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- haar**, *n.* A wet sea fog or very fine drizzle which drifts in from the sea in coastal districts of eastern Scotland and northeast England, especially in summer.
- habitat sanctuary**. A marine sanctuary established for the preservation, protection and management of essential or specialized habitats representative of important marine systems. See also MARINE SANCTUARY.
- hachules**, *n. pl.* 1. Short lines on topographic maps or nautical charts to indicate the slope of the ground or the submarine bottom. They usually follow the direction of the slope. 2. Inward-pointing short lines or "ticks" around the circumference of a closed contour indicating a depression or a minimum.
- hack**, *n.* A chronometer which has failed to meet the exacting requirements of a standard chronometer, and is used for timing observations of celestial bodies, regulating ship's clocks, etc. A comparing watch, which may be of high quality, is normally used for timing celestial observations, the watch being compared with the chronometer, preferably both before and after observations. Sometimes called HACK CHRONOMETER.
- hack chronometer**. See HACK.
- hack watch**. See COMPARING WATCH.
- hail**, *n.* Frozen precipitation consisting of ice balls or irregular lumps of ice of varying size, ranging from that of a raindrop to an inch or considerably more. They are composed of clear ice or of alternate layers of ice and snow, and may fall detached or frozen together into irregular lumps. Hail is usually associated with thunderstorms. A hailstone is a single unit of hail. Small hail consists of snow pellets surrounded by a very thin ice covering. See also SNOW PELLETS.
- hailstone**, *n.* See under HAIL.
- hail storm**. See under STORM, definition 2.
- half-power points**. Power ratios used to define the angular width of a radar beam. One convention defines beam width as the angular width between points at which the field strength is 71 percent of its maximum value. Expressed in terms of power ratio, this convention defines beam width as the angular width between half-power points. A second convention defines beam width as the angular width between points at which the field strength is 50 percent of its maximum value. Expressed in terms of power ratio, the latter convention defines beam width as the angular width between quarter-power points.
- half tide**. The condition or time of the tide when midway between high and low.
- half-tide basin**. A lock of very large size and usually of irregular shape, the gates of which are kept open for several hours after high tide so that vessels may enter as long as there is sufficient depth over the sill. Vessels remain in the half-tide basin until the ensuing flood tide before they may pass through the gate to the inner harbor. If entry to the inner harbor is required before this time, water must be admitted to the half-tide basin from some external source. See also TIDAL BASIN, NON-TIDAL BASIN.
- half-tide level**. A tidal datum midway between mean high water and mean low water. Mean sea level may coincide with half-tide level, but seldom does; the variation is generally about 3 centimeters and rarely exceeds 6 centimeters. Also called MEAN TIDE LEVEL. See also MID-EXTREME TIDE.
- halo**, *n.* Any of a group of optical phenomena caused by refraction or reflection of light by ice crystals in the atmosphere. The most common form is a ring of light of radius 22° or 46° around the sun or moon. See also CORONA, PARHELION, CIRCUMSCRIBED HALO, PARHELIC CIRCLE, SUN CROSS, SUN PILLAR, CIRCUMZENITHAL ARC, ANTHELION, PARANTHELION, HAVELIAN HALO, TANGENT ARC.
- halving**, *n.* The process of adjusting magnetic compass correctors so as to remove half of the deviation on the opposite cardinal or adjacent intercardinal headings to those on which adjustment was originally made when all deviation was removed. This is done to equalize the error on opposite headings.
- Handbook of Magnetic Compass Adjustment**. See PUB. NO. 226. (No longer in print)
- hand lead**. A light sounding lead (7 to 14 pounds), usually having a line of not more than 25 fathoms.
- hanging compass**. See INVERTED COMPASS.
- harbor**, *n.* 1. A body of water providing protection for vessels and, generally, anchorage and docking facilities. 2. A haven or space of deep water so sheltered by the adjacent land as to afford a safe anchorage for ships. See also NATURAL HARBOR, ARTIFICIAL HARBOR.
- harbor chart**. See under CHART CLASSIFICATION BY SCALE.
- harbor line**. The line beyond which wharves and other structures cannot be extended.
- harbor reach**. See under REACH.
- hard beach**. A portion of a beach especially prepared with a hard surface extending into the water, employed for the purpose of loading or unloading directly into landing ships or landing craft.
- hard disk**. Rigid computer data storage in disk form.
- hard iron**. Iron or steel which is not readily magnetized by induction, but which retains a high percentage of the magnetism acquired. The opposite is SOFT IRON.
- hardware**. The physical parts of a computer system; compare with SOFTWARE, the programs which accomplish work.
- harmattan**, *n.* The dry, dusty trade wind blowing off the Sahara Desert across the Gulf of Guinea and the Cape Verde Islands. Sometimes called the DOCTOR, because of its supposed healthful properties.
- harmful interference**. Any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio-communication service operating in accordance with the International Telecommunications Union Regulations.
- harmonic**, *n.* 1. A sinusoidal quantity having a frequency that is an integral multiple of the frequency of a periodic quantity to which it is related. 2. A signal having a frequency which is an integral multiple of the fundamental frequency.
- harmonic analysis**. The process by which the observed tide or tidal current at any place is separated into basic harmonic constituents. Also called HARMONIC REDUCTION.
- harmonic analyzer**. A machine designed for the resolution of a periodic curve into its harmonic constituents. Now performed by computer.
- harmonic component**. Any of the simple sinusoidal components into which a periodic quantity may be resolved.
- harmonic constants**. The amplitudes and epochs of the harmonic constituents of the tide or tidal current at any place.
- harmonic constituent**. See CONSTITUENT.
- harmonic expressions**. Trigonometric terms of an infinite series used to approximate irregular curves in two or three dimensions.
- harmonic function**. Any real function that satisfies a certain equation. In its simplest form, as used in tide and tidal current predictions, it is a quantity that varies as the cosine of an angle that increases uniformly with time.
- harmonic motion**. The projection of circular motion on a diameter of the circle of such motion. Simple harmonic motion is produced if the circular motion is of constant speed. The combination of two or more simple harmonic motions results in compound harmonic motion.
- harmonic prediction (tidal)**. Method of predicting tides and tidal currents by combining the harmonic constituents into a single tide curve, usually performed by computer.
- harmonic reduction**. See HARMONIC ANALYSIS.
- harmonic tide plane**. See INDIAN SPRING LOW WATER.
- harpoon log**. A log which consists of a rotator and distance registering device combined in a single unit, which is towed through the water. The TAFFRAIL LOG is similar except that the registering device is located at the taffrail, with only the rotator in the water.
- harvest moon**. The full moon occurring nearest the autumnal equinox. See also PHASES OF THE MOON.

- haul**, *v., i.* 1. A counterclockwise change in direction of the wind. 2. A shift in the direction of the wind forward. The opposite is to **VEER**. 2. *v., t.* To change the course of a sailing vessel to bring the wind farther forward, usually used with *up*, such as *haul up*.
- haven**, *n.* A place of safety for vessels.
- haze**, *n.* Fine dust or salt particles in the air, too small to be individually apparent but in sufficient number to reduce horizontal visibility and give the atmosphere a characteristic hazy appearance which casts a bluish or yellowish veil over the landscape, subduing its colors. This is sometimes called a dry haze to distinguish it from damp haze, small water droplets or very hygroscopic particles in the air, smaller and more scattered than light fog.
- head**, *n.* See **HEADLAND**.
- heading**, *n.* The horizontal direction in which a ship actually points or heads at any instant, expressed in angular units from a reference direction, usually from 000° at the reference direction clockwise through 360°. Heading is often designated as true, magnetic, compass, or grid. Heading should not be confused with **COURSE**, which is the intended direction of movement through the water. At a specific instant the heading may or may not coincide with the course. The heading of a ship is also called **SHIP'S HEAD**.
- heading angle**. Heading measured from 0° at the reference direction clockwise or counterclockwise through 90° or 180°. It is labeled with the reference direction as a prefix and the direction of measurement from the reference direction as a suffix.
- heading flasher**. An illuminated radial line on the radar for indicating own ship's heading on the bearing dial. Also called **HEADING MARKER**.
- heading line**. The line extending in the direction of a heading.
- heading marker**. See **HEADING FLASHER**.
- headland**, *n.* A comparatively high promontory having a steep face. Usually called **HEAD** when coupled with a specific name. Also called **FORELAND**.
- head sea**. A sea in which the waves move in a direction approximately opposite to the heading. The opposite is **FOLLOWING SEA**.
- head tide**. A tidal current setting in a direction approximately opposite to the heading of a vessel. One setting in such a direction as to increase the speed of a vessel is called a **FAIR TIDE**. One abeam is called a **BEAM TIDE**. One approximately 90° from the course is called a **CROSS TIDE**.
- head up, heading upward**. One of the three basic orientations of display of relative or true motion on a radarscope. In the **HEAD UP** orientation, the target pips are painted at their measured distances and in their directions relative to own ship's heading maintained **UP** in relation to the display and so indicated by the **HEADING FLASHER**. See also **NORTH UP**, **BASE COURSE UP**.
- headwaters**, *n., pl.* The source of a stream or river.
- headway**, *n.* Motion in a forward direction. Motion in the opposite direction is called **STERNWAY**.
- head wind**. Wind from ahead of the vessel.
- heat lightning**. A flash of light from an electric discharge, without thunder, believed to be the reflection by haze or clouds of a distant flash of lightning, too far away for the thunder to be audible.
- heat wave**. Unseasonably high temperatures extending over a period of a day or longer, particularly during the warm season of the year.
- heave**, *n.* The oscillatory vertical rise and fall, due to the entire hull being lifted by the force of the sea. Also called **HEAVING**. See also **SHIP MOTIONS**.
- heavenly body**. See **CELESTIAL BODY**.
- heave the lead**. To take a sounding with a lead.
- heaving**, *n.* See **HEAVE**.
- Heaviside layer**. See under **KENNELLY-HEAVISIDE REGION**.
- hecto-**. A prefix meaning one hundred (10²).
- hectometer**, *n.* One hundred meters.
- heel**, *n.* Lateral inclination of a vessel. See also **LIST**, *n.*
- heel**, *v., t., i.* To incline or be inclined to one side. See also **LIST**, *n.*
- heeling adjuster**. A dip needle with a sliding weight that can be moved along one of its arms to balance magnetic force, used to determine the correct position of a heeling magnet. Also called **HEELING ERROR INSTRUMENT**, **VERTICAL FORCE INSTRUMENT**. See also **HEELING ERROR**.
- heeling error**. The change in the deviation of a magnetic compass when a craft heels, due to the change in the position of the magnetic influences of the craft relative to the earth's magnetic field and to the compass.
- heeling error instrument**. Heeling adjuster. Also called **VERTICAL FORCE INSTRUMENT**.
- heeling magnet**. A permanent magnet placed vertically in a tube under the center of a marine magnetic compass, to correct for heeling error.
- height**, *n.* Vertical distance above a datum.
- height of eye correction**. The correction to sextant altitude due to dip of the horizon. Also called **DIP CORRECTION**.
- height of tide**. Vertical distance from the chart sounding datum to the water surface at any stage of the tide. It is positive if the water level is higher than the chart sounding datum. The vertical distance from the chart sounding datum to a high water datum is called **RISE OF TIDE**.
- heliocentric**, *adj.* Relative to the sun as a center.
- heliocentric parallax**. The difference in the apparent direction or positions of a celestial body outside the solar system, as observed from the earth and sun. Also called **STELLAR PARALLAX**, **ANNUAL PARALLAX**. See also **GEOCENTRIC PARALLAX**.
- helm**, *n.* The apparatus by which a vessel is steered; the tiller or wheel.
- hemisphere**, *n.* Half of a sphere.
- henry**, *n.* A derived unit of electric inductance in the International System of Units; it is the inductance of a closed circuit in which an electromotive force of 1 volt is produced when the electric current in the circuit varies uniformly at a rate of 1 ampere per second.
- hertz**, *n.* The special name for the derived unit of frequency in the International System of Units, it is one cycle per second.
- Hertzian waves**. See **RADIO WAVES**.
- heterodyne reception**. Radio reception in which an audio frequency is derived by beating the signal frequency with that produced by a local oscillator, followed by detection. Also called **BEAT RECEPTION**.
- Hevelian halo**. A faint white halo consisting of a ring occasionally seen 90° from the sun, and probably caused by the refraction and internal reflection of the sun's light by bi-pyramidal ice crystals.
- hexagon**, *n.* A closed plane figure having six sides.
- hibernal**, *adj.* Pertaining to winter. The corresponding adjectives for spring, summer, and fall are vernal, aestival, and autumnal.
- high**, *n.* An area of high pressure. Since a high is, on a synoptic chart, always associated with anticyclonic circulation, the term is used interchangeably with **ANTICYCLONE**. See also **LOW**.
- high altitude method**. The establishing of a circular line of position from the observation of the altitude of a celestial body by means of the geographical position and zenith distance of the body. The line of position is a circle having the geographical position as its center and a radius equal to the zenith distance. The method is normally used only for bodies at high altitudes having small zenith distances. See also **ST. HILAIRE METHOD**, **SUMNER METHOD**, **LONGITUDE METHOD**.
- high clouds**. Types of clouds the mean lower level of which is above 20,000 feet. The principal clouds in this group are cirrus, cirrocumulus, and cirrostratus.
- higher high water**. The higher of the two high waters of any tidal day.
- higher high water interval**. See under **LUNITIDAL INTERVAL**.
- higher lower water**. The higher of the two low waters of any tidal day.
- higher low water interval**. See under **LUNITIDAL INTERVAL**.
- high fidelity**. The ability to reproduce modulating waves at various audio frequencies without serious distortion.
- high focal plane buoy**. A type of lighted buoy in which the light is mounted exceptionally high above the surface of the sea.
- high frequency**. Radio frequency of 3 to 30 megahertz.
- high light**. The rear light of a lighted range. See **REAR LIGHT**.
- high noon**. See **LOCAL APPARENT NOON**.
- high sea, high seas**. All water beyond the outer limit of the territorial sea. Although the high seas are in part coextensive with the waters of the contiguous zone, the fishing zone, and those over the continental shelf, freedom of the seas is not invalidated by the zonal overlap.
- high tide**. See under **HIGH WATER**.
- high water**. The maximum height reached by a rising tide. The height may be due solely to the periodic tidal forces or it may have superimposed upon it the effects of prevailing meteorological conditions. Use of the synonymous term **HIGH TIDE** is discouraged.
- high water full and change**. See **ESTABLISHMENT OF THE PORT**.
- high water inequality**. The difference between the heights of the two high waters during a tidal day. See under **DIURNAL INEQUALITY**.
- high water interval**. See under **LUNITIDAL INTERVAL**.

high water line. 1. The intersection of the land with the water surface at an elevation of high water. 2. The line along the shore to which the waters normally reach at high water.

high water mark. A line or mark left upon tide flats, beach, or alongshore objects indicating the elevation of the intrusion of high water. It should not be confused with the MEAN HIGH WATER LINE or MEAN HIGHER HIGH WATER LINE.

high water neaps. See under NEAP TIDES.

high water springs. Short for MEAN HIGH WATER SPRINGS.

high water stand. The condition at high water when there is no sensible change in the height of the water. A similar condition at low water is called LOW WATER STAND. See also STAND.

hill, n. 1. A relatively low, rounded elevation of the earth's surface. 2. On the sea floor, an elevation rising generally less than 500 meters.

hillock, n. A small hill.

hoar, n. See FROST, definition 1.

hoarfrost, n. See FROST, definition 1.

holding ground. The bottom ground of an anchorage. The expression is usually used with a modifying adjective to indicate the quality of the holding power of the material constituting the bottom.

hole, n. 1. A small depression of the sea floor. 2. An opening through a piece of sea ice, or an open space between ice cakes. 3. A small bay, particularly in New England.

homing, n. Navigation toward a point by following a signal from that point. Radiobeacons are commonly used for homing.

homogenous, adj. Uniform throughout, or composed of parts which are similar in every detail.

hood, n. A shield placed over a radarscope, to eliminate extraneous light and thus make the radar picture appear clearly.

hook, n. A feature resembling a hook in shape, particularly, a. a spit or narrow cape of sand or gravel which turns landward at the outer end; or b. a sharp bend or curve, as in a stream.

hooked spit. See RECURVED SPIT.

hop, n. Travel of a radio wave to the ionosphere and back to earth. The number of hops a radio signal has experienced is usually designated by the expression one-hop, two-hop, multihop, etc.

H.O. Pub. No. 208., *Navigation Tables for Mariners and Aviators*; a sight reduction table first published in 1928 by the U.S. Navy Hydrographic Office but discontinued on 31 December 1970 by the successor, the U.S. Naval Oceanographic Office. The method was devised by Lieutenant Commander J. Y. Dreisonstok USN. It is based upon a navigational triangle divided by dropping a perpendicular from the zenith. The table has been published commercially. Popularly called DREISONSTOK.

H.O. Pub. No. 211. *Dead Reckoning Altitude and Azimuth Table*; a sight reduction table first published by the U.S. Navy Hydrographic Office in 1931 but discontinued as a separate publication on 31 December 1972 by the successor, the Defense Mapping Agency Hydrographic/Topographic Center. The method was devised by Lieutenant Arthur A. Ageton, USN. It is based upon a navigational triangle divided by dropping a perpendicular from the GP of the body. The table was republished in 1975 by the Defense Mapping Agency Hydrographic/Topographic Center as table 35 of *Volume II: American Practical Navigator*, but is no longer included. Popularly called the AGETON method.

H.O. Pub. No. 214. *Tables of Computed Altitude and Azimuth*; a nine-volume set of sight reduction tables of the inspection type published between 1936 and 1946 by the U.S. Navy Hydrographic Office, and reprinted from time to time until discontinued on 31 December 1973 by the successor, the Defense Mapping Agency Hydrographic/Topographic Center. These tables were superseded by *Pub. No. 229, Sight Reduction Tables for Marine Navigation*.

horizon, n. The great circle of the celestial sphere midway between the zenith and nadir, or a line resembling or approximating such a circle. The line where earth and sky appear to meet, and the projection of this line upon the celestial sphere, is called the visible or apparent horizon. A line resembling the visible horizon but above or below it is called a false horizon. The circle of the celestial sphere-formed by the intersection of the celestial sphere and a plane perpendicular to the zenith-nadir line is called sensible horizon if the plane is through any point, such as the eye of an observer; geoidal horizon if through any sea-level point; and celestial or rational horizon if through the center of the earth. The geometrical horizon was originally considered identical

with the celestial horizon, but the expression is now more commonly used to refer to the intersection of the celestial sphere and an infinite number of straight lines tangent to the earth's surface, and radiating from the eye of the observer. If there were no terrestrial refraction, GEOMETRICAL AND VISIBLE HORIZONS would coincide. An artificial horizon is a device for indicating the horizontal. A radio horizon is the line at which direct rays from a transmitting antenna become tangent to the earth's surface. A radar horizon is the radio horizon of a radar antenna.

horizon glass. The glass of a marine sextant, attached to the frame, through which the horizon is observed. The half of this glass nearer the frame is silvered to form the HORIZON MIRROR for reflecting the image of a celestial body; the other half is clear.

horizon mirror. The mirror part of the horizon glass. The expression is sometimes used somewhat loosely to refer to the horizon glass.

horizon prism. A prism which can be inserted in the optical path of an instrument, such as a bubble sextant, to permit observation of the visible horizon.

horizon system of coordinates. A set of celestial coordinates based on the celestial horizon as the primary great circle; usually altitude and azimuth or azimuth angle.

horizontal, adj. Parallel to the plane of the horizon; perpendicular to the direction of gravity.

horizontal, n. A horizontal line, plane, etc. horizontal beam width. The beam width measured in a horizontal plane.

horizontal control datum. See HORIZONTAL GEODETIC DATUM.

horizontal danger angle. The maximum or minimum angle between two points on a chart, as observed from a vessel, indicating the limit of safe approach to an off-lying danger. See also DANGER ANGLE.

horizontal datum. See HORIZONTAL GEODETIC DATUM.

horizontal earth rate. The rate at which the spin axis of a gyroscope must be tilted about the horizontal axis to remain parallel to the earth's surface. Horizontal earth rate is maximum at the equator, zero at the poles, and varies as the cosine of the latitude. See also EARTH RATE, VERTICAL EARTH RATE.

horizontal force instrument. An instrument used to make a comparison between the intensity of the horizontal component of the earth's magnetic field and the magnetic field at the compass location on board. Basically, it consists of a magnetized needle pivoted in a horizontal plane, as a dry card compass. It will settle in some position which will indicate the direction of the resultant magnetic field. If the needle is started swinging, it will be damped down with a certain period of oscillation dependent upon the strength of the magnetic field. Also called HORIZONTAL VIBRATING NEEDLE. See also DEFLECTOR.

horizontal geodetic datum. The basis for computations of horizontal control surveys in which the curvature of the earth is considered. It consists of the astronomical and geodetic latitude and the astronomical and geodetic longitude of an initial point (origin); an azimuth of a line from this point; the parameters (radius and flattening) of the reference ellipsoid; and the geoidal separation at the origin. A change in any of these quantities affects every point on the datum. For this reason, while positions within a system are directly and accurately relatable, those points from different datums must be transformed to a common datum for consistency. The horizontal geodetic datum may extend over a continent or be limited to a small area. See also DATUM. Also called HORIZONTAL DATUM, HORIZONTAL CONTROL DATUM.

horizontal intensity of the earth's magnetic field. The strength of the horizontal component of the earth's magnetic field.

horizontally polarized wave. A plane polarized electromagnetic wave in which the electric field vector is in a horizontal plane.

horizontal parallax. The geocentric parallax when a body is on the horizon. The expression is usually used only in connection with the moon, for which the tabulated horizontal parallax is given for an observer on the equator. The parallax at any altitude is called PARALLAX IN ALTITUDE.

horizontal vibrating needle. See HORIZONTAL FORCE INSTRUMENT.

- horn**, *n.* 1. A flared tube designed to match the acoustic impedance to the impedance of the atmosphere; it can behave as a resonator and can influence the directivity; the narrow end is called the throat and the large end the mouth. Also called TRUMPET. 2. See HORN ANTENNA.
- horn antenna**. An antenna consisting of a waveguide the cross-sectional area of which increases toward the open end. Often shortened to HORN.
- horse latitudes**. The regions of calms and variable winds coinciding with the subtropical high pressure belts on the poleward sides of the trade winds. The expression is generally applied only to the northern of these two regions in the North Atlantic Ocean, or to the portion of it near Bermuda.
- hostile ice**. An ice canopy containing no large sky lights or other features which permit a submarine to surface.
- hour**, *n.* 1. A 24th part of a day. 2. A specified interval. See also COTIDIAL HOUR, CURRENT HOUR.
- hour angle**. Angular distance west of a celestial meridian or hour circle; the arc of the celestial equator, or the angle at the celestial pole, between the upper branch of a celestial meridian or hour circle and the hour circle of a celestial body or the vernal equinox, measured westward through 360°. It is usually further designated as local, Greenwich, or sidereal as the origin of measurement is the local or Greenwich celestial meridian or the hour circle of the vernal equinox. See also MERIDIAN ANGLE.
- hour angle difference**. See MERIDIAN ANGLE DIFFERENCE.
- hour circle**. On the celestial sphere, a great circle through the celestial poles. An hour circle through the zenith is called a celestial meridian. Also called CIRCLE OF DECLINATION, CIRCLE OF RIGHT ASCENSION.
- hour-glass effect**. A radarscope phenomenon which appears as a constriction or expansion of the display near the center of the plan position indicator, which can be caused by a nonlinear time base or the sweep plot starting on the radar indicator at the same instant as the transmission of the pulse. The phenomenon is most apparent when in narrow rivers or close to shore.
- hug**, *v., t.* To remain close to, as to *hug the land*.
- Humboldt Current**. See PERU CURRENT.
- humidity**, *n.* The amount of water vapor in the air. The mass of water vapor per unit volume of air is called absolute humidity. The mass of water vapor per unit mass of moist air is called specific humidity. The ratio of the actual vapor pressure to the vapor pressure corresponding to saturation at the prevailing temperature is called relative humidity.
- hummock**, *n.* 1. A hillock of broken ice which has been forced upwards by pressure. It may be fresh or weathered. The submerged volume of broken ice under the hummocks, forced downwards by pressure, is called a BUMMOCK; 2. A natural elevation of the earth's surface resembling a hillock, but smaller and lower.
- hummocked ice**. Sea ice piled haphazardly one piece over another to form an uneven surface. When weathered, hummocked ice has the appearance of smooth hillocks.
- hummocking**, *n.* The pressure process by which sea ice is forced into hummocks. When the floes rotate in the process, it is called SCREWING.
- hunter's moon**. The full moon next following the harvest moon. See also PHASES OF THE MOON.
- hunting**, *n.* Fluctuation about a mid-point due to instability, as oscillations of the needle of an instrument about the zero point.
- hurricane**, *n.* 1. See under TROPICAL CYCLONE. 2. Wind of force 12 (64 knots and higher or 73 miles per hour and higher) on the Beaufort wind scale.
- hydraulic current**. A current in a channel caused by a difference in the surface level at the two ends. Such a current may be expected in a strait connecting two bodies of water in which the tides differ in time or range. The current in the East River, N.Y., connecting Long Island Sound and New York Harbor, is an example.
- hydrographer**, *n.* One who studies and practices the science of hydrography.
- hydrographic**, *adj.* Of or pertaining to hydrography.
- hydrographic datum**. A datum used for referencing depths of water or the heights of predicted tides. See also DATUM.
- hydrographic sextant**. A surveying sextant similar to those used for celestial navigation but smaller and lighter, constructed so that the maximum angle that can be read on it is slightly greater than that on the navigating sextant. Usually the angles can be read only to the nearest minute by means of a vernier. It is fitted with a telescope with a large object glass and field of view. Although the ordinary navigating sextant may be used in place of the hydrographic sextant, it is not entirely satisfactory for use in observing objects ashore which are difficult to see. Hydrographic sextants are either not provided with shade glasses or they are removed before use. Also called SOUNDING SEXTANT, SURVEYING SEXTANT.
- hydrographic survey**. The survey of a water area, with particular reference to submarine relief, and any adjacent land. See also OCEANOGRAPHIC SURVEY.
- hydrography**, *n.* The science that deals with the measurement and description of the physical features of the oceans, seas, lakes, rivers, and their adjoining coastal areas, with particular reference to their use for navigation.
- HYDROLANT**, *n.* A radio message disseminated by the Defense Mapping Agency Hydrographic/ Topographic Center and restricted to important marine incidents or navigational changes which affect navigational safety. The HYDROLANT broadcast covers those water areas outside and eastward of NAVAREA IV in the Atlantic Ocean. HYDROLANTS constitute part of the U.S. long range radio navigational warning system. The text of HYDROLANTS issued during a week which are in effect are available through NAVINFONET and are printed in the weekly *Notice to Mariners*.
- hydrology**, *n.* The scientific study of the waters of the earth, especially with relation to the effects of precipitation and evaporation upon the occurrence and character of ground water.
- hydrometeor**, *n.* Any product of the condensation or sublimation of atmospheric water vapor whether formed in the free atmosphere or at the earth's surface, also any water particles blown by the wind from the earth's surface. See also LITHOMETEOR.
- HYDROPAC**. A radio message disseminated by the Defense Mapping Agency Hydrographic/ Topographic Center and restricted to important marine incidents or navigational changes which affect navigational safety. The HYDROPAC broadcast covers those water areas outside of NAVAREA XII in the Pacific Ocean. HYDROPACS constitute part of the U.S. long range radio navigational warning system. The text of HYDROPACS issued during a week which is in effect are available through NAVINFONET and are printed in the weekly *Notice to Mariners*.
- hydrophone**, *n.* A listening device for receiving underwater sounds.
- hydrosphere**, *n.* The water portion of the earth as distinguished from the solid part, called the LITHOSPHERE, and from the gaseous outer envelope, called the ATMOSPHERE.
- hyetal**, *adj.* Of or pertaining to rain.
- hygrometer**, *n.* An instrument for measuring the humidity of the air. The most common type is a psychrometer consisting of drybulb and wet-bulb thermometers.
- hygroscope**, *n.* An instrument which indicates variation in atmospheric moisture.
- hygroscopic**, *adj.* Able to absorb moisture.
- hyperbola**, *n.* An open curve with two parts, all points of which have a constant difference in distance from two fixed points called FOCI.
- hyperbolic**, *adj.* Of or pertaining to a hyperbola.
- hyperbolic lattice**. A pattern formed by two or more families of intersecting hyperbolas.
- hyperbolic line of position**. A line of position in the shape of a hyperbola, determined by measuring the difference in distance to two fixed points. Loran C lines of position are an example.
- hyperbolic navigation**. Radionavigation based on the measurement of the time differences in the reception of signals from several pairs of synchronized transmitters. For each pair of transmitters the isochrones are substantially hyperbolic. The combination of isochrones for two or more pairs of transmitters forms a hyperbolic lattice within which position can be determined according to the measured time differences.
- hypersonic**, *adj.* Of or pertaining to high supersonic speed, of the order of five times the speed of sound, or greater.
- hypotenuse**, *n.* The side of a plane right triangle opposite the right angle; the longest side of a plane right triangle.
- hypographic detail**. The features pertaining to relief or elevation of terrain.

hypsographic map. A map showing land or submarine bottom relief in terms of height above, or below, a datum by any method, such as contours, hachures, shading, or hypsometric tinting. Also called HYPSONOMETRIC MAP, RELIEF MAP.

hypsoigraphy, *n.* 1. The science or art of describing elevations of land surfaces with reference to a datum, usually sea level. 2. That part of topography dealing with relief or elevation of terrain.

hypsometer, *n.* An instrument for measuring height by determining the boiling temperature of a liquid. Its operation depends on the principle that boiling temperature is dependent on pressure, which normally varies with height.

hypsometric map. See HYPSONOGRAPHIC MAP.

hypsometric tinting. A method of showing relief on maps and charts by coloring, in different shades, those parts which lie between different levels. Also called ALTITUDE TINTS, COLOR GRADIENTS, ELEVATION TINTS, GRADIENT TINTS, LAYER TINTS. See also HYPSONOMETRIC TINT SCALE.

hypsometric tint scale. A graphic scale in the margin of maps and charts which indicates heights or depths by graduated shades of color. See also HYPSONOMETRIC TINTING.

hysteresis, *n.* The lagging of the effect caused by change of a force acting on anything.

hysteresis error. That error in the reading of an instrument due to hysteresis.