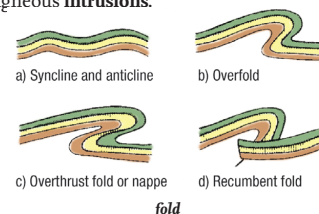
**flow line** A diagram showing volumes of movement, e.g. of people, goods or information between places. The width of the flow line is proportional to the amount of movement, for example in portraying commuter flows into an urban centre from surrounding towns and villages.



**Flow line** Commuter flows into a city.

**fodder crop** A crop grown for animal feed.

**fold** A bending or buckling of once horizontal rock **strata**. Many folds are the result of rocks being crumpled at plate boundaries (see **plate tectonics**), though **earthquakes** can also cause rocks to fold, as can igneous **intrusions**.



**fold mountains** Mountains which have been formed by large-scale and complex folding. Studies of typical fold mountains (the Himalayas, Andes, Alps and Rockies) indicate that folding has taken place deep inside the Earth's **crust** and upper **mantle** as well as in the upper layers of the crust.

**fossil fuel** Any naturally occurring carbon or hydrocarbon fuel, notably coal, oil, peat and natural gas. These fuels have been formed by decomposed prehistoric organisms.

**free trade** The movement of goods and services between countries without any restrictions (such as quotas, tariffs or taxation) being imposed.

**freeze-thaw** A type of physical **weathering** whereby **rocks** are denuded by the freezing of water in cracks and crevices on the rock face. Water expands on freezing, and this process causes stress and fracture along any line of weakness in the rock. **Nivation** debris accumulates at the bottom of a rock face as **scree**.

**front** A boundary between two air masses. See also **depression**.

## G

**gazetteer** A list of place names with their geographical coordinates.

**GDP** See **Gross Domestic Product**.

**geosyncline** A basin (a large **syncline**) in which thick marine sediments have accumulated.

**geothermal energy** A method of producing power from heat contained in the lower layers of the Earth's **crust**. New Zealand and Iceland both use superheated water or steam from geysers and volcanic **springs** to heat buildings and for hothouse cultivation and also to drive steam turbines to generate electricity. Geothermal energy is an example of a renewable resource of energy (see **renewable resources**, **nonrenewable resources**).

**glaciation** A period of cold **climate** during which time **ice sheets** and **glaciers** are the dominant forces of **denudation**.

**glacier** A body of ice occupying a valley and originating in a **corrie** or icefield. A glacier moves at a rate of several metres per day, the precise

speed depending upon climatic and **topographic** conditions in the area in question.

**global warming or greenhouse effect**

The warming of the Earth's atmosphere caused by an excess of carbon dioxide, which acts like a blanket, preventing the natural escape of heat. This situation has been developing over the last 150 years because of (a) the burning of **fossil fuels**, which releases vast amounts of carbon dioxide into the **atmosphere**, and (b) **deforestation**, which results in fewer trees being available to take up carbon dioxide (see **photosynthesis**).

**globalization** The process that enables financial markets and companies to operate internationally (as a result of deregulation and improved communications). **Transnational corporations** now locate their manufacturing in places that best serve their global market at the lowest cost.

**GNI (gross national income) formerly GNP (gross national product)** The total value of the goods and services produced annually by a nation, plus net property income from abroad.

**Gondwanaland** The southern-hemisphere super-continent, consisting of the present South America, Africa, India, Australasia and Antarctica, which split from **Pangaea** c.200 million years ago. Gondwanaland is part of the theory of **continental drift**. See also **plate tectonics**.

**GPS (global positioning system)** A system of earth-orbiting satellites, transmitting signals continuously towards earth, which enable the position of a receiving device on the earth's surface to be accurately estimated from the difference in arrival of the signals.

**gradient** 1. The measure of steepness of a line or slope. In mapwork, the average gradient between two points can be calculated as:

$$\frac{\text{difference in altitude}}{\text{distance apart}}$$

2. The measure of change in a property such as density. In **human geography** gradients are found in, for example, **population density**, land values and **settlement** ranking.

**granite** An **igneous rock** having large crystals due to slow cooling at depth in the Earth's **crust**.

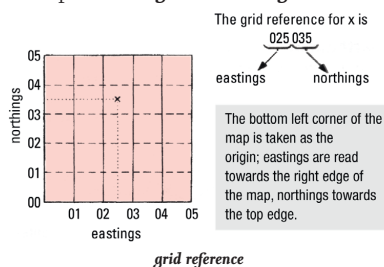
**green belt** An area of land, usually around the outskirts of a town or city on which building and other developments are restricted by legislation.

**greenfield site** A development site for industry, retailing or housing that has previously been used only for agriculture or recreation. Such sites are frequently in the **green belt**.

**greenhouse effect** See **global warming**.

**Greenwich Meridian** See **prime meridian**.

**grid reference** A method for specifying position on a map. See **eastings** and **northings**.



**Gross Domestic Product (GDP)** The total value of all goods and services produced domestically by a nation during a year. It is equivalent to **Gross National Income (GNI)** minus investment incomes from foreign nations.

**groundwater** Water held in the bedrock of a region, having percolated through the **soil** from the surface. Such water is an important **resource** in areas where **surface run-off** is limited or absent.

**groyne** See **breakwater**.

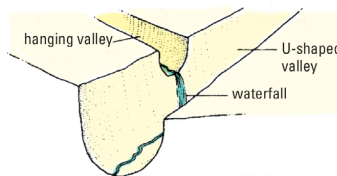
**gryke** An enlarged joint between blocks of **limestone (clints)**, especially in a **limestone pavement**.

**gulf** A large coastal indentation, similar to a **bay** but larger in extent. Commonly formed as a result of rising sea levels.

**H**

**habitat** A preferred location for particular species of plants and animals to live and reproduce.

**hanging valley** A tributary valley entering a main valley at a much higher level because of deepening of the main valley, especially by glacial erosion.



hanging valley

**HDI (human development index)**

A measurement of a country's achievements in three areas: longevity, knowledge and standard of living. Longevity is measured by life expectancy at birth; knowledge is measured by a combination of the adult literacy rate and the combined gross primary, secondary and tertiary school enrolment ratio; standard of living is measured by **GDP** per capita.

**headland** A promontory of resistant **rock** along the coastline. See **bay**.

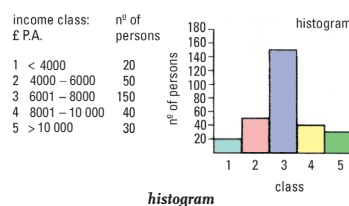
**hemisphere** Any half of a globe or sphere.

The earth has traditionally been divided into hemispheres by the **equator** (northern and southern hemispheres) and by the **prime meridian** and **International Date Line** (eastern and western hemispheres).

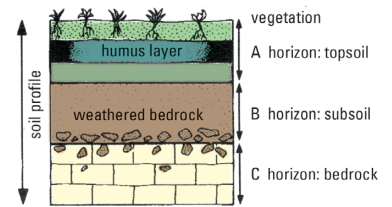
**hill farming** A system of **agriculture** where sheep (and to a lesser extent cattle) are grazed on upland rough pasture.

**hill shading** Shadows drawn on a map to create a 3-dimensional effect and a sense of visual relief.

**histogram** A graph for showing values of classed data as the areas of bars.



**horizon** The distinct layers found in the **soil profile**. Usually three horizons are identified – A, B and C, as in the diagram.



horizon A typical soil profile.

**horst** See **block mountain**.

**horticulture** The growing of plants and flowers for commercial sale. It is now an international trade, for example, orchids are grown in Southeast Asia for sale in Europe.

**human geography** The study of people and their activities in terms of patterns and processes of population, **settlement**, economic activity and **communications**. Compare **physical geography**.

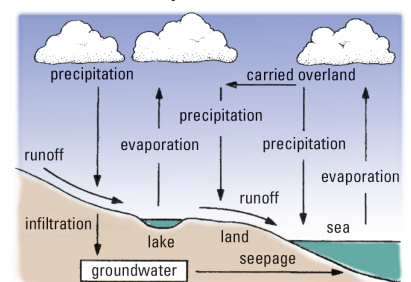
**hunter/gatherer economy** A pre-agricultural phase of development in which people survive by hunting and gathering the animal and plant **resources** of the natural **environment**. No cultivation or herding is involved.

**hurricane, cyclone or typhoon** A wind of force 12 on the **Beaufort wind scale**, i.e. one having a velocity of more than 118 km per hour. Hurricanes can cause great damage by wind as well as from the storm waves and floods that accompany them.

**hydraulic action** The erosive force of water alone, as distinct from **corrosion**. A river or the sea will erode partially by the sheer force of moving water and this is termed 'hydraulic action'.

**hydroelectric power** The generation of electricity by turbines driven by flowing water. Hydroelectricity is most efficiently generated in rugged **topography** where a head of water can most easily be created, or on a large river where a dam can create similar conditions. Whatever the location, the principle remains the same – that water descending via conduits from an upper storage area passes through turbines and thus creates electricity.

**hydrological cycle** The cycling of water through sea, land and **atmosphere**.



hydrological cycle

**hydrosphere** All the water on Earth, including that present in the **atmosphere** as well as in oceans, seas, **ice sheets**, etc.

**hygrometer** An instrument for measuring the relative humidity of the **atmosphere**. It comprises two thermometers, one of which is kept moist by a wick inserted in a water reservoir. Evaporation from the wick reduces the temperature of the 'wet bulb' thermometer, and the difference between the dry and the wet bulb temperatures is used to calculate relative humidity from standard tables.



## I

**Ice Age** A period of **glaciation** in which a cooling of **climate** leads to the development of **ice sheets**, **ice caps** and **valley glaciers**.

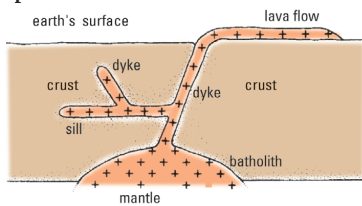
**ice cap** A covering of permanent ice over a relatively small land mass, e.g. Iceland.

**ice sheet** A covering of permanent ice over a substantial continental area such as Antarctica.

**iceberg** A large mass of ice which has broken off an **ice sheet** or **glacier** and left floating in the sea.

**ID (Identifier)** A unique value given to a particular object.

**igneous rock** A **rock** which originated as **magma** (molten rock) at depth in or below the Earth's **crust**. Igneous rocks are generally classified according to crystal size, colour and mineral composition. See also **plutonic rock**.



igneous rock

**immigration** The movement of people into a country or region from other countries or regions.

**impermeable rock** A rock that is non-porous and therefore incapable of taking in water or of allowing it to pass through between the grains. Compare **impervious rock**. See also **permeable rock**.

**impervious rock** A non-porous rock with no cracks or fissures through which water might pass.

**imports** Goods or services bought into one country from another (compare **exports**).

**industrialization** The development of industry on an extensive scale.

**infiltration** The gradual movement of water into the ground.

**infrastructure** The basic structure of an organization or system. The infrastructure of a city includes, for example, its roads and railways, schools, factories, power and water supplies.

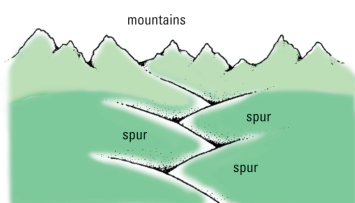
**inner city** The ring of buildings around the **Central Business District (CBD)** of a town or city.

**intensive farming** A system of **agriculture** where relatively large amounts of capital and/or labour are invested on relatively small areas of land.

**interglacial** A warm period between two periods of **glaciation** and cold **climate**. The present interglacial began about 10,000 years ago.

**interlocking spurs** Obstacles of hard **rock** round which a river twists and turns in a V-shaped valley.

**Erosion** is pronounced on the concave banks, and this ultimately causes the development of spurs which alternate on either side of the river and interlock as shown in the diagram.



interlocking spurs A V-shaped valley with interlocking spurs.

**International Date Line** An imaginary line which approximately follows 180° **longitude**. The area of the world just east of the line is one day ahead of the area just west of the line.

**international trade** The exchange of goods and services between countries.

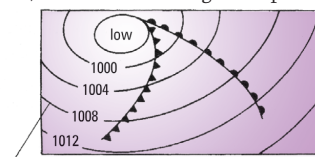
**intrusion** A body of **igneous rock** injected into the Earth's **crust** from the **mantle** below. See **dyke**, **sill**, **batholith**.

**ionosphere** See **atmosphere**.

**irrigation** A system of artificial watering of the land in order to grow crops. Irrigation is particularly important in areas of low or unreliable rainfall.

**island** A mass of land, smaller than a continent, which is completely surrounded by water.

**isobar** A line joining points of equal atmospheric pressure, as on the meteorological map below.



isobar

**isohyet** A line on a meteorological map joining places of equal rainfall.

**isotherm** A line on a meteorological map joining places of equal temperature.

## J

**joint** A vertical or semi-vertical fissure in a **sedimentary rock**, contrasted with roughly horizontal bedding planes. In **igneous rocks** jointing may occur as a result of contraction on cooling from the molten state. Joints should be distinguished from **faults** in that they are on a much smaller scale and there is no relative displacement of the rocks on either side of the joint. Joints, being lines of weakness are exploited by **weathering**.

## K

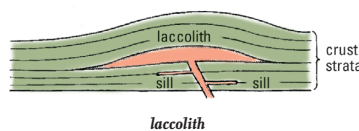
**kame** A short ridge of sand and gravel deposited from the water of a melted glacier.

**karst topography** An area of **limestone** scenery where **drainage** is predominantly subterranean.

**kettle hole** A small depression or hollow in a glacial outwash plain, formed when a block of ice embedded in the outwash deposits eventually melts, causing the **sediment** above to subside.

## L

**laccolith** An igneous **intrusion**, domed and often of considerable dimensions, caused where a body of viscous **magma** has been intruded into the **strata** of the Earth's **crust**. These strata are buckled upwards over the laccolith.

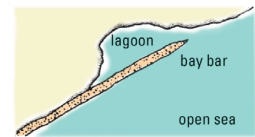


laccolith

**lagoon** 1. An area of sheltered coastal water behind

a bay bar or **tombolo**.

2. The calm water behind a coral reef.



lagoon

**lahar** A landslide of volcanic debris mixed with water down the sides of a volcano, caused either by heavy rain or the heat of the volcano melting snow and ice.

**lake** A body of water completely surrounded by land.

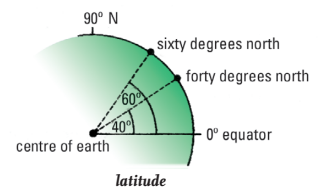
**land tenure** A system of land ownership or allocation.

**land use** The function of an area of land. For example, the land use in rural areas could be farming or forestry, whereas urban land use could be housing or industry.

**landform** Any natural feature of the Earth's surface, such as mountains or valleys.

**laterite** A hard (literally 'brick-like') soil in tropical regions caused by the baking of the upper **horizons** by exposure to the sun.

**latitude** Distance north or south of the equator, as measured by degrees of the angle at the Earth's centre:



latitude

**Laurasia** The northern hemisphere supercontinent, consisting of the present North America, Europe and Asia (excluding India), which split from **Pangaea** c. 200 million years ago. Laurasia is part of the theory of **continental drift**. See also **plate tectonics**.

**lava** **Magma** extruded onto the Earth's surface via some form of volcanic eruption. Lava varies in viscosity (see **viscous lava**), colour and chemical composition. Acidic lavas tend to be viscous and flow slowly; basic lavas tend to be nonviscous and flow quickly. Commonly, **lava flows** comprise basaltic material, as for example in the process of sea-floor spreading (see **plate tectonics**).

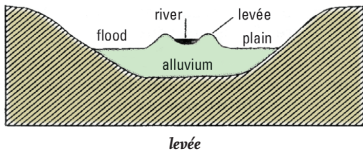
**lava flow** A stream of **lava** issuing from some form of volcanic eruption. See also **viscous lava**.

**lava plateau** A relatively flat upland composed of layer upon layer of approximately horizontally bedded lavas. An example of this is the Deccan Plateau of India.

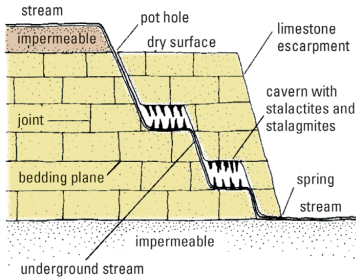
**leaching** The process by which soluble substances such as mineral salts are washed out of the upper soil layer into the lower layer by rain water.

**levée** The bank of a river, raised above the general level of the **flood plain** by **sediment** deposition during flooding. When the river bursts its banks, relatively coarse sediment is deposited first, and recurrent flooding builds up the river's banks accordingly. See diagram overleaf.

**lignite** A soft form of **coal**, harder than **peat** but softer than **bituminous coal**.

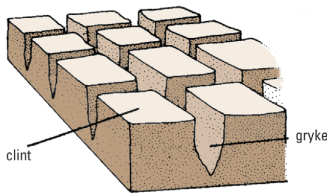


**limestone** Calcium-rich **sedimentary rock** formed by the accumulation of the skeletal matter of marine organisms.



**limestone**

**limestone pavement** An exposed **limestone** surface on which the joints have been enlarged by the action of rainwater dissolving the limestone to form weak carbonic acid. These enlarged joints, or **grykes**, separate roughly rectangular blocks of limestone called **clints**.



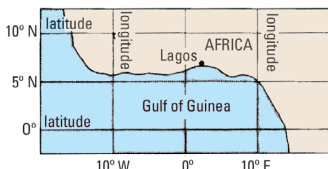
**limestone pavement**

**location** The position of population, settlement and economic activity in an area or areas. Location is a basic theme in **human geography**.

**loess** A very fine **silt** deposit, often of considerable thickness, transported by the wind prior to **deposition**. When irrigated, loess can be very fertile and, consequently, high **yields** can be obtained from crops grown on loess deposits.

**longitude** A measure of distance on the Earth's surface east or west of the Greenwich Meridian, an imaginary line running from pole to pole through Greenwich in London. Longitude, like **latitude**, is measured in degrees of an angle taken from the centre of the Earth.

The precise location of a place can be given by a **grid reference** comprising longitude and latitude. See also **map projection**, **prime meridian**.

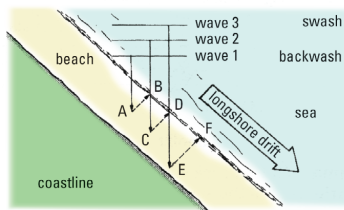


**longitude** A grid showing the location of Lagos, Nigeria.

**longshore drift** The net movement of material along a beach due to the oblique approach of waves to the shore. Beach deposits move in a zig-zag fashion, as shown in the diagram. Longshore drift is especially active on long, straight coastlines.

As waves approach, sand is carried up the beach by the **swash**, and retreats back down the beach with the **backwash**. Thus a single representative

grain of sand will migrate in the pattern A, B, C, D, E, F in the diagram.



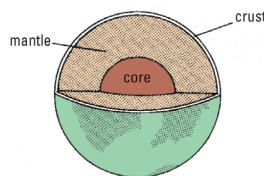
**longshore drift**

## M

**magma** Molten rock originating in the Earth's **mantle**; it is the source of all **igneous rocks**.

**malnutrition** The condition of being poorly nourished, as contrasted with **undernutrition**, which is lack of a sufficient quantity of food. The diet of a malnourished person may be high in starchy foods but is invariably low in protein and essential minerals and vitamins.

**mantle** The largest of the concentric zones of the Earth's structure, overlying the **core** and surrounded in turn by the **crust**.



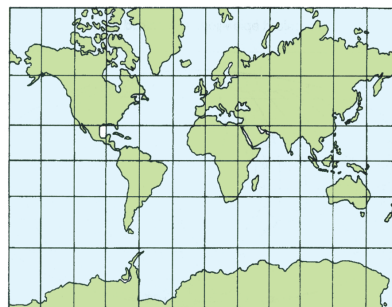
**mantle**

**manufacturing industry** The making of articles using physical labour or machinery, especially on a large scale. See **secondary sector**.

**map** Diagrammatic representation of an area – for example part of the earth's surface.

**map projection** A method by which the curved surface of the Earth is shown on a flat surface map. As it is not possible to show all the Earth's features accurately on a flat surface, some projections aim to show direction accurately at the expense of area, some the shape of the land and oceans, while others show correct area at the expense of accurate shape.

One of the projections most commonly used is the **Mercator projection**, devised in 1569, in which all lines of **latitude** are the same length as the equator. This results in increased distortion of area, moving from the equator towards the poles. This projection is suitable for navigation charts.

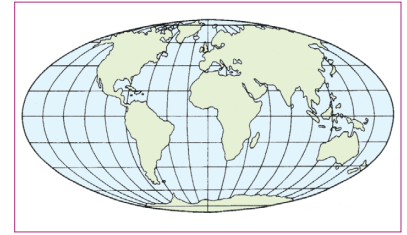


**map projection** Mercator projection.

The **Mollweide projection** shows the land masses

the correct size in relation to each other but there is distortion of shape. As the **Mollweide projection** has no area distortion it is useful for showing distributions such as population distribution.

The only true representation of the Earth's surface is a globe.



**map projection** Mollweide projection.

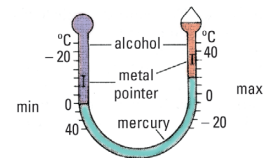
**marble** A whitish, crystalline **metamorphic rock** produced when **limestone** is subjected to great heat or pressure (or both) during Earth movements.

**maritime climate** A **temperate climate** that is affected by the closeness of the sea, giving a small annual range of temperatures – a coolish summer and a mild winter – and rainfall throughout the year. Britain has a maritime climate. Compare **extreme climate**.

**market gardening** An intensive type of **agriculture** traditionally located on the margins of urban areas to supply fresh produce on a daily basis to the city population. Typical market-garden produce includes salad crops, such as tomatoes, lettuce, cucumber, etc., cut flowers, fruit and some green vegetables.

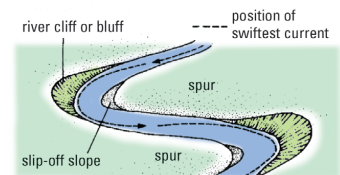
**mask** A method of hiding features on a map to improve legibility.

**maximum and minimum thermometer** An instrument for recording the highest and lowest temperatures over a 24-hour period.

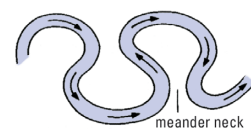


**maximum and minimum thermometer**

**meander** A large bend, especially in the middle or lower stages of a river's course. See **flood plain**. A meander is the result of lateral **corrosion**, which becomes dominant over vertical corrosion as the **gradient** of the river's course decreases. The characteristic features of a meander are summarized in the diagrams below. See also **oxbow lake**.



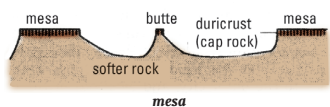
**meander** A river meander.



**meander** Fully formed meanders.

**mesa** A flat-topped, isolated hill in arid regions. A

mesa has a protective cap of hard **rock** underlain by softer, more readily eroded **sedimentary rock**. A **butte** is a relatively small outlier of a mesa.



**mesosphere** See **atmosphere**.

**metadata** All Information used to describe content, quality, condition, origin and other characteristics of data.

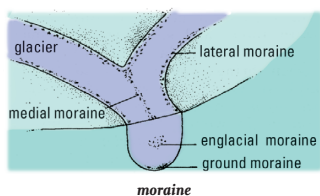
**metamorphic rock** A **rock** which has been changed by intensive heat or pressure. Metamorphism implies an increase in hardness and resistance to **erosion**. Shale, for example, may be metamorphosed by pressure into **slate**; **sandstone** by heat into **quartzite**, **limestone** into **marble**. Metamorphism of pre-existing rocks is associated with the processes of **folding**, **faulting** and **vulcanicity**.

**migration** A permanent or semipermanent change of residence.

**monoculture** The growing of a single crop.

**monsoon** The term strictly means 'seasonal wind' and is used generally to describe a situation where there is a reversal of wind direction from one season to another. This is especially the case in South and Southeast Asia, where two monsoon winds occur, both related to the extreme pressure gradients created by the large land mass of the Asian continent.

**moraine** A collective term for debris deposited on or by **glaciers** and ice bodies in general. Several types of moraine are recognized: *lateral moraine* forms along the edges of a valley glacier where debris eroded from the valley sides, or weathered from the slopes above the glacier, collects; *medial moraine* forms where two lateral moraines meet at a glacier junction; *englacial moraine* is material which is trapped within the body of the glacier; and *ground moraine* is material eroded from the floor of the valley and used by the glacier as an abrasive tool. A *terminal moraine* is material bulldozed by the glacier during its advance and deposited at its maximum down-valley extent. *Recessional moraines* may be deposited at standstills during a period of general glacial retreat.



**mortlake** See **oxbow lake**.

**mountain** A natural upward projection of the Earth's surface, higher and steeper than a hill, and often having a rocky summit.

## N

**national park** An area of scenic countryside protected by law from uncontrolled development. A national park has two main functions:  
(a) to conserve the natural beauty of the landscape;

(b) to enable the public to visit and enjoy the countryside for leisure and recreation.

**natural hazard** A natural event which, in extreme cases, can lead to loss of life and destruction of property. Some natural hazards result from geological events, such as **earthquakes** and the eruption of **volcanoes**, whilst others are due to weather events such as **hurricanes**, floods and droughts.

**natural increase** The increase in population due to the difference between **birth rate** and **death rate**.

**neap tides** See **tides**.

**névé** Compact snow. In a **corrie** icefield, for example, four layers are recognized: blue and white ice at the bottom of the ice mass; névé overlying the ice and powder snow on the surface.

**new town** A new urban location created  
(a) to provide overspill accommodation for a large city or **conurbation**;  
(b) to provide a new focus for industrial development.

**newly industrialized country (NIC)**

A **developing country** which is becoming industrialized, for example Malaysia and Thailand. Some NICs have successfully used large-scale development to move into the industrialized world. Usually the capital for such developments comes from outside the country.

**niviation** The process of **weathering** by snow and ice, particularly through **freeze-thaw** action. Particularly active in cold **climates** and high altitudes – for example on exposed slopes above a **glacier**.

**node** A point representing the beginning or ending point of an edge or arc.

**nomadic pastoralism** A system of **agriculture** in dry grassland regions. People and stock (cattle, sheep, goats) are continually moving in search of pasture and water. The pastoralists subsist on meat, milk and other animal products.

**non-governmental organizations (NGOs)** Independent organizations, such as charities (Oxfam, Water Aid) which provide aid and expertise to economically developing countries.

**nonrenewable resources** Resources of which there is a fixed supply, which will eventually be exhausted. Examples of these are metal ores and **fossil fuels**. Compare **renewable resources**.

**North and South** A way of dividing the industrialized nations, found predominantly in the North from those less developed nations in the South. The gap which exists between the rich 'North' and the poor 'South' is called the *development gap*.

**northings** The second element of a **grid reference**. See **eastings**.

**nuclear power station** An electricity-generating plant using nuclear fuel as an alternative to the conventional **fossil fuels** of coal, oil and gas.

**nuée ardente** A very hot and fast-moving cloud of gas, ash and rock that flows close to the ground after a violent ejection from a volcano. It is very destructive.

**nunatak** A mountain peak projecting above the general level of the ice near the edge of an **ice sheet**.

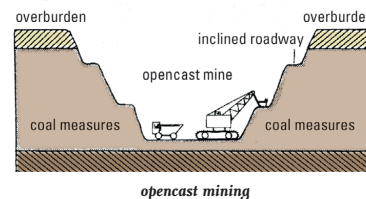
**nutrient cycle** The cycling of nutrients through the **environment**.

## O

**ocean** A large area of sea. The world's oceans are the Pacific, Atlantic, Indian and Arctic. The Southern Ocean is made up of the areas of the Pacific, Atlantic and Indian Oceans south of latitude 60°S.

**ocean current** A movement of the surface water of an ocean.

**opencast mining** A type of mining where the mineral is extracted by direct excavation rather than by shaft or drift methods.

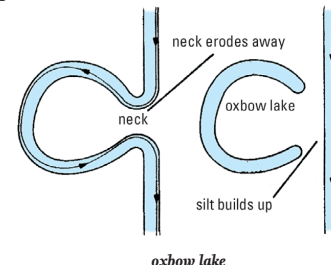


**organic farming** A system of farming that avoids the use of any artificial fertilizers or chemical pesticides, using only organic fertilizers and pesticides derived directly from animal or vegetable matter. Yields from organic farming are lower, but the products are sold at a premium price.

**overfold** See **fold**.

**oxbow lake, mortlake or cut-off**

A crescent-shaped lake originating in a **meander** that was abandoned when **erosion** breached the neck between bends, allowing the stream to flow straight on, bypassing the meander. The ends of the meander rapidly silt up and it becomes separated from the river.



**ozone** A form of oxygen found in a layer in the **stratosphere**, where it protects the Earth's surface from ultraviolet rays.

## P

**Pangaea** The supercontinent or universal land mass in which all continents were joined together approximately 200 million years ago. See **continental drift**.

**passage** See **strait**.

**pastoral farming** A system of farming in which the raising of livestock is the dominant element. See also **nomadic pastoralism**.

**peasant agriculture** The growing of crops or raising of animals, partly for subsistence needs and partly for market sale. Peasant agriculture is thus an intermediate stage between subsistence and commercial farming.

**peat** Partially decayed and compressed vegetative

matter accumulating in areas of high rainfall and/or poor **drainage**.

**penplain** A region that has been eroded until it is almost level. The more resistant rocks will stand above the general level of the land.

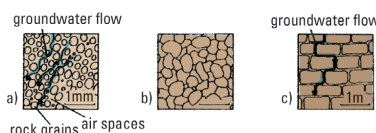
**per capita income** The **GNI** (gross national income) of a country divided by the size of its population. It gives the average income per head of the population if the national income were shared out equally. Per capita income comparisons are used as one indicator of levels of economic development.

**periglacial features** A periglacial landscape is one which has not been glaciated *per se*, but which has been affected by the severe **climate** prevailing around the ice margin.

**permafrost** The permanently frozen subsoil that is a feature of areas of **tundra**.

**permeable rock** Rock through which water can pass via a network of pores between the grains.

Compare **pervious rock**. See also **impermeable rock**.



**permeable rock** (a) Permeable rock, (b) impermeable rock, (c) pervious rock.

**pervious rock** Rock which, even if non-porous, can allow water to pass through via interconnected joints, bedding planes and fissures. An example is **limestone**. Compare **permeable rock**. See also **impermeable rock**.

**photosynthesis** The process by which green plants make carbohydrates from carbon dioxide and water, and give off oxygen. Photosynthesis balances **respiration**.

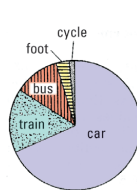
**physical feature** See **topography**.

**physical geography** The study of our **environment**, comprising such elements as geomorphology, hydrology, pedology, meteorology, climatology and biogeography.

**pie chart** A circular graph for displaying values as proportions:

The journey to work: mode of transport.  
(Sample of urban population)

Mode	No.	%	Sector (% x 3,6)
Foot	25	3.2	11.5
Cycle	10	1.3	4.7
Bus	86	11.1	40.0
Train	123	15.9	57.2
Car	530	68.5	246.6
Total	774	100	360
		per cent	degrees



**pie chart**

**plain** A level or almost level area of land.

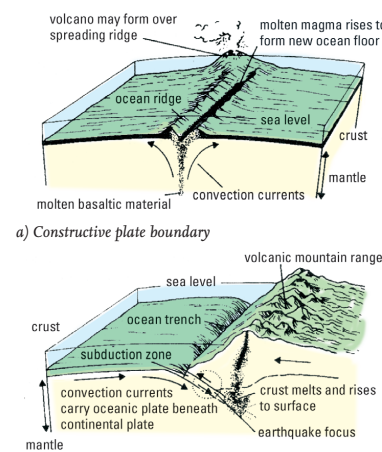
**plantation agriculture** A system of **agriculture** located in a tropical or semi-tropical **environment**, producing commodities for export to Europe, North America and other industrialized regions. Coffee, tea, bananas, rubber and sisal are examples of plantation crops.

**plateau** An upland area with a fairly flat surface and steep slopes. Rivers often dissect plateau surfaces.

**plate tectonics** The theory that the Earth's **crust** is divided into seven large, rigid plates, and several smaller ones, which are moving relative to each

other over the upper layers of the Earth's **mantle**.

See **continental drift**. **Earthquakes** and volcanic activity occur at the boundaries between the plates.



**plate tectonics**

**plucking** A process of glacial **erosion** whereby, during the passage of a valley **glacier** or other ice body, ice forming in cracks and fissures drags out material from a **rock** face. This is particularly the case with the backwall of a **corrie**.

**plug** The solidified material which seals the vent of a **volcano** after an eruption.

**plutonic rock** **Igneous rock** formed at depth in the Earth's **crust**; its crystals are large due to the slow rate of cooling. **Granite**, such as is found in **batoliths** and other deep-seated intrusions, is a common example.

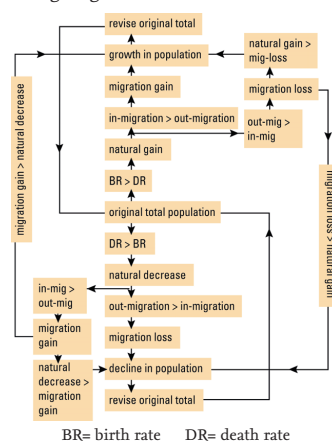
**podzol** The characteristic **soil** of the **taiga** coniferous forests of Canada and northern Russia. Podzols are leached, greyish soils: iron and lime especially are leached out of the upper horizons, to be deposited as **hardpan** in the B **horizon**.

**pollution** Environmental damage caused by improper management of **resources**, or by careless human activity.

**polygons** Closed shapes defined by a connected sequences of coordinate pairs, where the first and last coordinate pair are the same.

**polyline** A series of connected segments which form a path to define a shape.

**population change** The increase of a population, the components of which are summarized in the following diagram.



**population change**

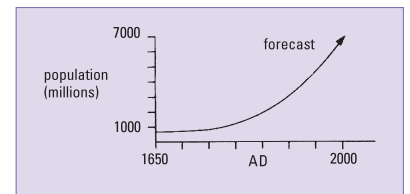
**population density** The number of people

per unit area. Population densities are usually expressed per square kilometre.

**population distribution** The pattern of population location at a given **scale**.

**population explosion** On a global **scale**, the dramatic increase in population during the 20th century.

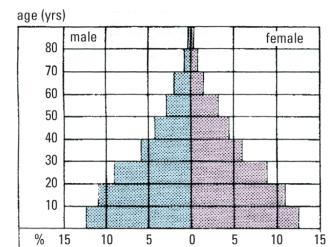
The graph below shows world **population growth**.



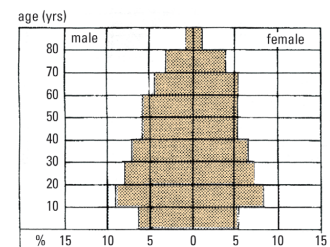
**population explosion**

**population growth** An increase in the population of a given region. This may be the result of natural increase (more births than deaths) or of in-migration, or both.

**population pyramid** A type of **bar graph** used to show population structure, i.e. the age and sex composition of the population for a given region or nation.



a) **population pyramid** Pyramid for India, showing high birth rates and death rates.



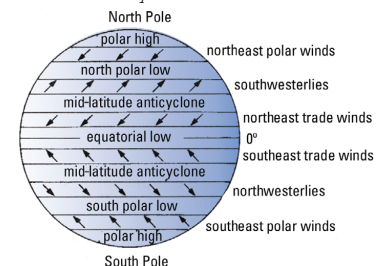
b) **population pyramid** Pyramid for England and Wales, showing low birth and death rates.

**pothole** 1. A deep hole in limestone, caused by the enlargement of a **joint** through the dissolving effect of rainwater.

2. A hollow scoured in a river bed by the swirling of pebbles and small boulders in eddies.

**precipitation** Water deposited on the Earth's surface in the form of e.g. rain, snow, sleet, hail and dew.

**prevailing wind** The dominant wind direction of a region. Prevailing winds are named by the direction from which they blow.



**primary keys** A set of properties in a database that uniquely identifies each record.

**primary sector** That sector of the national economy which deals with the production of primary materials: **agriculture**, mining, forestry and fishing. Primary products such as these have had no processing or manufacturing involvement. The total economy comprises the primary sector, the **secondary sector**, the **tertiary sector** and the **quaternary sector**.

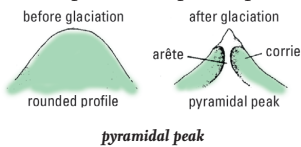
**primary source** See **secondary source**.

**prime meridian** or **Greenwich Meridian**

The line of 0° longitude passing through Greenwich in London.

**pumped storage** Water pumped back up to the storage lake of a **hydroelectric power** station, using surplus 'off-peak' electricity.

**pyramidal peak** A pointed mountain summit resulting from the headward extension of **corries** and **arêtes**. Under glacial conditions a given summit may develop corries on all sides, especially those facing north and east. As these erode into the summit, a formerly rounded profile may be changed into a pointed, steep-sided peak.



**pyroclasts** Rocky debris emitted during a volcanic eruption, usually following a previous emission of gases and prior to the outpouring of **lava** – although many eruptions do not reach the final lava stage.

**Q**  
**quality of life** The level of wellbeing of a community and of the area in which the community lives.

**quartz** One of the commonest minerals found in the Earth's **crust**, and a form of silica (silicon+oxide). Most **sandstones** are composed predominantly of quartz.

**quartzite** A very hard and resistant **rock** formed by the metamorphism of **sandstone**.

**quaternary sector** That sector of the economy providing information and expertise. This includes the microchip and microelectronics industries. Highly developed economies are seeing an increasing number of their workforce employed in this sector. Compare **primary sector**, **secondary sector**, **tertiary sector**.

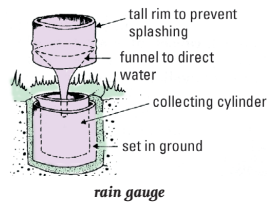
**query** A request to select features or records from a database.

**R**  
**rain gauge** An instrument used to measure rainfall. Rain passes through a funnel into the jar below and is then transferred to a measuring cylinder. The reading is in millimetres and indicates the depth of rain which has fallen over an area. See diagram.

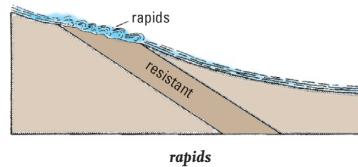
**raised beach** See **wave-cut platform**.

**range** A long series or chain of mountains.

**rapids** An area of broken, turbulent water in a river channel, caused by a stratum of resistant



**rock** that dips downstream. The softer rock immediately upstream and downstream erodes more quickly, leaving the resistant rock sticking up, obstructing the flow of the water. Compare **waterfall**.



**raster** A pattern of closely spaced rows of dots that form an image.

**raw materials** The **resources** supplied to industries for subsequent manufacturing processes.

**reef** A ridge of rock, sand or coral whose top lies close to the sea's surface.

**regeneration** Renewed growth of, for example, forest after felling. Forest regeneration is crucial to the long-term stability of many **resource** systems, from **bush fallowing** to commercial forestry.

**region** An area of land which has marked boundaries or unifying internal characteristics. Geographers may identify regions according to physical, climatic, political, economic or other factors.

**rejuvenation** Renewed vertical **corrosion** by rivers in their middle and lower courses, caused by a fall in sea level, or a rise in the level of land relative to the sea.

**relative humidity** The relationship between the actual amount of water vapour in the air and the amount of vapour the air could hold at a particular temperature. This is usually expressed as a percentage. Relative humidity gives a measure of dampness in the **atmosphere**, and this can be determined by a **hygrometer**.

**relief** The differences in height between any parts of the Earth's surface. Hence a relief map will aim to show differences in the height of land by, for example, **contour** lines or by a colour key.

**remote sensing** The gathering of information by the use of electronic or other sensing devices in satellites.

**renewable resources** Resources that can be used repeatedly, given appropriate management and conservation. Compare **non-renewable resources**.

**representative fraction** The fraction of real size to which objects are reduced on a map; for example, on a 1:50 000 map, any object is shown at 1/50 000 of its real size.

**reserves** Resources which are available for future use.

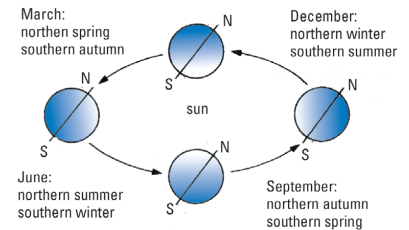
**reservoir** A natural or artificial lake used for collecting or storing water, especially for water supply or **irrigation**.

**resolution** The smallest allowable separation between two coordinate values in a feature class.

**resource** Any aspect of the human and physical **environments** which people find useful in satisfying their needs.

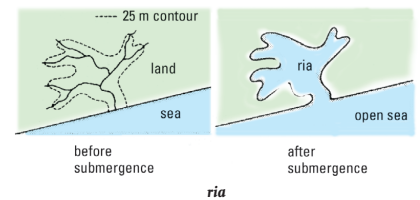
**respiration** The release of energy from food in the cells of all living organisms (plants as well as animals). The process normally requires oxygen and releases carbon dioxide. It is balanced by **photosynthesis**.

**revolution** The passage of the Earth around the sun; one revolution is completed in 365.25 days. Due to the tilt of the Earth's axis (23½° from the vertical), revolution results in the sequence of seasons experienced on the Earth's surface.



**revolution** The seasons of the year.

**ria** A submerged river valley, caused by a rise in sea level or a subsidence of the land relative to the sea.

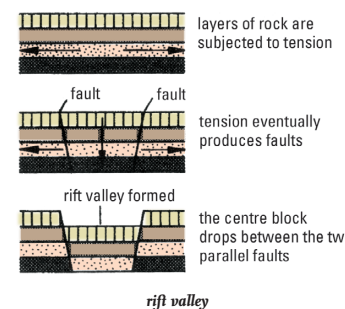


**ribbon lake** A long, relatively narrow lake, usually occupying the floor of a U-shaped glaciated valley. A ribbon lake may be caused by the **overdeepening** of a section of the valley floor by glacial **abrasion**.

**Richter scale** A scale of **earthquake** measurement that describes the magnitude of an earthquake according to the amount of energy released, as recorded by **seismographs**.

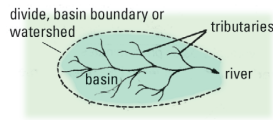
**rift valley** A section of the Earth's **crust** which has been downfaulted. The **faults** bordering the rift valley are approximately parallel. There are two main theories related to the origin of rift valleys. The first states that tensional forces within the Earth's crust have caused a block of land to sink between parallel faults. The second theory states that compression within the Earth's crust has caused faulting in which two side blocks have risen up towards each other over a central block.

The most complex rift valley system in the world is that ranging from Syria in the Middle East to the river Zambezi in East Africa.



**river** A large natural stream of fresh water flowing along a definite course, usually into the sea.

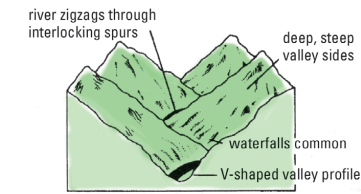
**river basin** The area drained by a river and its tributaries, sometimes referred to as a **catchment area**.



river basin

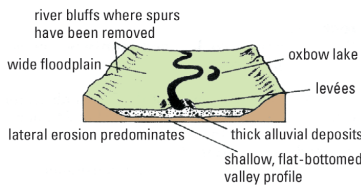
**river cliff or bluff** The outer bank of a **meander**. The cliff is kept steep by undercutting since river **erosion** is concentrated on the outer bank. See **meander** and **river's course**.

**river's course** The route taken by a river from its source to the sea. There are three major sections: the upper course, the middle course and the lower course.



vertical erosion predominates

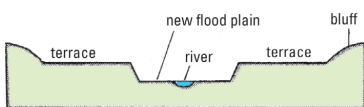
**river's course Upper course.**



lateral erosion predominates

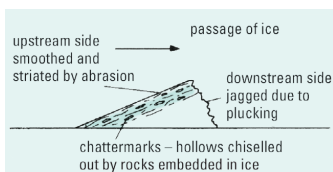
**river's course Lower course.**

**river terrace** A platform of land beside a river. This is produced when a river is **rejuvenated** in its middle or lower courses. The river cuts down into its **flood plain**, which then stands above the new general level of the river as paired terraces.



river terrace Paired river terraces above a flood plain.

**roche moutonnée** An outcrop of resistant **rock** sculpted by the passage of a **glacier**.



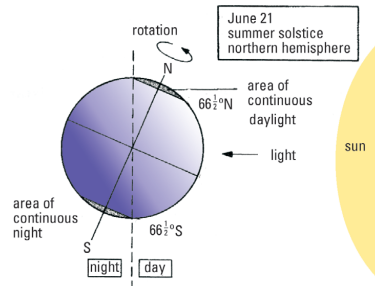
roche moutonnée

**rock** The solid material of the Earth's **crust**. See **igneous rock**, **sedimentary rock**, **metamorphic rock**.

**rotation** The movement of the Earth about its own axis. One rotation is completed in 24 hours. Due to the tilt of the Earth's axis, the length of day and night varies at different points on the Earth's surface. Days become longer with increasing latitude north; shorter with increasing latitude south. The situation is reversed during the northern midwinter (= the southern midsummer). See diagram.

**rural depopulation** The loss of population from the countryside as people move away from rural

areas towards cities and **conurbations**.



rotation The tilt of the Earth at the northern summer and southern winter solstice.

**rural-urban migration** The movement of people from rural to urban areas. See **migration** and **rural depopulation**.

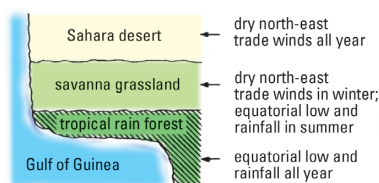
## S

**saltpan** A shallow basin, usually in a desert region, containing salt which has been deposited from an evaporated salt lake.

**sandstone** A common **sedimentary rock** deposited by either wind or water. Sandstones vary in texture from fine- to coarse-grained, but are invariably composed of grains of **quartz**, cemented by such substances as calcium carbonate or silica.

**satellite image** An image giving information about an area of the Earth or another planet, obtained from a satellite. Instruments on an Earth-orbiting satellite, such as Landsat, continually scan the Earth and sense the brightness of reflected light. When the information is sent back to Earth, computers turn it into *false-colour images* in which built-up areas appear in one colour (perhaps blue), vegetation in another (often red), bare ground in a third, and water in a fourth colour, making it easy to see their distribution and to monitor any changes. Compare **aerial photograph**.

**savanna** The grassland regions of Africa which lie between the **tropical rainforest** and the hot **deserts**. In South America, the *Llanos* and *Campos* regions are representative of the savanna type.

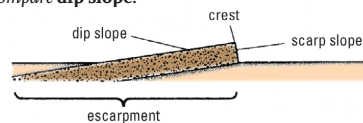


savanna The position of the savanna in West Africa.

**scale** The size ratio represented by a map; for example, on a map of scale 1:25 000, the real landscape is portrayed at 1/25 000 of its actual size.

**scarp slope** The steeper of the two slopes which comprise an **escarpment** of inclined **strata**.

Compare **dip slope**.



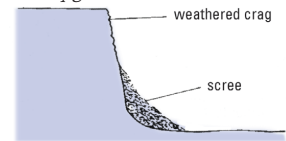
scarp slope

**science park** A site accommodating several companies involved in scientific work or research.

Science parks are linked to universities and tend to be located on **greenfield** and/or landscaped sites.

Compare **business park**.

**scree or talus** The accumulated **weathering debris** below a **crag** or other exposed rock face. Larger boulders will accumulate at the base of the scree, carried there by greater momentum.



scree or talus

**sea level** The average height of the surface of the oceans and seas.

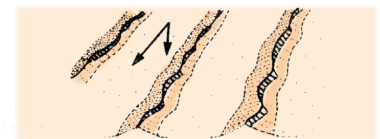
**secondary sector** The sector of the economy which comprises manufacturing and processing industries, in contrast with the **primary sector** which produces **raw materials**, the **tertiary sector** which provides **services**, and the **quaternary sector** which provides information.

**secondary source** A supply of information or data that has been researched or collected by an individual or group of people and made available for others to use; census data is an example of this. A *primary source* of data or information is one collected at first hand by the researcher who needs it; for example, a traffic count in an area, undertaken by a student for his or her own project.

**sediment** The material resulting from the **weathering** and **erosion** of the landscape, which has been deposited by water, ice or wind. It may be reconsolidated to form **sedimentary rock**.

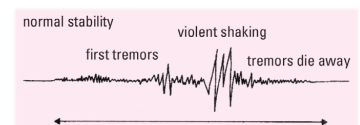
**sedimentary rock** A rock which has been formed by the consolidation of **sediment** derived from pre-existing rocks. **Sandstone** is a common example of a rock formed in this way. **Chalk** and **limestone** are other types of sedimentary rock, derived from organic and chemical precipitations.

**seif dune** A linear sand dune, the ridge of sand lying parallel to the prevailing wind direction. The eddying movement of the wind keeps the sides of the dune steep.



seif dunes

**seismograph** An instrument which measures and records the seismic waves which travel through the Earth during an **earthquake**.



seismograph A typical seismograph trace.

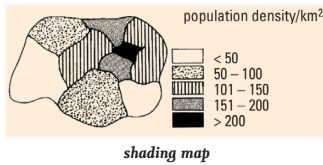
**seismology** The study of **earthquakes**.

**serac** A pinnacle of ice formed by the tumbling and shearing of a **glacier** at an ice fall, i.e. the broken ice associated with a change in **gradient** of the valley floor.

**service industry** The people and organizations that provide a service to the public.

**settlement** Any location chosen by people as a permanent or semi-permanent dwelling place.

**shading map** or **choropleth map** A map in which shading of varying intensity is used. For example, the pattern of **population densities** in a region.



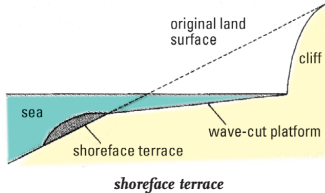
**shanty town** An area of unplanned, random, urban development often around the edge of a city. The shanty town is a major element of the structure of many **Third World** cities such as São Paulo, Mexico City, Nairobi, Kolkata and Lagos. The shanty town is characterized by high-density/low-quality dwellings, often constructed from the simplest materials such as scrap wood, corrugated iron and plastic sheeting – and by the lack of standard services such as sewerage and water supply, power supplies and refuse collection.

**shape files** A storage format for storing the location, shape and attributes of geographic features.

**shifting cultivation** See **bush fallowing**.

**shoreface terrace** A bank of **sediment** accumulating at the change of slope which marks the limit of a marine **wave-cut platform**.

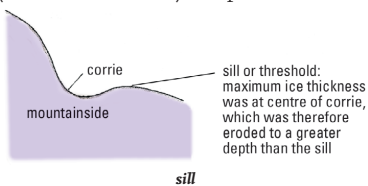
Material removed from the retreating cliff base is transported by the undertow off the wave-cut platform to be deposited in deeper water offshore.



**silage** Any **fodder crop** harvested whilst still green. The crop is kept succulent by partial fermentation in a *silo*. It is used as animal feed during the winter.

**sill** 1. An igneous intrusion of roughly horizontal disposition. See **igneous rock**.

2. (Also called **threshold**) the lip of a **corrie**.



**silt** Fine **sediment**, the component particles of which have a mean diameter of between 0.002 mm and 0.02 mm.

**sinkhole** See **pothole**.

**slash and burn** See **tropical rainforest**.

**slate** Metamorphosed shale or **clay**. Slate is a dense, fine-grained **rock** distinguished by the characteristic of *perfect cleavage*, i.e. it can be split along a perfectly smooth plane.

**slip** The amount of vertical displacement of **strata** at a **fault**.

**smog** A mixture of smoke and fog associated with urban and industrial areas, that creates an unhealthy **atmosphere**.

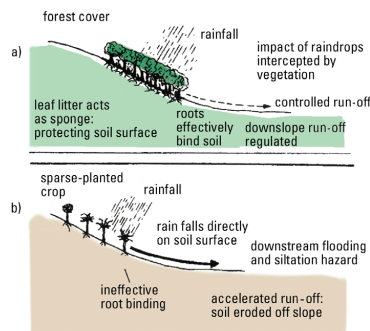
**snow line** The altitude above which permanent snow exists, and below which any snow that falls will not persist during the summer months.

**socioeconomic group** A group defined by particular social and economic characteristics, such as educational qualifications, type of job, and earnings.

**soil** The loose material which forms the uppermost layer of the Earth's surface, composed of the *inorganic fraction*, i.e. material derived from the **weathering** of bedrock, and the *organic fraction* – that is material derived from the decay of vegetable matter.

**soil erosion** The accelerated breakdown and removal of soil due to poor management. Soil erosion is particularly a problem in harsh **environments**.

**soil profile** The sequence of layers or **horizons** usually seen in an exposed soil section.



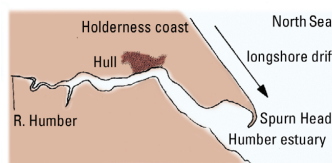
soil erosion a) Stable environment, b) unstable environment.

**solar power** Heat radiation from the sun converted into electricity or used directly to provide heating. Solar power is an example of a renewable source of energy (see **renewable resources**).

**solifluction** A process whereby thawed surface soil creeps downslope over a permanently frozen **subsoil (permafrost)**.

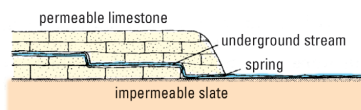
**spatial distribution** The pattern of locations of, for example, population or **settlement** in a region.

**spit** A low, narrow bank of sand and shingle built out into an **estuary** by the process of **longshore drift**.



spit Spurn Head, a coastal spit.

**spring** The emergence of an underground stream at the surface, often occurring where **impermeable rock** underlies **permeable rock** or **pervious rock** or **strata**.



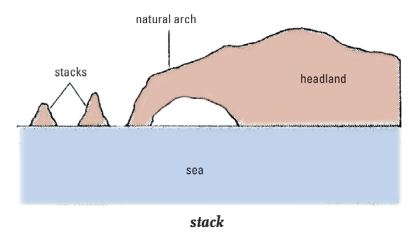
spring Rainwater enters through the fissures of the limestone and the stream springs out where the limestone meets slate.

**spring tides** See **tides**.

**squatter settlement** An area of peripheral urban settlement in which the residents occupy land to which they have no legal title. See **shanty town**.

**stack** A coastal feature resulting from the collapse

of a natural arch. The stack remains after less resistant **strata** have been worn away by **weathering** and marine **erosion**.



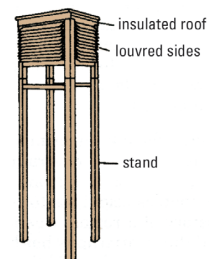
**stalactite** A column of calcium carbonate hanging from the roof of a **limestone** cavern. As water passes through the limestone it dissolves a certain proportion, which is then precipitated by **evaporation** of water droplets dripping from the cavern roof. The drops splashing on the floor of a cavern further evaporate to precipitate more calcium carbonate as a **stalagmite**.

**stalagmite** A column of calcium carbonate growing upwards from a cavern floor. Compare **stalactite**. Stalactites and stalagmites may meet, forming a column or pillar.

**staple diet** The basic foodstuff which comprises the daily meals of a given people.

**stereoplotter** An instrument used for projecting an aerial photograph and converting locations of objects on the image to x-, y-, and z-coordinates. It plots these coordinates as a map.

**Stevenson's screen** A shelter used in weather stations, in which thermometers and other instruments may be hung.

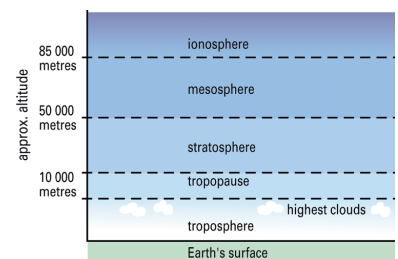


Stevenson's screen

**strait, channel** or **passage** A narrow body of water, between two land masses, which links two larger bodies of water.

**strata** Layers of **rock** superimposed one upon the other.

**stratosphere** The layer of the **atmosphere** which lies immediately above the troposphere and below the mesosphere and ionosphere. Within the stratosphere, temperature increases with altitude.



stratosphere

**stratus** Layer-cloud of uniform grey appearance, often associated with the warm sector of a **depression**. Stratus is a type of **low cloud** which

may hang as mist over mountain tops.

**striations** The grooves and scratches left on bare rock surfaces by the passage of a glacier.

**strip cropping** A method of soil conservation whereby different crops are planted in a series of strips, often following contours around a hillside. The purpose of such a sequence of cultivation is to arrest the downslope movement of soil. See soil erosion.

**subduction zone** See plate tectonics.

**subsistence agriculture** A system of agriculture in which farmers produce exclusively for their own consumption, in contrast to commercial agriculture where farmers produce purely for sale at the market.

**subsoil** See soil profile.

**suburbs** The outer, and largest, parts of a town or city.

**surface run-off** That proportion of rainfall received at the Earth's surface which runs off either as channel flow or overland flow. It is distinguished from the rest of the rainfall, which either percolates into the soil or evaporates back into the atmosphere.

**sustainable development** The ability of a country to maintain a level of economic development, thus enabling the majority of the population to have a reasonable standard of living.

**swallow hole** See pothole.

**swash** The rush of water up the beach as a wave breaks. See also backwash and longshore drift.

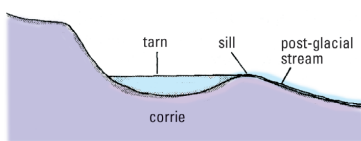
**syncline** A trough in folded strata; the opposite of anticline. See fold.

## T

**taiga** The extensive coniferous forests of Siberia and Canada, lying immediately south of the arctic tundra.

**talus** See scree.

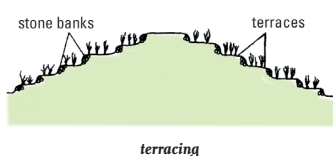
**tarn** The postglacial lake which often occupies a corrie.



**temperate climate** A climate typical of mid-latitudes. Such a climate is intermediate between the extremes of hot (tropical) and cold (polar) climates. Compare extreme climate. See also maritime climate.

**terminal moraine** See moraine.

**terracing** A means of soil conservation and land utilization whereby steep hillsides are engineered into a series of flat ledges which can be used for agriculture, held in places by stone banks to prevent soil erosion.



**tertiary sector** That sector of the economy which provides services such as transport, finance and

retailing, as opposed to the primary sector which provides raw materials, the secondary sector which processes and manufactures products, and the quaternary sector which provides information and expertise.

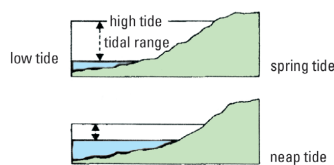
**thermal power station** An electricity-generating plant which burns coal, oil or natural gas to produce steam to drive turbines.

**Third World** A collective term for the poor nations of Africa, Asia and Latin America, as opposed to the 'first world' of capitalist, developed nations and the 'second world' of formerly communist, developed nations. The terminology is far from satisfactory as there are great social and political variations within the 'Third World'. Indeed, there are some countries where such extreme poverty prevails that these could be regarded as a fourth group. Alternative terminology includes 'developing countries', 'economically developing countries' and 'less economically developed countries' (LEDC). **Newly industrialized countries** are those showing greatest economic development.

**threshold** See sill (sense 2).

**tidal range** The mean difference in water level between high and low tides at a given location. See tides.

**tides** The alternate rise and fall of the surface of the sea, approximately twice a day, caused by the gravitational pull of the moon and, to a lesser extent, of the sun.



tides Tidal ranges.

**till** See boulder clay.

**tombolo** A spit which extends to join an island to the mainland.



tombolo Chesil Beach, England.

**topography** The composition of the visible landscape, comprising both physical features and those made by people.

**topsoil** The uppermost layer of soil, more rich in organic matter than the underlying subsoil. See horizon, soil profile.

**tornado** A violent storm with winds circling around a small area of extremely low pressure. Characterized by a dark funnel-shaped cloud. Winds associated with tornadoes can reach speeds of over 300 mph (480 km/h).

**trade winds** Winds which blow from the subtropical belts of high pressure towards the equatorial belt of low pressure. In the northern hemisphere, the winds blow from the northeast and in the southern hemisphere from the southeast.

**transhumance** The practice whereby herds of farm

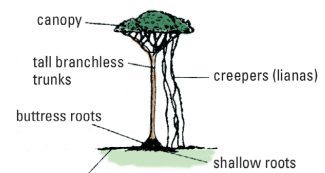
animals are moved between regions of different climates. Pastoral farmers (see pastoral farming) take their herds from valley pastures in the winter to mountain pastures in the summer. See also alp.

**transnational corporation (TNC)**

A company that has branches in many countries of the world, and often controls the production of the primary product and the sale of the finished article.

**tributary** A stream or river which feeds into a larger one. Compare distributary.

**tropical rainforest** The dense forest cover of the equatorial regions, reaching its greatest extent in the Amazon Basin of South America, the Congo Basin of Africa, and in parts of South East Asia and Indonesia. There has been much concern in recent years about the rate at which the world's rainforests are being cut down and burnt. The burning of large tracts of rainforest is thought to be contributing to global warming. Many governments and conservation bodies are now examining ways of protecting the remaining rainforests, which are unique ecosystems containing millions of plant and animal species.



Intense bacterial activity breaks down fallen leaves, etc., to return nutrients to soil surface for immediate uptake by roots. Soils themselves are infertile: the nutrient cycle is concentrated in the vegetation and top few inches of soil.

a forest giant in the tropical rainforest

**tropics** The region of the Earth lying between the tropics of Cancer ( $23\frac{1}{2}^{\circ}\text{N}$ ) and Capricorn ( $23\frac{1}{2}^{\circ}\text{S}$ ). See latitude.

**troposphere** See atmosphere.

**trough** An area of low pressure, not sufficiently well-defined to be regarded as a depression.

**truncated spur** A spur of land that previously projected into a valley and has been completely or partially cut off by a moving glacier.

**tsunami** A very large, and often destructive, sea wave produced by a submarine earthquake.

Tsunamis tend to occur along the coasts of Japan and parts of the Pacific Ocean, and can be the cause of large numbers of deaths.

**tuff** Volcanic ash or dust which has been consolidated into rock.

**tundra** The barren, often bare-rock plains of the far north of North America and Eurasia where subarctic conditions prevail and where, as a result, vegetation is restricted to low-growing, hardy shrubs and mosses and lichens.

**typhoon** See hurricane.

## U

**undernutrition** A lack of a sufficient quantity of food, as distinct from malnutrition which is a consequence of an unbalanced diet.

**urban decay** The process of deterioration in the infrastructure of parts of the city. It is the result of

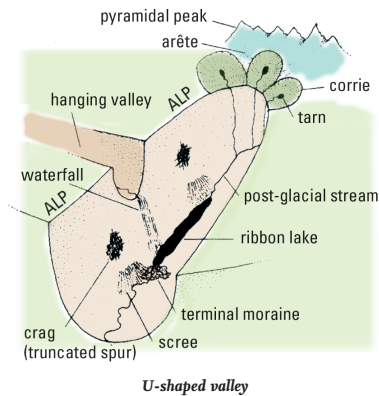


long-term shifts in patterns of economic activity, residential **location** and **infrastructure**.

**urban sprawl** The growth in extent of an urban area in response to improvements in transport and rising incomes, both of which allow a greater physical separation of home and work.

**urbanization** The process by which a national population becomes predominantly urban through a **migration** of people from the countryside to cities, and a shift from agricultural to industrial employment.

**U-shaped valley** A glaciated valley, characteristically straight in plan and U-shaped in **cross section**. See diagram. Compare **V-shaped valley**.



## V

**valley** A long depression in the Earth's surface, usually containing a river, formed by **erosion** or by movements in the Earth's **crust**.

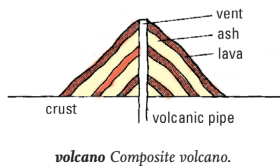
**vector** A quantity that has both magnitude and direction.

**vegetation** The plant life of a particular region.

**viscous lava** Lava that resists the tendency to flow. It is sticky, flows slowly and congeals rapidly. Non-viscous lava is very fluid, flows quickly and congeals slowly.

**volcanic rock** A category of **igneous rock** which comprises those rocks formed from **magma** which has reached the Earth's surface. **Basalt** is an example of a volcanic rock.

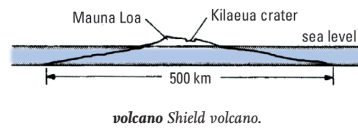
**volcano** A fissure in the Earth's **crust** through which **magma** reaches the Earth's surface. There are four main types of volcano:  
 (a) *Acid lava cone* – a very steep-sided cone composed entirely of acidic, **viscous lava** which flows slowly and congeals very quickly.  
 (b) *Composite volcano* – a single cone comprising alternate layers of ash (or other **pyroclasts**) and lava.



(c) *Fissure volcano* – a volcano that erupts along a linear fracture in the crust, rather than from a single cone.

(d) *Shield volcano* – a volcano composed of very basic, non-viscous lava which flows quickly and

congeals slowly, producing a very gently sloping cone.



**V-shaped valley** A narrow, steep-sided valley made by the rapid erosion of rock by streams and rivers. It is V-shaped in cross-section. Compare **U-shaped valley**.

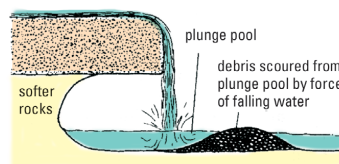
**vulcanicity** A collective term for those processes which involve the intrusion of **magma** into the **crust**, or the extrusion of such molten material onto the Earth's surface.

## W

**wadi** A dry watercourse in an arid region; occasional rainstorms in the desert may cause a temporary stream to appear in a wadi.

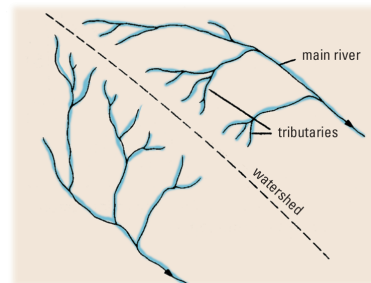
**warm front** See **depression**.

**waterfall** An irregularity in the long profile of a **river's course**, usually located in the upper course. Compare **rapids**.



waterfall

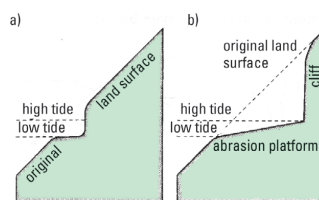
**watershed** The boundary, often a ridge of high ground, between two **river basins**.



watershed

**water table** The level below which the ground is permanently saturated. The water table is thus the upper level of the **groundwater**. In areas where **permeable rock** predominates, the water table may be at some considerable depth.

**wave-cut platform** or **abrasion platform** A gently sloping surface eroded by the sea along a coastline.

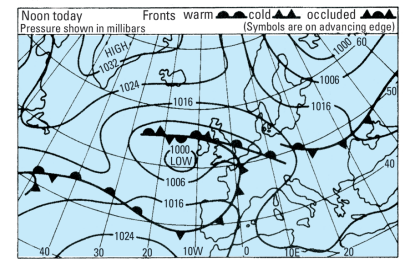


wave-cut platform a) Early in formation, b) later in formation.

**weather** The day-to-day conditions of e.g. rainfall, temperature and pressure, as experienced at a particular location.

**weather chart** A map or chart of an area giving

details of **weather** experienced at a particular time of day. Weather charts are sometimes called **synoptic charts**, as they give a synopsis of the weather at a particular time.



weather chart

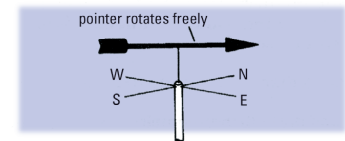
**weather station** A place where all elements of the weather are measured and recorded. Each station will have a **Stevenson's screen** and a variety of instruments such as a **maximum and minimum thermometer**, a **hygrometer**, a **rain gauge**, a **wind vane** and an **anemometer**.

**weathering** The breakdown of rocks *in situ*; contrasted with **erosion** in that no large-scale transport of the denuded material is involved.

**wet and dry bulb thermometer**

See **hygrometer**.

**wind vane** An instrument used to indicate wind direction. It consists of a rotating arm which always points in the direction from which the wind blows.



wind vane

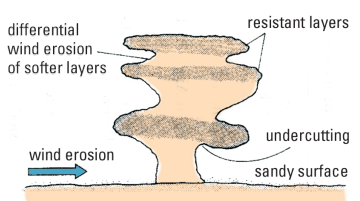
## Y

**yardang** Long, roughly parallel ridges of **rock** in arid and semi-arid regions. The ridges are undercut by wind **erosion** and the corridors between them are swept clear of sand by the wind. The ridges are oriented in the direction of the prevailing wind.

**yield** The productivity of land as measured by the weight or volume of produce per unit area.

## Z

**Zeugen** Pedestal rocks in arid regions; wind **erosion** is concentrated near the ground, where **corrosion** by wind-borne sand is most active. This leads to undercutting and the pedestal profile emerges.



Zeugen