

## B

**backflooding.** 1. Temporarily rising water level in a cave caused by downstream passage being too small to pass an abnormally high discharge. The excavation and reexcavation of some caves is ascribed to the enlargement of a passage at or near the water table by gravity flow alternating with periods of calcite precipitation<sup>[10]</sup>. 2. Flooding due to backup of excess flow behind a constriction in a major conduit. Water that is ponded in tributary passages and proto-caves upstream of the constriction may contribute to the enlargement of maze caves<sup>[9]</sup>.

**background noise.** The level of intensity of signals due to normal activities other than the specific signal emission<sup>[16]</sup>.

**backwater.** The accumulated water above the normal level of a water course due to impoundment at a point downstream<sup>[16]</sup>.

**backwater curve.** Water surface profile in a stream or channel above a constriction or impoundment<sup>[16]</sup>.

**bacon.** Thin, elongated, translucent flowstone having parallel colored bands on or projecting from roofs and walls of some caves<sup>[10]</sup>. See also blanket; curtain; drapery.

**bacteria.** Simple, colorless one-cell plants, most of which are unable to manufacture their own food using sunlight. Bacteria are possibly important in caves as synthesizers of food materials from minerals. They are also important as decomposers<sup>[23]</sup>.

**bactericide.** A substance used to destroy bacteria (e.g. iron bacteria)<sup>[6]</sup>.

**bailer.** 1. A cylindrical container used to withdraw a sample of water from a well. 2. A cylindrical container with a bottom valve for the clearing of drill cuttings from the bottom of a borehole<sup>[16]</sup>.

**bailing line.** Cable operating a bailer<sup>[16]</sup>.  
Synonym: sand line.

**balcony.** Any projection on the wall of a cave large enough to support one or more persons<sup>[10]</sup>.

**bank.** Ascending slope bordering a river<sup>[16]</sup>.

**bank erosion.** Erosion of a river bank<sup>[16]</sup>.

**bank storage.** 1. Subsurface conduit water that has been driven back up into older, higher karst levels and into the surrounding rock matrix during a high flow period. 2. River water that has infiltrated river banks during a high flow period and being retained in temporary storage<sup>[16]</sup>.

**barbels.** Fleshy threadlike sensory structures hanging like whiskers near the mouths of certain fish, such as catfish<sup>[23]</sup>.

**bare karst.** A type of karst landscape lacking soil cover and where dissolution of carbonate rocks to form karst landforms occurs primarily on the exposed bedrock surface<sup>[9]</sup>. See naked karst.

**barite.** 1. A cave mineral — BaSO<sub>4</sub>. 2. A natural finely ground barium sulfate used

for increasing the density of drilling fluids<sup>[6]</sup>.

**barograph.** A pressure recorder<sup>[16]</sup>.

**barometer.** An indicator of barometric pressure<sup>[16]</sup>.

**barometric efficiency.** The ratio of water level change to atmospheric pressure change in a well<sup>[16]</sup>.

**barrier.** A geological formation or part of a formation having become impervious to ground-water flow due to a facies change<sup>[16]</sup>.

**barrier, freshwater.** Barrier of freshwater injected into an aquifer to stop the inflow of seawater into a coastal aquifer<sup>[16]</sup>.

**barrier, hydrologic.** Lithologic formation preventing horizontal movement of ground water<sup>[16]</sup>.

**barrier, permeability.** A geologic or petrographic feature in a bed obstructing free flow<sup>[16]</sup>.

**barrier spring.** See spring, barrier.

**base exchange.** The displacement of a cation bound to a site on the surface of a solid, as in silica-alumina clay-mineral packets, by a cation solution<sup>[6]</sup>.

**base flow.** 1. That part of the stream discharge that is not attributable to direct runoff from precipitation or melting snow; it is usually sustained by ground-water discharge<sup>[22]</sup>. 2. Sustained fair weather runoff<sup>[16]</sup>.

**base level.** Lowest level of erosion by a stream<sup>[16]</sup>.

**base level of erosion.** The lowest theoretical level of surface to be achieved by erosion<sup>[16]</sup>.

**base level, karst.** See karst base level.

**base line.** 1. An arbitrary line from which deflections of self potential are read<sup>[16]</sup>. 2. Shale line<sup>[16]</sup>.

**baseline monitoring.** The establishment and operation of a designed surveillance system for continuous or periodic measurements and recording of existing and changing conditions that will be compared with future observations<sup>[22]</sup>.

**base of karstification.** Level below which karstification has not occurred. See also karst base level.

**base width.** The width of the hydrograph as determined by a line parallel to the time axis cutting through the points where the rising limb starts and where the recession curve ends<sup>[16]</sup>.

**basin.** Hydrogeographic unit receiving precipitation and discharging runoff in one point<sup>[16]</sup>.

**basin characteristics.** The physiographic, geologic, and ecologic characteristics of a basin<sup>[16]</sup>.

**basin, closed.** Drainage basin with no surface flow outlet<sup>[16]</sup>.

**basin, drainage.** The area contributing to runoff which sustains streamflow<sup>[16]</sup>. See also drainage basin.

**basin, experimental.** A basin chosen for the thorough study of hydrological phenomena<sup>[16]</sup>.

**basin, ground-water.** The area throughout which ground water drains towards the same point. It can be larger than the associated drainage basin if permeable layers extend outside of the topographical divide<sup>[16]</sup>. In karst terranes, the ground-water basin often does not resemble the drainage basin.

**basin, infiltration.** Basin in which water is spread for recharge<sup>[16]</sup>.

**basin, intermontane.** A basin lying between two mountain ranges<sup>[16]</sup>.

**basin method.** A recharge method in which water is spread in shallow basins<sup>[16]</sup>.

**basin mouth.** The point at which runoff leaves a basin<sup>[16]</sup>.

**basin perimeter.** The circumference of a basin following the divide<sup>[16]</sup>.

**basin relief, maximum.** The elevation difference between basin mouth and the highest point within a basin perimeter<sup>[16]</sup>.

**basin, settling.** A basin used for the settling out of solids from suspension<sup>[16]</sup>.

**bat.** A member of the order *Chiroptera*, the only mammals capable of true flight as they have membranes between the toes of their forefeet<sup>[25]</sup>.

**bathybenthic.** Of the bottom of the truly deep areas of the sea, where the "rain" of organic material produces a deposit of food<sup>[23]</sup>.

**bathypelagic.** Of the deep sea. Refers to the depths between roughly 3000 feet below the surface and the bottom of the sea. No food accumulates in these waters<sup>[23]</sup>.

**bathypneumatic.** Referring to water moving with some speed through downward looping passages in the phreatic zone<sup>[25]</sup>. See bathypneumatic zone, ground water, phreas.

**bathypneumatic zone.** See bathypneumatic, ground water, phreas.

**bathymeter.** An instrument for measuring water depths in wells<sup>[16]</sup>.

**beach.** A shore consisting of sand or gravel deposits<sup>[16]</sup>.

**beachrock.** 1. Rock composed of sand grains and/or sand-sized shell fragments cemented by calcium carbonate, commonly formed very rapidly on some beaches in tropical and sub-tropical areas. Beachrock generally occurs as thin beds between bedding planes that dip seawards at angles similar to those of the beach slope<sup>[9]</sup>. 2. A friable to indurated rock consisting of sand grains of various minerals cemented by calcium carbonate; occurs in thin beds dipping seaward at less than 15°. Also known as beach sandstone<sup>[10]</sup>.

**bearing.** The angle measured clockwise that a line makes with the north line.

True, magnetic and grid bearings are measured respectively from true, magnetic and grid north<sup>[25]</sup>.

**bed.** 1. A layer in sedimentary rocks; a stratum<sup>[10]</sup>. 2. A sedimentary deposit of relatively small thickness and great areal extent, separated by bedding planes from over- and underlying deposits<sup>[16]</sup>.

**bed load.** See bedload.

**bed, lower confining.** An impermeable bed underlying an aquifer<sup>[16]</sup>.

**bed, marker.** Bed with characteristic features that can be followed over large areas for identification purposes<sup>[16]</sup>.

**bed, mortar.** Secondary calcium carbonate cementations in the lower part of a soil profile<sup>[16]</sup>. Synonym: hardpan.

**bed, river.** The channel of a river covered by water<sup>[16]</sup>.

**bed roughness.** The roughness of a channel or river bed<sup>[16]</sup>.

**bed, stream.** The bottom of a stream covered by water<sup>[16]</sup>.

**bed, upper confining.** Impermeable bed overlying an aquifer<sup>[16]</sup>.

**bedding.** Applies to rocks resulting from consolidation of sediments and exhibiting surfaces of separation (bedding planes) between layers of the same or different materials (e.g., shale, sandstone, limestone, etc.).

**bedding cave.** See bedding-plane cave.

**bedding grike.** Term used to describe the occurrence of the dissolution and widening (similar to that which occurs in joints) of nearly vertical bedding in karst terranes<sup>[8]</sup>. Synonym: (German.) *Schichtfugenkarren*.

**bedding joint.** A joint in rocks that runs parallel to or on a bedding plane<sup>[16]</sup>.

**bedding plane.** 1. A primary depositional lamination in sedimentary rocks that may be preserved, though possibly with different properties, in metamorphic rocks. These laminations may be clearly visible where lithologies change or where depositional cycles were completed/initiated, or they may be effectively invisible to the naked eye, marking subtle changes in depositional conditions. Most bedding planes were originally horizontal or very slightly inclined, but more steeply inclined bedding planes developed in rocks deposited in deltaic or sand dune environments or in marine reefs. When rocks are folded the bedding planes provide an indication of the degree of deformation. Bedding planes play a crucial role in the inception and ongoing development of most caves and many surface karst features<sup>[3]</sup>. 2. A plane that separates two strata of differing characteristics<sup>[10]</sup>. See also parting.

**bedding-plane cave.** 1. Bedding planes are widespread and very significant features within most carbonate rocks, and cave passages are commonly guided by them. Their structure, their distribution and the chemical contrasts that some bedding planes provide may be the major influence during the earliest phases of

development of a cave system. The term bedding-plane cave is strictly applied to a passage that has not enlarged by growth into a major tube or canyon, but has remained almost entirely on the bedding plane. A famous example is Hensler's Passage, in Gaping Gill, Yorkshire, which is over 400 m long, nearly over 5 m wide and nowhere higher than 1 m<sup>[9]</sup>. 2. A passage formed along a bedding plane, especially when there is a difference in susceptibility to corrosion in the two beds<sup>[10]</sup>. 3. A cave whose location is controlled by the bedding of the enclosing formation or formations<sup>[20]</sup>. Synonyms: (French.) *grotte de stratification*; (German.) *schichtgebundene Höhle*; (Greek.) *strosigenes speleon*; (Italian.) *grotta di interstrato*; (Russian.) *peščera v ploakosti naplastovanija*; (Spanish.) *cueva adaptada a planos de estratificación*; (Turkish.) *tabakalanma mağarası*; (Yugoslavian.) *slojna pećina*.

**bedding-plane parting.** See bedding plane and parting.

**bedeckter karst.** See covered karst.

**bedload.** The part of the total stream load that is moved on or immediately above the stream bed, such as the larger or heavier particles (boulders, pebbles, gravel) transported by traction or saltation along the bottom; the part of the load that is not continuously in suspension or solution<sup>[6]</sup>.

**bedrock.** Solid rock underlying unconsolidated material<sup>[16]</sup>.

**bench mark.** A relatively permanent mark, natural or artificial, furnishing a survey

point at a known elevation in relation to an adopted datum<sup>[16]</sup>. Bench marks, or marked points, connected by precise leveling, constitute the control of land-surface settlement in subsidence studies<sup>[21]</sup>.

**bend.** Curve in a water course<sup>[16]</sup>.

**bentonite.** A colloidal clay, largely made up of the mineral sodium montmorillonite, a hydrated aluminum silicate<sup>[6]</sup>.

**B-horizon.** Illuvial horizon in which soluble material from the overlying A-horizon has been deposited<sup>[16]</sup>.

**belay.** A safety rope tied around a caver that is played out or taken in by a second person as the caver moves. The purpose of the belay is to prevent the caver from falling more than a few feet<sup>[13]</sup>.

**beudantite.** A cave mineral —  $\text{PbFe}_3(\text{AsO}_4)(\text{SO}_4)(\text{OH})_6$ <sup>[11]</sup>.

**bicarbonate.** A salt containing the radical  $\text{HCO}_3^{-1}$ , such as  $\text{Ca}(\text{HCO}_3)_2$ <sup>[10]</sup>.

**bifurcation.** The forklike separation of a water course into two arms<sup>[16]</sup>.

**bifurcation ratio.** The ratio of the number of stream segments of a given order to the number of segments of next higher order<sup>[16]</sup>.

**biological clock.** An inherited time-measuring process within a living thing, which governs its responses to certain external events<sup>[23]</sup>.

**biomass.** The total weight of living matter, whether in an entire community, at a particular trophic level, or of a particular kind of organism in the community. Thus we may refer to the biomass of a pond community, of herbivores in the pond, or of copepods in the pond<sup>[23]</sup>.

**biomicrite.** A microscopic-textured limestone composed of skeletal grains in a matrix of micrite; micrite is a finely crystalline carbonate sediment with the upper crystalline diameter being 4 microns<sup>[20]</sup>. Synonyms: (French.) *biomicrite*; (German.) *Biomicrite*; (Greek.) *micrite*; (Italian.) *biomicrite*; (Spanish.) *biomicrita*; (Turkish.) *biyomikrit*; (Yugoslavian.) *biomikrit*. See also micrite; peloid.

**biospeleology.** 1. The study of subterranean living organisms, particularly in karst caves and other openings in rock formations<sup>[9, 21]</sup>. 2. The scientific study of cave animal life, or the biology of caves, karst, and groundwater. A biologist who specializes in this study is called a biospeleologist<sup>[23]</sup>. Synonyms: (French.) *biospéléologie*, *biospéologie*; (German.) *Biospeläologie*; (Greek.) *biospeleology*; (Italian.) *biospeleogia*; (Russian.) *biospeleologija*; (Spanish.) *biospeleología*; (Turkish.) *biyospeleoloji*, *mağara canlıları bilimi*; (Yugoslavian.) *biospeleologija*.

**biphosphammite.** A cave mineral —  $\text{NH}_4\text{H}_2\text{PO}_4$ <sup>[11]</sup>.

**birnessite.** A cave mineral —  $(\text{Na}, \text{Ca})\text{Mn}_7\text{O}_{14} \cdot 3\text{H}_2\text{O}$ <sup>[11]</sup>.

**blade.** In a cave, a thin sharp projection jutting out from roof, wall, or floor, of which it is an integral part; generally the remains of a partition or bridge<sup>[10]</sup>.

**blanket.** A thick layer of dripstone, not translucent<sup>[10]</sup>. See also bacon; curtain; drapery.

**blind chimney.** See chimney.

**blind shaft.** A vertical extension upwards from part of a cave, but not reaching the surface; small in area in relation to its height<sup>[25]</sup>.

**blind valley.** 1. A karst valley abruptly terminated by the passage underground of the watercourse which has hitherto resisted the karst processes and remained at the surface. An intermediate type, the *half-blind valley*, exists in which the valley form continues downstream from the sinkhole used under conditions of normal river flow. The watercourse only flows here intermittently and the valley may (except for its use as a flood conduit) be fossil in that it represents the section abandoned by the river as it sought progressively higher swallow holes<sup>[19]</sup>. 2. A karst valley with no evident downstream continuation, and one in which the water drains and disappears underground into one or more ponors<sup>[20]</sup>. 3. A valley that terminates abruptly at a point where its stream sinks, or once sank, underground. As sinks develop higher up the blind valley, the original valley termination may be dry under most flow conditions<sup>[9]</sup>. Related to marginal polje. Synonyms: (French.) *vallée aveugle*; (German.) *Blindtal*, (*Kesseltal*); (Greek.) *kliste karstike kilas*; (Italian.)

*valle cieca, valle chiusa*; (Russian.) *slepaja dolina*; (Spanish.) *valle ciego*; (Turkish.) *kör vadi*; (Yugoslavian.) *slijepa dolina, sepa dolina*. See also half-blind valley; marginal polje.

**bloedite.** A cave mineral —  
 $\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$ <sup>[11]</sup>.

**blowhole.** 1. Opening in the roof of a cave or cavern through which air is expelled vigorously. In coastal areas the phenomenon is usually due to compression of air within the cave by incoming tides or waves<sup>[20]</sup>. 2. Cliff top entrance to a sea cave, also known as a geo, gloop, or gloup<sup>[9]</sup>. 3. (Australian.) A small hole in the surface of the Nullarbor Plain through which air blows in and out with observable force, sometimes audibly<sup>[10]</sup>. Related to breathing hole. Synonyms: (French.) *trou souffleur*; (German.) *Windhöhle*; (Greek.) *ope ekphysosa*; (Italian.) *bocca soffiante*; (Spanish.) *soplador*; (Turkish.) *üflenme ağızı*; (Yugoslavian.) *vjetrenica, veternica, pihaljka, pihalnik, dihalnik*. See also steam hole.

**blowing cave.** A cave out of which or into which a current of air flows intermittently<sup>[10]</sup>.

**blowing well.** A well or borehole into which air is sucked and from which air is blown (often with considerable velocity) due to changes in barometric pressure or in water level. The phenomenon indicates that the well or borehole is in communication with an underground air-filled cavity. Synonyms: (French.) *puits souffleur*; (German.) *Windkamin*; (Greek.) *ekphysosa ope*; (Italian.) *pozzo soffiante*;

(Russian.) *dujuščij kolokec*; (Spanish.) *sondeo soplador*; (Turkish.) *üfleç kuyu*. See also steam hole.

**blowout.** An uncontrolled escape of drilling fluid, gas, oil, or water from a well caused by the formation pressure being greater than the hydrostatic head of the fluid in the hole<sup>[6]</sup>.

**blue hole.** 1. Deep resurgence pool, notably in Jamaica and Florida, that may have a blue color due to the presence of algae. Also a deep submarine cave of the Bahamas. The latter type are large flooded shafts cut into the limestones of the shallow reefs and lagoon floors. Many are 100 m in diameter and some are 100 m deep. Opening from the shafts are flooded cave passages at various depths, some of which have been explored subhorizontally for more than 1 km. Their origins are complex. Extensive stalagmite deposits show that large old caves were drained when sea-levels were low during the Pleistocene (when water was held in the ice sheets). They are now being modified by marine dissolution, notably at the interface between fresh and salt waters (sea littoral zone) and by powerful tidal flows between connected holes<sup>[9]</sup>. 2. (Jamaican.) A major emergence where water (artesian spring) rises from below without great turbulence. 3. (Bahamas.) A drowned solution sinkhole<sup>[10]</sup>. 4. Caribbean expression for a major quiet up-welling karst spring inland or along the coast. The blue color is due to the scattering of sunlight by water molecules, although in some cases it may be attributed to the presence of calcareous algae<sup>[20]</sup>. Synonyms: (French.) *source bleue* (Jura), *bleu-fon* (South of France);

(German.) *Blaue Grotto*; (Greek.) *galapo speleo*. See also boiling spring.

**bobbin.** A decender that opens to enclose the rope around two fixed pulleys. May have a handle ("STOP") which must be squeezed to allow descent<sup>[25]</sup>.

**Bodenbedeckter karst.** See subsoil karst.

**bog.** Swamp<sup>[16]</sup>.

**bogaz.** 1. (Slavic.) An elongated depression in limestone or karst terrain; thus it embraces a defile, a blind valley or a ravine leading to a ponor. It can be considered as a giant grike. This meaning is based on the Serbian use<sup>[20]</sup>. 2. A variable-discharge artesian spring in which hydrostatic pressure is great enough to cause a turbulent or even fountain-like discharge. 3. A long narrow chasm enlarged by solution of the limestone<sup>[10]</sup>. 4. Large linear fissure or box valley through a karst block. Effectively a giant grike, perhaps 50 m deep and 1 km long, formed by dissolution on a fault or joint in very massive limestone<sup>[9]</sup>. Synonyms: (French.) *défilé*, *bogaz*; (German.) *Doline*, *Karstgaße*, *Blindtal*, *Zangön*; (Greek.) *faragotheris doline*; (Spanish.) *zanjón*; (Turkish.) *boğaz*; (Yugoslavia.) *bogaz*. See also canyon; gorge; grike; corridor; struga; zanjón.

**boiling spring.** See spring, boiling.

**bollard.** A projection of rock over which rope, tape or wire can be placed to create an anchor<sup>[25]</sup>.

**bolt.** A high tensile steel bolt used as an anchor; either a conical bolt screwed into a metal holder in a hole drilled in rock, causing expansion for grip, or a bolt with partially filed thread hammered into a slightly smaller hole<sup>[25]</sup>.

**bone-breccia.** 1. Cave breccia including much bone<sup>[10]</sup>. 2. A breccia containing many bone fragments. (Scientific attention should be drawn to the finding of such in caves<sup>[25]</sup>.)

**bone cave.** A cave recognized particularly for its contained deposits of animal bones. The bones may be the remains of animals that fell into the cave, as in the Joint Mitnor Cave, Devon, or in many other pitfall or fissure sites. Alternatively the bones may be of animals that originally lived in the cave — and these may include man, as at Niah Cave, Sarawak, or at Russell Cave, USA. A third, and most important, type of bone cave is the ancient animal den, into which scavengers such as hyaenas dragged the remains of many other animals, as for example at Kirkdale Cave in North Yorkshire<sup>[3]</sup>.

**borehole.** 1. Boring into unconsolidated and consolidated materials for the purpose of subsurface hydrogeological investigations. 2. Synonym for a well developed phreatic tube passage<sup>[9]</sup>.

**botryoid, botryoidal speleothem.** 1. Generally sub-spherical or globular calcium carbonate deposits ranging in size between tiny beads and masses up to 1 m across. Botryoidal describes a form resembling a bunch of grapes<sup>[9]</sup>. 2. A grape-like deposit of calcium carbonate generally found on walls of caves<sup>[10]</sup>.



Synonyms: clusterite; grape formation.  
See coralloid speleothem.

**bottom hole.** The lowest part of a drilled hole where the drilling bit cuts into the rock<sup>[16]</sup>.

**bottomland.** A lowland along an alluvial river plain<sup>[16]</sup>.

**boulder clay.** See glacial till.

**boundary spring.** See spring, boundary.

**bourne.** (British.) 1. A stream that appears in a normally dry valley, particularly on the Chalk outcrop in southern England, during wet conditions<sup>[9]</sup>. 2. Intermittent stream in a normally dry valley in chalk country<sup>[10]</sup>.

**boxwork.** 1. A three-dimensional network of thin sheets of mineral projecting from a cave wall. The boxwork is vein fillings etched from the cave wall by dissolution of the host limestone and consists mostly of calcite and quartz. It is not common, but spectacular displays occur in Ind Cave, South Dakota, USA<sup>[9]</sup>. 2. Network of thin blades of calcite or gypsum etched out in relief on the limestone walls and ceiling of a cave<sup>[10]</sup>.

**brackish water.** Water containing from 1000 to 10,000 ppm of total dissolved solids<sup>[16]</sup>.

**braided stream.** A stream that divides into or follows an interlacing or tangled network of several small branching and reuniting shallow channels separated from each other by branch islands or

channel bars, resembling in plan the strands of a complex braid<sup>[6]</sup>.

**brake bar.** A round bar approximately  $2\frac{1}{2} \times \frac{3}{4}$  inches that is placed on rappel racks or carabiners so that rope can be threaded through the rack or carabiners for rappelling<sup>[13]</sup>.

**branchwork cave pattern.** 1. A cave system that has been formed by the intersection of tubular or canyon-like conduits as tributaries in the down-flow direction. 2. A dendritic cave system of subterranean watercourses having many incoming branches and no visible outgoing ones<sup>[10]</sup>.

**breakdown.** See cave breakdown.

**breakthrough.** A quantum jump in erosional activity that is associated with the transition from dominantly laminar to dominantly turbulent flow conditions<sup>[9]</sup>. See turbulent threshold.

**breakthrough curve.** 1. A plot of relative concentration versus time, where relative concentration is defined as  $C/C_0$  with  $C$  as the concentration at a point in the ground-water flow domain, and  $C_0$  as the source concentration<sup>[22]</sup>. 2. A plot of tracer concentration,  $C$ , versus time,  $t$ , for a ground-water tracing study in karst conduit for the purpose of quantitatively determining how much tracer mass was recovered, mean time of travel, mean tracer flow velocity, and related hydraulic flow and geometric parameters. Synonyms: recovery curve; tracer-breakthrough curve; tracer-recovery curve.

**breakthrough time.** The time required to develop a conduit large enough (usually 5–10 mm in diameter) to support turbulent flow<sup>[9]</sup>.

**breathing cave.** Air movement through a cave is described as breathing when it reverses more frequently than the seasonal reversal of a through-draught in a cave with higher and lower entrances. Slow breathing occurs in response to barometric pressure changes, when the volume of cave air is forced to change. It is notoriously strong in large caves of the Australian Nullarbor Plain. More rapid wind reversals or oscillations, as in Breathing Cave, Virginia, are a resonance phenomenon, similar to the effect produced by air passing over the neck of a bottle. In the cave environment the resonant frequency is relatively low and periodic air flow reversals occur, rather than the sound waves observed at the higher frequencies met in the bottle neck example<sup>[9]</sup>.

**breathing hole.** Opening in the roof of a cave, cavern or other underground void through which air is sucked in and expelled in a rhythmic manner similar to inhalation and exhalation of breath<sup>[20]</sup>. Related to blow hole and steam hole. Synonyms: (French.) *trou souffleur*; (German.) *Luftloch*, (Greek.) *anapnéousa opí spiléou*; (Spanish.) *respirador*; (Turkish.) *esintili delik*.

**breccia.** 1. Angular fragments of rock, commonly, but not inevitably, cemented by finer-grained materials including silica, iron minerals, and calcite to form a new rock. Many fault planes are marked by zones of broken rock, either loose or

re-cemented, forming a fault breccia<sup>[9]</sup>. 2. Rock composed of angular fragments<sup>[16]</sup>.

**bridge.** 1. May be a natural bridge of bedrock normally formed outside a cave entrance by partial collapse leaving an isolated roof segment, as in the famous examples of Rakov Škocjan, Slovenia. Rock bridges may also occur inside caves due either surrounding phreatic dissolution or collapse between superimposed passages. Another common type inside a cave is a span of false floor where sediment is washed from below, as at The Bridge in GB Cavern in the Mendip Hills<sup>[9]</sup>. 2. In a cave, a residual rock span across a passage<sup>[10]</sup>. 3. In water wells, an obstruction in the drill hole or annulus. A bridge is usually formed by caving of the wall of the well bore, by the intrusion of a large boulder, or by filter pack materials during well completion. Bridging can also occur in the formation during well development<sup>[16]</sup>. See also natural bridge.

**bridging effect.** The forming of arches in a packing of materials<sup>[16]</sup>.

**brine.** Water containing more than 100,000 ppm of total dissolved solids<sup>[16]</sup>.

**brittle deformation.** The sudden failure of a rock with complete loss of cohesion across a plane.

**brochantite.** A cave mineral —  
 $\text{Cu}_4(\text{SO}_4)(\text{OH})_6$ <sup>[11]</sup>.

**brushite.** A cave mineral —  
 $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$ <sup>[11]</sup>.

**bubble gage.** A stage recorder based on the principle of equating a gas pressure to water level<sup>[16]</sup>.

**bucket.** A measuring reservoir in liquid gaging instruments<sup>[16]</sup>.

**buffered solution.** A solution that resists changes in the pH value upon addition of acids or bases<sup>[16]</sup>.

**buildup.** The vertical distance the water table or potentiometric surface is raised, or the increase of the pressure head due to the addition of water<sup>[22]</sup>.

**buried karst.** Karst topography entirely buried by relatively younger post-rock or sediments and not part of the contemporary landscape<sup>[17]</sup>. Synonyms: fossil karst; (French.) *karst couvert*, *karst fossile*, *paleokarst*; (German.) *bedeckter Karst*, *Urkarst*; (Greek.) *kaymeno paleokarst*; (Italian.) *carso sepolto*; (Spanish.) *karst soterrado*; (Turkish.) *gömülü karst*; (Yugoslavian.) *pokriveni kŕs*. See also covered karst; paleokarst; subsoil karst.

**buried valley.** An ancient valley buried by recent, often glacial deposits<sup>[16]</sup>.

**burst.** 1. Periods of heavy rainfall<sup>[16]</sup>. 2. An explosive breaking of brittle rock material (e.g., rock burst in a deep mine tunnel).

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