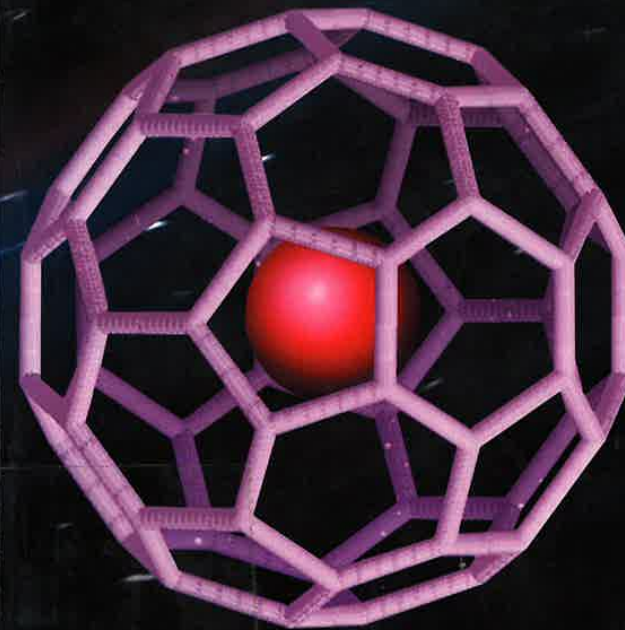


McGraw-Hill
Dictionary of
SCIENTIFIC
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TERMS



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Sixth Edition

On the cover: Representation of a fullerene molecule with a noble gas atom trapped inside. At the Permian-Triassic sedimentary boundary the noble gases helium and argon have been found trapped inside fullerenes. They exhibit isotope ratios quite similar to those found in meteorites, suggesting that a fireball meteorite or asteroid exploded when it hit the Earth, causing major changes in the environment. (Image copyright © Dr. Luann Becker. Reproduced with permission.)

Over the six editions of the Dictionary, material has been drawn from the following references: G. M. Garrity et al., *Taxonomic Outline of the Prokaryotes*, Release 2, Springer-Verlag, January 2002; D. W. Linzey, *Vertebrate Biology*, McGraw-Hill, 2001; J. A. Pechenik, *Biology of the Invertebrates*, 4th ed., McGraw-Hill, 2000; U.S. Air Force Glossary of Standardized Terms, AF Manual 11-1, vol. 1, 1972; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, Department of Defense, 1967; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, National Aeronautics and Space Administration, 1965; *Glossary of Stinfor Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *ADP Glossary*, Department of the Navy, NAVSO P-3097; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology*, White Sands Missile Range, New Mexico, National Bureau of Standards, AD 467-424; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission.

**McGraw-Hill Dictionary of Scientific and Technical Terms,
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torsion group [MATH] 1. A group whose elements all have finite period. 2. For a topological space X , one of a sequence of finite groups $G_n(X)$ such that the homology group $H_n(X)$ is the direct sum of $G_n(X)$ and a number of infinite cyclic groups. { 'tôr-shôn ,grüp }

torsion hygrometer [ENG] A hygrometer in which the rotation of the hygrometric element is a function of the humidity; such hygrometers are constructed by taking a substance whose length is a function of the humidity and twisting or spiraling it under tension in such a manner that a change in length will cause a further rotation of the element. { 'tôr-shôn hî'grâm-äd-ör }

torsionmeter See torsionmeter. { 'tôr-shôn ,mêd-ör }

torsion module [MATH] A module M over an entire principal ring R is said to be a torsion module if for any element x in M there exists an element a in R such that $a \neq 0$ and $ax = 0$. { 'tôr-shôn ,mä-jül }

torsion pendulum See torsional pendulum. { 'tôr-shôn 'pen-jä-läm }

torsion-string galvanometer [ENG] A sensitive galvanometer in which the moving system is suspended by two parallel fibers that tend to twist around each other. { 'tôr-shôn 'striŋ ,gal-vä'näm-äd-ör }

torsion subgroup [MATH] The torsion subgroup of an Abelian group G is the subset of all torsion elements of G . { 'tôr-shôn 'səb ,grüp }

torsion submodule [MATH] The torsion submodule of a module E over an entire principal ring is the submodule consisting of all torsion elements of E . { 'tôr-shôn 'səb ,mä-jül }

torso mountain See monadnock. { 'tôr-sō ,maunt-ən }

torticollis [MED] A deformity of the neck resulting from contraction of the cervical muscles or fascia. Also known as wryneck. { ,törd-ə'käl-əs }

tortoise [VERT ZOO] Any of various large terrestrial reptiles in the order Chelonia, especially the family Testudinidae. { 'törd-əs }

Tortonian [GEOL] A European stage of geologic time: Miocene (above Helvetian, below Sarmatian). { 'tôr-tō-nē-ən }

Tortricidae [INV ZOO] A family of phytophagous moths in the superfamily Tortricoidea which have a stout body, lightly fringed wings, and threadlike antennae. { 'tôr'tris-ə,dē }

Tortricoidea [INV ZOO] A superfamily of small wide-winged moths in the suborder Heteroneura. { ,tôr-trə'kōid-ē-ə }

Torulopsidales [MYCOL] The equivalent name for Cryptococcales. { ,tôr-ə,lüp-sə'dä-lēz }

torulosis See cryptococcosis. { ,tôr-ə'lō-səs }

torus [ANAT] A rounded protuberance occurring on a body part. [BOT] The thickened membrane closing a bordered pit. [MATH] 1. The surface of a doughnut-shaped object. 2. The topological space obtained by identifying the opposite sides of a rectangle. 3. The group which is the product of two circles. { 'tôr-əs }

Torymidae [INV ZOO] A family of hymenopteran insects in the superfamily Chalcidoidea. { 'tôr'im-ə,dē }

TOS See tape operating system.

tosca [METEOROL] A southwest wind on Lake Garda in Italy. { 'tôs-kə }

toss bombing [ORD] A method of bombing where an aircraft flies on a line toward the target, pulls up in a vertical plane, releasing the bomb at an angle that will compensate for the effect of gravity drop on the bomb. { 'tôs ,büm-ing }

total air [ENG] The actual quantity of air supplied for combustion of fuel in a boiler, expressed as a percentage of theoretical air. { 'töd-əl 'er }

total allowable catch [OCEANOGR] A fishery management approach to assign an annual quota that, if exceeded, will terminate the fishery for that year; the total allowable catch is set at a level to prevent a catch so large that the stock will be overfished. { ,töd-əl ə,lau-ə-bəl 'kach }

total binding energy See binding energy. { 'töd-əl 'bînd-ing 'en-ər-jē }

total carbon [MET] The sum of free and combined carbon in a ferrous alloy, especially steel. { 'töd-əl 'kär-bən }

total coincidence [MECH ENG] The condition in which all the joints of a robot become locked in position. { 'töd-əl kō'in-säd-əns }

total conductivity [GEOPHYS] In atmospheric electricity, the sum of the electrical conductivities of the positive and negative

ions found in a given portion of the atmosphere. { 'töd-əl ,kän-däkt'iv-äd-ē }

total curvature [MATH] See Gaussian curvature. [OPTICS] The difference between the reciprocals of the radii of curvature of the two surfaces of a lens. { 'töd-əl 'kär-və-chär }

total cyanide [MET] Total amount of cyanide contained in an electroplating bath, including both simple and complex ions. { 'töd-əl 'st-ə,nîd }

total deadlock [COMPUT SCI] A deadlock that involves all the tasks in a multiprogramming system. { 'töd-əl 'ded,läk }

total differential [MATH] The total differential of a function of several variables, $f(x_1, x_2, \dots, x_n)$, is the function given by the sum of terms $(\partial f / \partial x_i) dx_i$ as i runs from 1 to n . Also known as differential. { 'töd-əl ,dif-ə'ren-chəl }

total displacement See slip. { 'töd-əl di'spläs-mənt }

total drift [NAV] In marine gyroscopes, the algebraic sum of the apparent and real precession or drift; the apparent drift is that caused by the gyroscope attempting to maintain its orientation in inertial space while the vehicle on which the gyroscope is mounted moves to new locations. { 'töd-əl 'drift }

total eclipse [ASTRON] An eclipse that obscures the entire surface of the moon or sun. { 'töd-əl i'klîps }

total energy ball [NUCLEO] An array of high-efficiency, low-resolution gamma-ray detectors that completely surrounds the target of a heavy-ion accelerator, and is used to measure the total energy deposited by the gamma-ray shower from a heavy-ion collision and the number of component detectors in which this energy is deposited. { 'töd-əl 'en-ər-jē ,bəl }

total evaporation See evapotranspiration. { 'töd-əl i,vap-ə'rä-shən }

total harmonic distortion [ELECTR] Ratio of the power at the fundamental frequency, measured at the output of the transmission system considered, to the power of all harmonics observed at the output of the system because of its nonlinearity, when a single frequency signal of specified power is applied to the input of the system; it is expressed in decibels. { 'töd-əl här'män-ik di'stôr-shən }

total head [FL MECH] The sum of the velocity head and the pressure head corresponding to the static pressure. { 'töd-əl 'hed }

total heat See enthalpy. { 'töd-əl 'het }

total heat of dilution See heat of dilution. { 'töd-əl 'het əv di'lü-shən }

total heat of solution See heat of solution. { 'töd-əl 'het əv sölü-shən }

total impulse [AERO ENG] The product of the thrust and the time over which the thrust is produced, expressed in pounds (force)-seconds; used especially in reference to a rocket motor or a rocket engine. { 'töd-əl 'îm,puls }

total internal reflection [OPTICS] A phenomenon in which electromagnetic radiation in a given medium which is incident on the boundary with a less-dense medium (one having a lower index of refraction) at an angle less than the critical angle is completely reflected from the boundary. { 'töd-əl in'təm-əl ri'flek-shən }

totality [ASTRON] 1. The portion of a total eclipse of the sun during which the sun is entirely covered by the moon at a specified location on the earth's surface. 2. The portion of a total eclipse of the moon or other body during which the eclipsed body is entirely within the umbra of the eclipsing body. { 'töd-əl 'äd-ē }

total lift [AERO ENG] The upward force produced by the gas in a balloon; it is equal to the sum of the free lift, the weight of the balloon, and the weight of auxiliary equipment carried by the balloon. { 'töd-əl 'lift }

total lung capacity [PHYSIO] The volume of gas contained within the lungs at the end of a maximum inspiration. { 'töd-əl 'lŋg kə,pas-äd-ē }

totally bounded set See precompact set. { 'töd-əl-ē 'baun-däd 'set }

totally disconnected [MATH] A topological space has this property if the largest connected subset containing any given point is only the point itself. { 'töd-əl-ē ,dis-kə'nek-täd }

totally imaginary field [MATH] An extension field F of the field of rational numbers such that no embedding of F in the complex numbers is contained in the real numbers. { 'töd-əl-ē i,maj-ə,ner-ē 'fîld }

totally ordered set See linearly ordered set. { 'töd-əl-ē ,örd-örd 'set }

TORTOISE

Desert tortoise (*Gopherus agassizi*).