

ROPES
& GRAY



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Dictionary

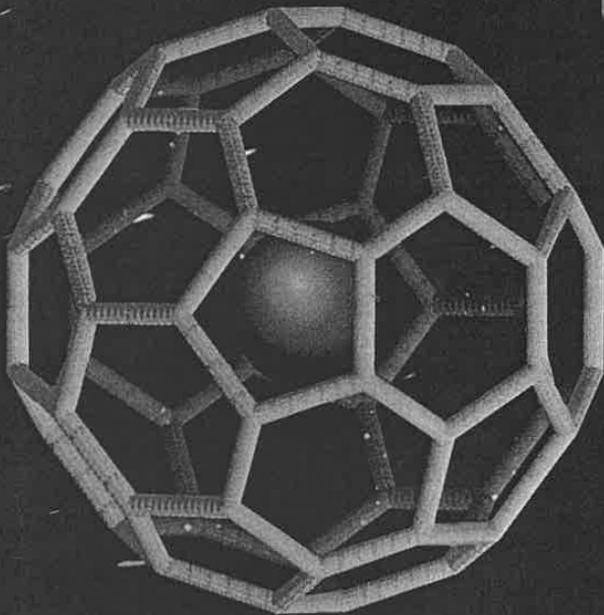
of

SCIENTIFIC

and

TECHNICAL

TERMS



Sixth Edition

McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

**Sixth
Edition**

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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 Stinfo 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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orthotropic [BOT] Having a straight ovule with the micropyle at the end opposite the stalk. { 'ór-thá-trá-pós }

orthotungstic acid See tungstic acid. { 'ór-thó'táj-stík 'ás-ád }

Orthox [GEOL] A suborder of the soil order Oxisol that is moderate to low in organic matter, well drained, and moist all or nearly all year; believed to be extensive at low altitudes in the heart of the humid tropics. { 'ór-tháks }

Orussidae [INV ZOO] A small family of hymenopteran insects in the superfamily Siricoidea. { 'ó-rús-á,dē }

orvietite [PETR] An extrusive rock composed of approximately equal amounts of plagioclase and sanidine; includes leucite, augite, minor biotite, and olivine, and accessory apatite and opaque oxides. { 'ór-vē-á,fít }

oryctocoenosis [PALEON] The part of a thanatocoenosis that has been preserved as a fossil. { 'ó,rík-tá-sá'nō-sás }

Os See osmium.

Osagean [GEOL] A provincial series of geologic time in North America; Lower Mississippian (above Kinderhookian, below Meramecian). { 'ó-sá-jē-ón }

osage orange [BOT] *Maclura pomifera*. A tree in the mulberry family of the Urticales characterized by yellowish bark, milky sap, simple entire leaves, strong axillary thorns, and aggregate green fruit about the size and shape of an orange. { 'ó,sáj 'ár-inj }

osar See esker. { 'ó,sár }

osazone [BIOCHEM] Any of the compounds that contain two phenylhydrazine residues and are produced by a reaction between a reducing sugar and phenylhydrazine. { 'ó-sá,zón }

O scan See O scope. { 'ó ,skán }

osciducer [ELECTR] Transducer in which information pertaining to the stimulus is provided in the form of deviation from the center frequency of an oscillator. { 'ás-á'dú-sár }

oscillating conveyor [MECH ENG] A conveyor on which pulverized solids are moved by a pan or trough bed attached to a vibrator or oscillating mechanism. Also known as vibrating conveyor. { 'ás-á,lád-inj kán'vá-ór }

oscillating granulator [MECH ENG] Solids size-reducer in which particles are broken by a set of oscillating bars arranged in cylindrical form over a screen of suitable mesh. { 'ás-á,lád-inj 'gran-yá,lád-ór }

oscillating magnetic field [ELECTROMAG] A magnetic field which varies periodically in time. { 'ás-á,lád-inj mag'ned-ik 'feld }

oscillating screen [MECH ENG] Solids separator in which the sifting screen oscillates at 300 to 400 revolutions per minute in a plane parallel to the screen. { 'ás-á,lád-inj 'skrén }

oscillating series [MATH] A series that is divergent but not properly divergent; that is, the partial sums do not approach a limit, or become arbitrarily large or arbitrarily small. { 'ás-á,lád-inj ,sír,éz }

oscillating universe [ASTRON] An extension of the closed universe model in which the universe, after contracting toward a singularity, undergoes another big bang to begin a new cycle, and thenceforth oscillates between successive expansions and contractions, each contraction followed by a new big bang. { 'ás-á,lád-inj 'yü-ná,vørs }

oscillation [CONT SYS] See cycling. [MATH] 1. The oscillation of a real-valued function on an interval is the difference between its least upper bound and greatest lower bound there. 2. The oscillation of a real-valued function at a point x is the limit of the oscillation of the function on the interval $[x - \epsilon, x + \epsilon]$ as ϵ approaches 0. Also known as saltus. [PHYS] Any effect that varies periodically back and forth between two values. { 'ás-á'lá-shón }

oscillation photography [SOLID STATE] A method of x-ray diffraction analysis in which a single crystal is made to oscillate through a small angle about an axis perpendicular to a beam of monochromatic x-rays or particles. { 'ás-á'lá-shón fótáig-rá-fē }

oscillation ripple See oscillation ripple mark. { 'ás-á'lá-shón ,rip-əl }

oscillation ripple mark [GEOL] A symmetric ripple mark having a sharp, narrow, and relatively straight crest between broadly rounded troughs, formed by the motion of water agitated by oscillatory waves on a sandy base at a depth shallower than wave base. Also known as oscillation ripple; oscillatory ripple mark; wave ripple mark. { 'ás-á'lá-shón 'rip-əl ,márk }

oscillator [ELECTR] 1. An electronic circuit that converts

energy from a direct-current source to a periodically varying electric output. 2. The stage of a superheterodyne receiver that generates a radio-frequency signal of the correct frequency to mix with the incoming signal and produce the intermediate-frequency value of the receiver. 3. The stage of a transmitter that generates the carrier frequency of the station or some fraction of the carrier frequency. [PHYS] Any device (mechanical or electrical) which, in the absence of external forces, can have a periodic back-and-forth motion, the frequency determined by the properties of the oscillator. { 'ás-á,lád-ór }

oscillator harmonic interference [ELECTR] Interference occurring in a superheterodyne receiver due to the interaction of incoming signals with harmonics (usually the second harmonic) of the local oscillator. { 'ás-á,lád-ór hár'mán-ik ,in-tár'fir-əns }

Oscillatoriales [BOT] An order of blue-green algae (Cyanophyceae) which are filamentous and truly multicellular. { 'ás-á-lá,tór-ē'á-léz }

oscillator-mixer-first detector See converter. { 'ás-á,lád-ór 'mik-sár ,fórst di'tek-tór }

oscillator strength [ATOM PHYS] A quantum-mechanical analog of the number of dispersion electrons having a given natural frequency in an atom, used in an equation for the absorption coefficient of a spectral line; it need not be a whole number. Also known as f value; Ladenburg f value. { 'ás-á,lád-ór ,strenkth }

oscillatory circuit [ELEC] Circuit containing inductance or capacitance, or both, and resistance, connected so that a voltage impulse will produce an output current which periodically reverses or oscillates. { 'ás-á-lá,tór-ē 'sár-kət }

oscillatory discharge [ELEC] Alternating current of gradually decreasing amplitude which, under certain conditions, flows through a circuit containing inductance, capacitance, and resistance when a voltage is applied. { 'ás-á-lá,tór-ē 'dis ,cháj }

oscillatory extinction See undulatory extinction. { 'ás-á-lá,tór-ē ik'stink-shón }

oscillatory reaction [CHEM] A chemical reaction in which a variable of a chemical system exhibits regular periodic changes in time or in space. { 'ás-á-lá,tór-ē rē'ak-shən }

oscillatory ripple mark See oscillation ripple mark. { 'ás-á-lá,tór-ē 'rip-əl ,márk }

oscillatory shear [FL MECH] Application of small-amplitude oscillations to produce shear in viscoelastic fluids for the study of dynamic viscosity. { 'ás-á-lá,tór-ē 'shir }

oscillatory surge [ELEC] Surge which includes both positive and negative polarity values. { 'ás-á-lá,tór-ē 'sərgj }

oscillatory twinning [CRYSTAL] Repeated, parallel twinning. { 'ás-á-lá,tór-ē 'twin-inj }

oscillatory wave [PHYS] A wave composed of individual particles, each of which oscillates about a point with little, if any, permanent change in position. { 'ás-á-lá,tór-ē 'wāv }

oscillistor [ELECTR] A bar of semiconductor material, such as germanium, that will oscillate much like a quartz crystal when it is placed in a magnetic field and is carrying direct current that flows parallel to the magnetic field. { 'ás-á-lá-tór }

oscillogram [ENG] The permanent record produced by an oscillograph, or a photograph of the trace produced by an oscilloscope. { 'ó'sil-á,grám }

oscillograph [ENG] A measurement device for determining waveform by recording the instantaneous values of a quantity such as voltage as a function of time. { 'ó'sil-á,graf }

oscillographic polarography [PHYS CHEM] A type of voltammetry using a dropping mercury electrode with oscillographic scanning of the applied potential; used to measure the concentration of electroactive species in solutions. { 'ás-á-lá,gráf-ik ,pó-lá'rág-rá-fē }

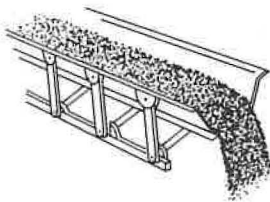
oscillograph tube [ELECTR] Cathode-ray tube used to produce a visible pattern, which is the graphical representation of electric signals, by variations of the position of the focused spot or spots according to these signals. { 'ó'sil-á,graf ,tüb }

oscillometric titration [PHYS CHEM] Radio-frequency technique used for conductometric and dielectric titrations; the changes in conductance or dielectric properties changes the solution capacity and thus the frequency of the connected oscillator circuit. { 'ás-á-lá'me'trík tí'trá-shən }

OSAGE ORANGE

Leaf and branch of *Maclura pomifera*.

OSCILLATING CONVEYOR



Oscillating conveyor, with whole trough oscillating.

taking place; this results in a metastable state. { 'sü-pär'häd-ij }

superheavy boson [PART PHYS] A hypothetical particle, postulated in grand unified theories, which would be responsible for interactions between quarks and leptons in the early universe, and also responsible for proton decay. Also known as X boson. { 'sü-pär'hev-ë 'bõ,sän }

superheavy element [INORG CHEM] A chemical element with an atomic number of 110 or greater. { 'sü-pär'hev-ë 'el-ə-mənt }

superhelix [BIOCHEM] A macromolecular structure consisting of a number of alpha-helical polypeptide strands which are twisted together. { 'sü-pär'hē,liks }

superhet See superheterodyne receiver. { 'sü-pär,het }

superheterodyne receiver [ELECTR] A receiver in which all incoming modulated radio-frequency carrier signals are converted to a common intermediate-frequency carrier value for additional amplification and selectivity prior to demodulation, using heterodyne action; the output of the intermediate-frequency amplifier is then demodulated in the second detector to give the desired audio-frequency signal. Also known as superhet. { 'sü-pär'he-trə, 'dīn rī'sē-vər }

superhigh frequency [COMMUN] A frequency band from 3000 to 30,000 megahertz, corresponding to wavelengths from 1 to 10 centimeters. Abbreviated SHF. { 'sü-pär'hī 'frē-kwən-sē }

superhighway [CIV ENG] A broad highway, such as an expressway, freeway, turnpike, for high-speed traffic. { 'sü-pär'hī,wā }

superimposed [GEOL] Pertaining to layered or stratified rocks. { 'sü-pär-im'pözd }

superimposed back pressure [MECH ENG] The static pressure at the outlet of an operating pressure relief device, resulting from pressure in the discharge system. { 'sü-pär-im'pözd 'bak 'preš-ər }

superimposed coding [COMPUT SCI] A means of placing many keywords in a single card area, where they can be scanned simultaneously. { 'sü-pär-im'pözd 'kõd-ij }

superimposed drainage [HYD] A naturally evolved drainage system that became established on a preexisting surface, now eroded, and whose course is unrelated to the present underlying geological structure. { 'sü-pär-im'pözd 'drā-nij }

superimposed fan [GEOL] An alluvial fan developed on, and having a steeper gradient than, an older fan. { 'sü-pär-im'pözd 'fan }

superimposed fold See cross fold. { 'sü-pär-im'pözd 'fõld }

superimposed glacier [GEOL] A glacier whose course is maintained despite different preexisting structures and lithologies as the glacier erodes downward. { 'sü-pär-im'pözd 'glā-shər }

superimposed stream [HYD] A stream, started on a new surface, that kept its course through the different preexisting lithologies and structures encountered as it eroded downward into the underlying rock. Also known as superinduced stream. { 'sü-pär-im'pözd 'strēm }

superimposed valley [GEOL] A valley eroded by or containing a superimposed stream. { 'sü-pär-im'pözd 'val-ē }

superincumbent [GEOL] Pertaining to a superjacent layer, especially one that is situated so as to exert pressure. { 'sü-pär-in'kõm-bənt }

superinduced stream See superimposed stream. { 'sü-pär-in'düst 'strēm }

superinfection [VIROL] An attack on a bacterial cell by several phages due to the introduction of large numbers of viruses into the bacterial culture. { 'sü-pär-in'fek-shən }

superinsulation [CHEM ENG] A multilayer insulation for cryogenic systems, composed of many floating radiation shields in an evacuated double-wall annulus, closely spaced but thermally separated by a poor-conducting fiber. { 'sü-pär,in-sə'lā-shən }

superionic conduction [SOLID STATE] Extremely fast conduction of ions in certain inorganic crystalline solids, approaching the ionic conductivity of aqueous sodium chloride. { 'sü-pär,ī'an-ik kən'dæk-shən }

superionic conductor [SOLID STATE] An ionic solid whose ionic conductivity is extremely high, on the order of 100 times that normally observed. { 'sü-pär,ī'an-ik kən'dæk-tər }

superior [BOT] 1. Positioned above another organ or structure. 2. Referring to a calyx that is attached to the ovary. 3.

Referring to an ovary that is above the insertion of the floral parts. { 'sü-pär-ē-ər }

superior air [METEOROL] An exceptionally dry mass of air formed by subsidence and usually found aloft but occasionally reaching the earth's surface during extreme subsidence processes. { 'sü-pär-ē-ər 'er }

superior alveolar canals [ANAT] The alveolar canals of the maxilla. { 'sü-pär-ē-ər al'vē-ə-lər kə'nälz }

superior conjunction [ASTRON] A conjunction when an astronomical body is opposite the earth on the other side of the sun. { 'sü-pär-ē-ər kən'jõnk-shən }

superior fruit See true fruit. { 'sü-pär-ē-ər 'früt }

superior ganglion [NEUROSCI] 1. The upper sensory ganglion of the glossopharyngeal nerve, located in the upper part of the jugular foramen; it is inconstant. 2. The upper sensory ganglion of the vagus nerve, located in the jugular foramen. { 'sü-pär-ē-ər 'gæg-glē-ən }

superior mesenteric artery [ANAT] A major branch of the abdominal aorta with branches to the pancreas and intestine. { 'sü-pär-ē-ər ,mez-ən'ter-ik 'ärd-ə-rē }

superior mirage [OPTICS] A spurious image of an object formed above the object's position by abnormal refraction conditions; opposite to an inferior mirage. { 'sü-pär-ē-ər mi'räzh }

superior planet [ASTRON] Any of the planets that are farther than the earth from the sun; includes Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. { 'sü-pär-ē-ər 'plan-ət }

superior tide [OCEANOGR] The tide in the hemisphere in which the moon is above the horizon. { 'sü-pär-ē-ər 'tid }

superior transit See upper transit. { 'sü-pär-ē-ər 'tran-zät }

superior vena cava [ANAT] The principal vein collecting blood from the head, chest wall, and upper extremities and draining into the right atrium. { 'sü-pär-ē-ər 'vē-nə 'kä-və }

superjacent [GEOL] Pertaining to a stratum situated immediately upon or over a particular lower stratum or above an unconformity. { 'sü-pär'jä-sənt }

superjacent roadway system See Hirschback method. { 'sü-pär'jä-sənt 'rõd,wā ,sis-təm }

superjacent waters [OCEANOGR] The waters above the continental shelf. { 'sü-pär'jä-sənt 'wõd-ərz }

super-Jupiter See brown dwarf. { 'sü-pär 'jü-päd-ər }

super-large-scale integrated circuit [ELECTR] A very complex integrated circuit that has a high density of transistors and other components, for a total of 10⁶ or more components. Also known as superchip. Abbreviated SLSI circuit. { 'sü-pär 'lärj 'skäl ,in-tə'gräd-əd 'sär-kõt }

superlattice [ELECTR] A structure consisting of alternating layers of two different semiconductor materials, each several nanometers thick. [SOLID STATE] An ordered arrangement of atoms in a solid solution which forms a lattice superimposed on the normal solid solution lattice. Also known as artificial crystal; artificially layered structure; superstructure. { 'sü-pär'läd-əs }

superlayer [FL MECH] A very thin, highly convoluted interface that separates the turbulent from the nonturbulent regions in a flow of high Reynolds number. { 'sü-pär,lä-ər }

superleak See lambda leak. { 'sü-pär,lēk }

superline [COMPUT SCI] A unit of text longer than an ordinary line, used in some of the more powerful text editors. { 'sü-pär,līn }

superluminal motion [ASTRON] Apparent proper motion exceeding the velocity of light in an astronomical object. { 'sü-pär,līm-ə-nəl 'mõ-shən }

superluminal radio source [ASTRON] A radio source whose velocity appears to exceed that of light. { 'sü-pär,lüm-ən-əl 'räd-ē-õ ,sõrs }

supermale [GEN] In *Drosophila*, a male with one X chromosome and three or more sets of autosomes, resulting in sterility and generally early death. { 'sü-pär,mäl }

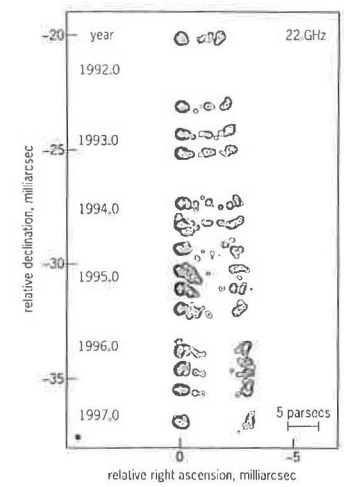
supermassive star [ASTRON] A star with a mass exceeding about 50 times that of the sun. { 'sü-pär'mas-iv 'stär }

supermatrite [GEOL] Pertaining to a texturally mature elastic sediment whose grains have become rounded. { 'sü-pär-mə'thür }

super-metal-rich star [ASTRON] 1. A low-luminosity giant star of spectral class K, strongly enhanced cyanogen radical (CN) bands, and apparently strong metal lines. 2. A star that is significantly richer in metals than those of the Hyades. { 'sü-pär 'med-əl ,rīch 'stär }

supermicro [COMPUT SCI] A computer resembling a

SUPERLUMINAL MOTION



A series of 14 very long baseline interferometry images of the quasar 3C 279 over a period of 6 years. All images show a bright feature on the left (the nucleus of the quasar), and a feature on the right, which moves away steadily with time. Superluminal speed is 4.3c, where c is the speed of light. (*Astronomical Society of the Pacific Conference Proceedings Series*)