V

vadose cave. 1. A cave that underwent most of its development above the water table. Within the vadose zone, drainage is free-flowing under gravity, and cave passages therefore have air above any water surface. The gravitational control of vadose flow means that all vadose cave passages drain downslope, they exist in the upper part of a karst aquifer, and they ultimately drain into the phreatic zone or out to the surface. Active stream caves, explorable by non-diving cavers, are by definition vadose (though they generally have phreatic origins). Characteristics of vadose caves are uneroded ceilings (except for immature phreatic features pre-dating the vadose conditions) and continuous downhill gradients (unless interrupted by short perched sumps). The main passage forms are canyons, with meanders and potholes, broken by sub-cylindrical, spray-corroded shafts that may demonstrate waterfall retreat. Some of the caves of Monte Canin, Italy, are spectacularly long and deep vadose systems[9]. 2. Older, higher cave passages found in the vadose zone; usually vadose caves have been abandoned by the ground water except in times of extreme aquifer recharge. Passages are usually appear as canyons and keyholes.

vadose flow. Water flowing in free-surface streams in caves[25].

vadose seepage. See percolation, percolation water.

vadose shaft. A vertical tube in the vadose zone that may be a few inches to several feet in diameter and may be a few feet deep to hundreds and over a thousand of feet deep. They commonly occur as complexes. A drain hole is usually evident at their base. See also vertical shaft.

vadose water. 1. That part of the underground water in a karst limestone which circulates freely under gravity above the level of saturation - the *vadose zone*. Caves formed by flowing water are said to be *vadose caves*[19]. 2. Water in the zone of aeration; water above the zone of saturation[10].

vadose zone. 1. The zone between the land surface and the water table[22]. 2. The zone between the land surface and the deepest water table which includes the capillary fringe. Generally, water in this zone is under less than atmospheric pressure, and some of the voids may contain air or other gases at atmospheric pressure. Beneath flooded areas or in perched water bodies the water pressure locally may be greater than atmospheric[22]. When discussing a karst setting, it is preferable to use the term, vadose zone, so as to avoid confusion regarding chemical saturation. Synonym: unsaturated zone. See also zone of aeration.

valley fill. Unconsolidated debris accumulated on a valley bottom[16].

valley sink. (American.) An elongated closed depression or series of interconnecting depressions forming a valley-like depression. Compare karst valley; uvala[10].

valley spring. See spring, valley.

vanadinite. A cave mineral — $Pb_5(VO_4)_3Cl$[11].

vaporization. The process by which liquid or solid water changes into the gaseous state[16].

variable-temperature zone. The area of a cave where air temperature fluctuates with the seasons. See also *zonation*.

variance. The square of the standard deviation[16].

variscite. A cave mineral — $AlPO_4 \cdot 2H_2O$[11].

varve. The alternating of coarse and fine grained layers in glacial lake sediments[16].

vasque. A large, shallow solution pan formed in the intertidal zone of warm seas by the action of brine and marine organisms[19].

vauclusian spring; vauclusian rising. See spring, vauclusian.

vegetation cover. The cover living vegetation on top of the upper soil horizon[16].

vein. A mineral filled fracture cutting through a host rock. The mineral filling may be derived from the host rock, as is the case with many calcite veins in limestone (e.g. at Marble Showers in Ogof Ffynnon Ddu) or derived from other, generally deeper, sources, such as the many veins containing lead and zinc ore minerals in the Derbyshire Peak District, England[9].

velocity, average interstitial. The average rate of ground-water flow in interstices expressed as the product of hydraulic conductivity and hydraulic gradient divided by the effective porosity. Synonymous with average linear ground-water velocity or effective velocity.

vermiculation. Pattern of thin, worm-shaped coatings of clay or silt on cave surfaces[25].

vertebrate. An animal with a backbone. The group includes fishes, amphibians, reptiles, birds, and mammals. Some amphibians and fishes live permanently in caves. See also *invertebrate*.

vertical angle. The angle in a vertical plane between a line of sight and the horizontal, positive above the horizontal and negative below[25].

vertical cave. A vertical passage within a cave system, formed along joints by which underground watercourses are transferred from a higher to a lower bedding plane[19]. They may become transformed into vertical shafts by sufficiently uniform dissolution as to create a rounded vertical passage. See also fissure cave; vertical shaft.

vertical shaft. These are formed by underground water dripping of flowing straight downward through the limestone along vertical cracks. Uniformly distributed dissolution of the rock results in a silo- or well-shaped passage so that most of them appear roughly circular in cross section when viewed straight up and

down. They form above active tubular passages although they may intersect a limited number of passages along their length. At Mammoth Cave, they range in size from 30 feet across to 200 feet from top to bottom[15]. Synonym: dome-pit. See also canyon passage; fissure cave; keyhole passage; passage; tubular passage; vadose shaft; vertical cave.

vertical caver. A caver who enjoys and is competent doing vertical caving[13]. See also vertical caving.

vertical caving. Caving that includes a lot of ascending and descending[13]. See also vertical caver.

very fine sand. Grain particles with diameters ranging from 0.05 to 0.1 mm[16].

vesicular. Containing small circular cavities[16].

victor tube. The single phreatic sub-conduit among the many that potentially exist on a given bedding plane (or fracture plane) that is the first to reach a diameter capable of establishing turbulent-flow conditions. Following this breakthrough the victor tube tends to enlarge more rapidly than other branching or sub-parallel alternatives and eventually captures much of the drainage within its field of influence[9].

virgin flow. Flow unaffected by artificial diversions, impoundments, or channels[16].

virgin passage. A cave passage that has not previously been entered; a new discovery[13].

viscosity. 1. The resistance of liquid to flow[16]. 2. The property of a real fluid creating shear forces between two fluid elements and giving rise to fluid friction[16]. Specifically, it is the ratio of the shear stress to the rate of shear strain[6].

void. See interstice.

void ratio. The ratio of (a) the volume of void space to (b) the volume of solid particles in a given soil mass[22].

volatiles. Substances with relatively large vapor pressures. Many organic substances are almost insoluble in water so that they occur primarily in a gas phase in contact with water, even though their vapor pressure may be very small[22].

volumetric flowmeter. Apparatus designed to measure a volume flow rate[16].

volumetric moisture content. The concentration of water in soil by volume[16].

vrulje. (Yugoslavian.) See submarine spring.

vug. A small cavity in rock usually lined with crystals. Adjective, vuggy[10]. See also geode.

vugular pore space. Void space due to solution cavities of small size[16].

vulcanokarst. An area comprised of tubular caves within lava flows and shows evidence of mechanical collapse of the roof into them. See also lava cave; pseudokarst.

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