

# GLOSSARIES OF BLM SURVEYING AND MAPPING TERMS



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U. S. DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

# GLOSSARY OF BLM SURVEYING AND MAPPING TERMS



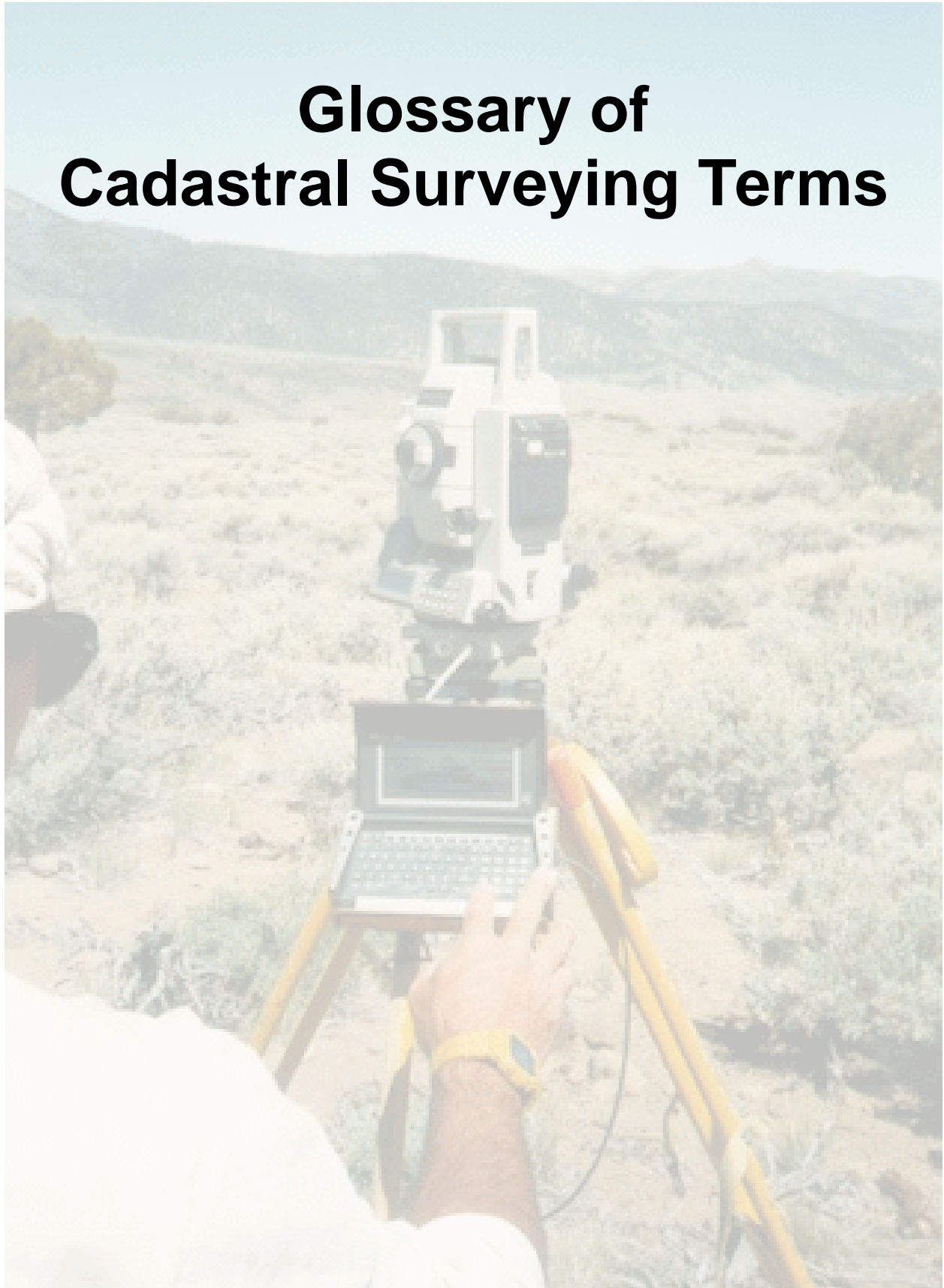
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## PREFACE

The original edition of this glossary was developed for use by trainee cadastral surveyors during the cadastral survey professional series of training courses. This edition is intended for use by all BLM personnel and should be of particular value to newly hired cadastral and cartographic personnel. For the sake of clarity and exactness, many first edition definitions have been modified.

The definitions are not meant to conflict with those in other glossaries, but since the glossary is for BLM cadastral personnel, some terms will have a meaning unique to BLM cadastral surveys.

# **Glossary of Cadastral Surveying Terms**



## A

**A (Land Status Records)** – Acre(s).  
**ABC** – Airborne Control. See AIRBORNE CONTROL SURVEY.  
**ACQ (Land Status Records)** – Acquired.  
**ACSM** – American Congress on Surveying and Mapping.  
**ACT OF CONG (Land Status Records)** – Act of Congress.  
**ADHE (Land Status Records)** – Adjusted homestead entry.  
**ADM S (Land Status Records)** – Administrative site.  
**ADP** – Automatic Data Processing.  
**A&E** – Architect and Engineer.  
**AEC (Land Status Records)** - Atomic Energy Commission.  
**AF (Land Status Records)** – Air Force.  
**AGRI (Land Status Records)** – Agriculture, Agricultural.  
**AGRI EXP STA (Land Status Records)** – Agriculture Experimental Station.  
**AHA (Land Status Records)** – Alaska House Authority.  
**AHE (Land Status Records)** – Additional homestead entry.  
**AK** – Alaska.  
**AL** – Alabama.  
**ALA** – Alabama.  
**ALL MIN (Land Status Records )** – All Minerals.  
**ALLOT** – (Land Status Records) – Allotment.  
**ALS PS (Land Status Records)** - Alaska Public Sale.  
**AM** – Amended Monument.  
**AMC** – Auxiliary Meander Corner.  
**A&M COL (Land Status Records)** – Agriculture and Mechanical College.  
**AMDT (Land Status Records)** – Amendment, Amended, Amends.  
**ANCSA** – Alaska Native Claims Settlement Act.  
**ANS (Land Status Records)** – Air Navigation Site.  
**AP** – Angle point; also AP-1, AP-2 etc.  
**APLN (Land Status Records)** – Application.  
**APLN EXT (Land Status Records)** – Application for extension.  
**APP (Land Status Records)** – Appendix.  
**APPROP (Land Status Records)** – Appropriation, Appropriate, Appropriated.  
**APPVD (Land Status Records)** – Approved.  
**AR** – Arkansas.  
**AREA ADM O (Land Status Records)** – Area Administrator Order(s).  
**ARIZ** – Arizona.  
**ARK** – Arkansas.  
**ARPT (Land Status Records)** - Airport.  
**ARRCS (Land Status Records)** – Alaska Rural Rehabilitation Corp. Sale.  
**ASCE** – American Society of Civil Engineers.  
**ASGN (Land Status Records)** – Assignment.  
**ASPH (Land Status Records)** – Asphalt.  
**ASRHE (Land Status Records)** – Additional stockraising homestead entry.  
**AUTH (Land Status Records)** – Authorization.  
**AVE LSE (Land Status Records)** – Aviation lease.  
**AZ** – Arizona.  
**ABANDON** – To desert or forsake entirely. To voluntarily relinquish possession with the intent of terminating ownership but without vesting it in any other person. In determining whether one has abandoned his property or rights, intent is the paramount object of inquiry for to abandon, one must intend to abandon. The intent must be clear and the act must be complete. To abandon a homestead one must leave with the intention of never returning. To abandon a mining claim held by location without patent, the holder must leave voluntarily without any intention to retake or resume the claim and regardless of what may become of it in the future. Even in prescriptive rights, non-use is not abandonment. However, See TUNNEL LOCATIONS. Also See PRESCRIPTIVE, HIGHWAY ABANDONMENT, ABANDONED MILITARY RESERVATION.

**ABANDONED MILITARY RESERVATION** – A military reservation which has been transferred to the Department of the Interior for Administration.

**ABROGATE** – To abolish by authoritative action. To do away with or annul.

**ABSENTEE OWNER** – By law, one cannot be both a resident and an absentee of a given area, state or country. Therefore, an owner who lives in an area other than the one in which land he owns is situated is an absentee owner.

**ABSTRACT** – (noun) A summary or abridgment. A shortened form of a work or record retaining the general sense and unity of the original. (verb) To summarize. To shorten or condense by the omission of words without sacrifice of sense or continuity. See **ABSTRACT OF TITLE**.

**ABSTRACT OF TITLE** – A condensed history of the title to land, consisting of a synopsis or summary of the material or operative position of all the conveyances, which in any manner affects said land or any estate or interest therein, together with a statement of all liens, charges, or liabilities to which the same may be subject.

**ABUT** – To reach; to touch. In old law, the ends were said to abut, the sides to adjoin. The term “*abutting*” implies a closer proximity than the term “*adjacent*.”

**ABUTTING PROPERTY** – The buttings or boundings of lands, showing to what other lands they adjoin.

**ACCEPTED SURVEY** – A survey accepted by the official having Cadastral Survey approval authority. See **CADASTRAL SURVEY APPROVAL AUTHORITY** and **OFFICIAL CADASTRAL SURVEY**.

**ACCESS** – The right to enter and leave over the lands of another. See **EGRESS**; **REGRESS**.

**ACCESSORIES, CORNER** – See **CORNER ACCESSORIES**.

**ACCRETION** – Derived from the Latin “*accrescere*” which means to grow or increase, it is the gradual and imperceptible addition of soil or other material by the natural processes of water-borne sedimentation or by the action of currents against shores and banks. Accretion is the washing up of sand, silt or soil so as to form firm ground, called alluvion. In common practice the terms alluvion and accretion have been used almost interchangeably. Usually, however, alluvion means the deposit itself while accretion usually denotes the act. See **ALLUVION**, **RELICION**, **EROSION**, **AVULSION**, **RIPARIAN RIGHTS**.

**ACCRETION, ARTIFICIAL** – Additions to a riparian owner’s soil by the imperceptible process of accretion which was induced by man’s activities.

**ACCURACY (USC&GS. S.P. 242)** – Degree of conformity with a standard, or accepted value. Accuracy relates to the quality of a *result*, and is distinguished from precision which relates to the quality of the operation by which the result is obtained. See **PRECISION**.

**ACEQUIA** – A ditch, channel or canal through which water, diverted from its natural course, is conducted for use in irrigation or other purposes. Public ditches.

**ACKNOWLEDGEMENT** – In regard to a legal instrument or document, formal declaration before an authorized official such as a Notary Public, by the person who executed the instrument, that it is his free act and deed. Also refers to the Notary’s statement itself.

**ACQUIESCENCE** – Some act of concurrence by the adjoining owners bearing on the practical location of their common boundary where the definite or more accurate position of the line or lines has not or cannot be defined by survey. Acquiescence may be the tacit consent of one owner by not interposing a formal objection to what might be an encroachment by another, all subject to judicial review as to the legal effect.

**ACQUIRED LANDS** – Federal lands obtained by purchase, condemnation, exchange, or gift under laws other than public land laws. Legally defined as: “... *land obtained by the United States through purchase or transfer from a State or private individual and normally dedicated to a specific use.*” *McKenna v. Wallis*, 200 F. Supp. 468 (1961). See also *Bobby Lee Moore, et al*, 72 I.D. 505 (1965). See **FEDERAL LAND**, **PUBLIC LANDS**, **PUBLIC DOMAIN**.

**ACRE** – A unit of area measurement. An acre equals 10 square chains or 43,560 square feet. 640 acres equal 1 square mile. See **CHAIN**.

**ACT OF APRIL 25, 1812** – Provided “*that there shall be established in the Department of the Treasury an office to be denominated as the General Land Office; the chief officer of which shall be called the Commissioner of the General Land Office ...*” Edward Tiffin was the first Commissioner of the General Land Office. See **GENERAL LAND OFFICE**.

**ACT OF APRIL 29, 1898** – See **ARKANSAS SWAMP LANDS COMPROMISE ACT**.

**ACT OF AUGUST 4, 1842** – An act to “*provide for the armed occupation and settlement of the unsettled parts*” of Florida. By meeting certain conditions and fulfilling certain requirements, a settler was to receive 160 acres as an armed occupation donation.

**ACT OF DECEMBER 22, 1928** – See **COLOR-OF-TITLE ACT**.

**ACT OF JULY 22, 1854** – Donation of 160 acres to each male white resident of New Mexico who resided there on January 1, 1853, and to male white citizens or intended citizens of the United States who emigrated there by January

1, 1858. According to the Public Land Commission of 1904, only 4,640 acres had been approved for patent under this act.

**ACT OF MARCH 1, 1800** – This act established a precedent for the important principle that corners regularly set by a cadastral surveyor in the field are held to be the true corners, although later surveys may show they were placed incorrectly.

**ACT OF MARCH 3, 1877** – See DESERT LAND ENTRY. Also See CAREY ACTS, which provided for grants of desert lands to states.

**ACT OF MAY 10, 1800** – This Act contained the authorization for the creation of the first “*Land Districts*” and the provision for the placement of errors of measurement and convergence in the northern and western tiers of sections. In the old Northwest Territory these errors were placed in the last half mile, but in Louisiana the errors were placed equally in each half mile of the last mile. In Florida they were sometimes placed on the south and east side of a township. The general instructions in the Manual of Surveying Instructions, 1855, directed all survey districts to handle the matter in the same way, however, irregular procedures continued to be used in some areas for a short time. See LAND DISTRICT.

**ACT OF MAY 18, 1796** – Provided for administration, survey and sale of public lands in the central part of the Northwest Territory, north of the Ohio River. Also established the position of executive Surveyor General, who supervised work of professional surveyors under contract to the Government. The rectangular system of surveys inaugurated under the Ordinance of May 20, 1785 was continued, and the present numerical arrangement of the 36 sections was adopted.

**ACT OF MAY 20, 1785** – See ORDINANCE OF MAY 20, 1785.

**ACT OF MAY 27, 1908 (35 Stat. 347)** – Provided “*for the purchase of metal monuments to be used for public land survey corners wherever practicable.*” See REGULATION IRON POST.

**ACT OF OCTOBER 22, 1919** – See PITTMAN UNDERGROUND WATER ACT.

**ADDITIONAL HOMESTEAD ENTRY** – An application for title which is made by an individual for public lands additional to those already acquired under the homestead laws. The total area covered by an original homestead and additional homestead entries could not exceed the maximum area allowed for the class of homestead entry involved.

**AD HOC** – For this; for this special purpose. An attorney ad hoc, or a committee ad hoc, is one appointed or selected for the particular case at hand without consideration of wider application.

**AD INFINITUM** – Without end or limit. To an infinite extent; indefinitely.

**ADIT** – In mining, an entrance or approach; a horizontal excavation used as an entrance to a mine, or a vent by which ore or water are removed. See SHAFT, DRIFT, TUNNEL.

**ADJACENT** – Lying near or close to; sometimes contiguous; neighboring. The term “*adjacent*” implies that the two objects or parcels of land are not widely separated, though they may not actually touch, while “*adjoining*” implies that they are so joined or united to each other that no third object or parcel of land intervenes. See ABUT.

**ADJOINER** – An owner of land which touches the land of another, his name being given in the deed or instrument by which the land is conveyed.

**ADJOINING** – Touching or contiguous, as distinguished from lying near to or adjacent. To be in contact with; to abut upon.

**ADJOINING FARM HOMESTEAD ENTRY** – A homestead entry on public lands which are adjacent to land owned by the entryman (which he had obtained other than by homestead entry) and which, together with the land owned, does not exceed 160 acres.

**ADJUDICATION** – The pronouncing of a judgment or decree in a cause; also the judgment given. The legal processing of applications, entries, claims, etc., to assure full compliance with the public-land laws and regulations; also the interpretation of statutes and regulations and their application to a particular set of facts.

**ADJUSTMENT** – State or condition of an instrument which has its parts in proper relationship. See ADJUSTMENT\*.

**ADMINISTRATIVE SITE** – A reservation of public lands for use as a site for public buildings, ranger stations, or other administrative facilities.

**ADVANCE FIELD COMPLETION** – A process in USGS map production which shows boundary information which is available but not found on final topographic maps.

**ADVERSE POSSESSION** – The possession of land, under such circumstances as indicate that such possession has been commenced and continued under an assertion of rights on the part of the possessor against the original owners. To be “*adverse*,” possession must be “*actual, continued, visible, notorious, distinct and hostile.*” Title obtained by adverse possession is a fee-simple title. Possession of land does not operate adversely against the United States or a State. Title to Government land cannot be acquired by adverse possession – however, under the Act of Dec. 22, 1928, Public No. 645, 70<sup>th</sup> Cong., a patent may be obtained to public lands held for 20 years under “*color of title.*” See COLOR-OF-TITLE ACT; PRESCRIPTION.

**ADVERSE PROCEEDINGS** – Strictly speaking, a contest; often, that portion of the contest proceedings which precede the hearing.

**AEROTRIANGULATION\***.

**AFFIDAVIT** – A written or printed declaration or statement of facts made voluntarily, and confirmed by oath, without notice to the adverse party and without opportunity to cross-examine. Affidavits are usually attached to field notes in support of corner restorations. See DEPOSITION.

**AGREEMENT LINE** – A concurrence between adjoining land owners on the location of their common boundaries. The effect on the location is subject to judicial review.

**AGRICULTURAL LANDS** – Land suitable for agricultural purposes. Land may be agricultural in character even though it is covered with trees, grass, weeds or brush.

**AIRBORNE CONTROL SURVEY (ABC)** – A control survey using theodolites, electronic distance measuring equipment and a helicopter equipped with a hoversight and flashing light. The helicopter is hovered over a ground station and the position of the flashing light is determined by computations. See ELECTRONIC CONTROL SURVEY, HOVERSIGHT, AIRBORNE CONTROL, SURVEY SYSTEM\*.

**AIR NAVIGATION SITE** – A reservation of public lands for aviation purposes pursuant to the act of May 24, 1928 (45 Stat. 728, 49 U.S.C. sec 214).

**ALASKA NATIVE CLAIMS SETTLEMENT ACT** – The Act of Congress of December 18, 1971, 85 Stat. 688, 43 U.S.C. 1601, et. seq., which provides for the settlement of aboriginal land claims of the Natives and Native groups in Alaska.

**ALASKA PURCHASE** – Purchase of Alaska from Russia under a convention signed March 30, 1867, and proclaimed June 20, 1867, provided the United States with more than 365 million acres of additional public lands.

**ALIENATION** – A legal term applied to the process of transfer of title, or a legal conveyance of property to another. In common BLM usage, alienated lands are lands that have been patented.

**ALINEMENT (alignment)** – 1) Formation or position in line, or, more properly, in a common vertical plane. 2) In railway or highway surveying: The ground plan, showing the alinement or direction, and components of the center line, as distinguished from a profile, which shows the vertical element.

**ALiquot** – Contained an exact number of times in another; a part of a measurement that divides the measurement without a remainder. See ALIQUOT PARTS.

**ALiquot PARTS** – Legal subdivisions, except fractional lots, or further subdivision of any smaller legal subdivision, except fractional lots by division into halves or fourths ad infinitum. See LEGAL SUBDIVISION; SUBDIVISION, SMALLEST LEGAL and MINOR SUBDIVISION.

**ALIUNDE** – From another source. Evidence aliunde is evidence from outside or from another source. A written instrument may be explained by evidence drawn from sources outside the instrument itself, such as the testimony of a witness to conversations, admissions or preliminary negotiations.

**ALLOTMENT** – See INDIAN ALLOTMENT.

**ALLOWED APPLICATION** – An application to acquire title to public lands which has been accepted and approved as having been filed in full compliance with the requirements of the regulations; an entry.

**ALLOWED ENTRY** – See ENTRY ALLOWED.

**ALLUVION (alluvium)** – The soil that is deposited along a river or the sea by gradual and imperceptible action of the water. See ACCRETION.

**AMENDED ENTRY** – A process of adjudication under R.S. sec. 2372, as amended February 24, 1909 (35 Stat. 645; 43 U.S.C. sec. 697). This process is used in cases of erroneous location as means of protecting bona fide rights of claimants. See BONA FIDE, ERRONEOUS LOCATION.

**AMERICAN MERIDIAN** – See WASHINGTON MERIDIAN.

**ANALYTICAL PHOTOTRIANGULATION** – A mathematical determination of ground positions of paneled points observed in a strip or block of aerial photographs. The positions are determined by computations based on coordinate measurements of the image positions in each photograph. This method, which considers such factors as camera calibration, film distortion, atmospheric refraction and earth curvature during computations, produces data of a higher order of accuracy than that obtained by the mechanical methods. See MECHANICAL PHOTOTRIANGULATION, ANALYTICAL AEROTRIANGULATION\*.

**ANGLE POINT** – A point in a survey where the alinement or boundary deflects from a straight line.

**APEX** – In mining, the outcrop of a vein or the highest portion of a fold in a vein.

**APPEAL** – A process of civil law origin that entirely removes a controversy to an appellate court for the purpose of obtaining review and possible retrial. In general terms, an appeal takes a case to a higher court. See WRIT OF ERROR, CERTIORARI, BOARD OF LAND APPEALS.



**APPELLANT** – The party who takes an appeal from one court or jurisdiction to another. Used broadly or nontechnically, the term includes one who sues out a writ of error. See WRIT OF ERROR.

**APPELLEE** – The party in a cause against whom an appeal is taken; that is, the party who has an interest adverse to setting aside or reversing the judgment. Sometimes also called the “*respondent*.”

**APPLICANT** – An individual, corporation, State or local government, etc., applying for rights in, or title to, public lands or resources. See APPLICANT, SURVEY.

**APPLICANT, SURVEY** – An individual, corporation, State or local government, etc., requesting the execution of a cadastral survey.

**APPLICATION** – A formal request for rights in, or eventual title to, public lands or resources.

**APPROPRIATED PUBLIC LANDS** – Original public domain lands which are covered by an entry, patent, certification, or other evidence of land disposal; for certain purposes, public lands which are within a reservation, which contain improvements constructed with the aid of Federal funds, or which are covered by certain classes of leases are also considered appropriated. See VACANT AND UNAPPROPRIATED PUBLIC DOMAIN LANDS.

**APPROVED CLEAR LIST** – A selection which has been approved by the Secretary of the Interior or the Director of the Bureau of Land Management. See CLEAR LIST.

**APPROVED MINERAL SURVEY** – The approval of a mineral survey at the State level is final. No Washington Office acceptance is required as in the case of public land subdivisional surveys.

**APPROVED SURVEY** – The terms “*approved survey*” and “*official survey*” are often incorrectly used as being synonymous with “*accepted survey*.” Strictly speaking an “approved survey” is a survey which has the field notes approved and the plat accepted by the BLM official who has been delegated the authority for such action. The proper term is now ACCEPTED SURVEY. (Prior to 1910 the field notes and plats were APPROVED by the Surveyor’s General, which action was equivalent to the present acceptance of the plat. After 1910 they were approved by the Surveyor General, or Supervisor of Surveys, and after examination accepted by the Commissioner of the General Land Office.) The field notes and plat become OFFICIAL records of the BLM when filed in the appropriate land office. The field notes and the plats of Mineral Surveys are both APPROVED at the State Office level. See ACCEPTED SURVEY, OFFICIAL SURVEY and MINERAL SURVEY.

**APPURTENANCE** – Anything so annexed to the land or used with it that it will pass with the conveyance of the land. An incidental right (as a right of way) attached to a principal property right and passing in possession with it.

**ARBITRATION** – The submission for determination of disputed matter to a private unofficial person selected by agreement or in a manner provided by law. Voluntary arbitration is; therefore, by mutual and free consent of the parties.

**ARBITRATOR** – A private, disinterested person chosen by the parties to a disputed question for the purpose of hearing their contention and giving judgment between them. The parties to the dispute submit themselves to the arbitrator’s decision (award).

**ARE** – A metric unit of area equal to 100 square meters.

**AREA, GROSS** – In BLM usage, the total area of all lands, irrespective of ownership, within the boundaries of a township, reservation or other tract of land. See AREA, NET.

**AREA, NET** – In BLM usage, the area of public lands within the boundaries of a township, reservation or other tract of land less exclusions. See AREA, GROSS.

**AREAS (BLM)** – From the mid-1950’s until 1961 the Bureau of Land Management was composed of the Headquarters Office in Washington, D.C.; a field organization of three “Areas” in the United States and one in Alaska; 11 State Offices and an Eastern States Office which was in Washington, D.C.

*Area 1* had supervision over Washington, Oregon and California. The Area administrative office was in Portland, Oregon.

*Area 2* had supervision over Idaho, Nevada, Utah and Arizona. The Area administrative office was in Salt Lake City, Utah.

*Area 3* had supervision over Montana, Wyoming, Colorado, New Mexico and the Missouri River Basin surveys. The Area administrative office was in Denver, Colorado.

*Area 4* had supervision over Alaska and the administrative office was in Anchorage, Alaska. See SPECIAL OFFICES (BLM). Also see REGIONS (BLM).

**ARKANSAS DRAINAGE ENTRY** – An entry on public lands to which, under Federal statutory authority, Arkansas State drainage charges attach.

**ARKANSAS SWAMP LANDS COMPROMISE ACT** – Under the terms of this act of April 29, 1898, Arkansas relinquished all rights, title and interest to the remaining unappropriated swamp and overflowed lands within its boundaries (43 U.S.C. sec. 987).

**ARROW** – An obsolete term for chaining pin.

**ARTICLES OF CONFEDERATION** – The name of the instrument embodying the compact made between the Thirteen Original States prior to the adoption of the present constitution.

**ASSESSMENT WORK** – The annual labor or improvements which must be performed on a valid mining claim location in order for the claimant(s) to maintain a possessory right to the claim as against the United States or third parties. The statutory requirement (43 U.S.C. 28) is that \$100 worth of labor or improvements must be made annually on valid claims for which a patent has not been issued.

**ASSIGNMENT INSTRUCTIONS** – Written instructions to a cadastral surveyor authorizing him to execute a specific part, or all, of a particular survey. Even if the survey has been authorized, a surveyor may not execute it or any part of it without instructions containing his specific assignment. See **SPECIAL INSTRUCTIONS**.

**ASTRONOMIC** – Of or pertaining to astronomy. See **ASTRONOMIC\***, **ASTRONOMIC LATITUDE\***, **ASTRONOMIC LONGITUDE\***, **ASTRONOMIC NORTH\***, **GEOGRAPHIC POSITION\***.

**ASTRONOMIC AZIMUTH** – At the point of observation, the angle measured from the vertical plane through the celestial pole to the vertical plane through the observed object. Astronomic azimuth is the terrestrial azimuth which results directly from observations on a celestial body: It is measured in the plane of the horizon and is usually reckoned from south (0°), through west (90°), north (180°), and east (270°) back to south (360° or 0°). It is affected by the local deflection of the vertical (station error) which, in the United States, produces differences between astronomic and geodetic azimuths of as much as 26” in the mountain regions of the Western States and 10” in the less rugged Eastern States. Astronomic azimuths are sometimes reckoned clockwise or counterclockwise through 180°.

**ATTEST** – To affirm to be true or genuine. Specifically, to authenticate by signing as a witness; to establish or verify the usage of; to bear witness. See **TESTIMONY**.

**AUTHORITY, PUBLIC LANDS** – Article IV Sec. 3, Clause 2 of the Constitution of the United States established the fundamental authority for public land and resource management upon the adoption of the Constitution in 1787. It states: “*Congress shall have the power to dispose of and make all needful rules and regulations respecting territory and property belonging to the United States...*” It has been held that this power of Congress is without limitation. See **CADASTRAL SURVEY AUTHORITY**.

**AUTO SURVEYOR** – Trade name for an Inertial Positioning System.

**AUXILIARY GUIDE MERIDIAN** – Where guide meridians have been placed at intervals exceeding the distance of 24 miles (under practice permissible prior to issuance of the *1881 Manual of Surveying Instructions* which specified 24 mile tracts), and new governing lines are required, a new guide meridian is established, and a local name is assigned, such as “*Twelfth Auxiliary Guide Meridian West*,” or “*Grass Valley Guide Meridian*.” Auxiliary guide meridians are surveyed, in the same manner as guide meridians.

**AUXILIARY MEANDER CORNER** – An auxiliary meander corner is established at a suitable point on the meander line of a lake lying entirely within a quarter section or on the meander line of an island falling entirely within a section and which is found to be too small to subdivide. A line is run connecting the monument to a regular corner on the section boundary. See **SPECIAL MEANDER CORNER**.

**AVULSION** – A river’s sudden change in flow alignment out from its previous left and right banks to a new channel, leaving an identifiable upland area between the abandoned channel and the new channel. The new flow alignment will generally be a shortcut in channel length because of hydraulic considerations. The U.S. Supreme Court in *Iowa v. Nebraska* 143 US 359 distinguished avulsion from rapid erosion, but some State courts have established different definitions. See *Goins v. Merryman* 183 Okla. 155. Frequently the elements of sudden and perceptible changes are included in the definitions. See **ACCRETION**, **AVULSION\***.

**AVULSION, ARTIFICIAL** – Man-made or man-induced changes in flow alignment of a river such as to leave an identifiable area of upland between the old and new channels.

**AVULSIVE CUTOFF** – A river’s action when avulsion takes place; also, describes the area of land enclosed by the old and the new channels.

**AZIMUTH** – The horizontal direction reckoned clockwise from the meridian plane. See **ASTRONOMIC AZIMUTH**, **GEODETTIC AZIMUTH**, **GRID AZIMUTH**.

## B

**BAL (Land Status Records)** – Balance.

**BDY; BDRS (Land Status Records)** – Boundary, Boundaries.

**BEN (Land Status Records)** – Bentonite.

**BH MER (Land Status Records)** – Black Hills Meridian.

**BIA (Land Status Records)** – Bureau of Indian Affairs.

**BIFC** – Boise Interagency Fire Center.

**BLK (Land Status Records)** – Block.

**BLM (Land Status Records)** – Bureau of Land Management.

**BLM-M (Land Status Records)** – Bureau of Land Management Manual.

**BM (Land Status Records)** – Bench Mark.

**BM** – Erroneously for Boise Meridian.

**BO** – Bearing Object.

**BOISE MER (Land Status Records)** – Boise Meridian.

**BR** – Bearing rock. An obsolete corner marking for a bearing object used on mineral surveys.

**BR (Land Status Records)** – Bureau of Reclamation.

**BSFW (Land Status Records)** – Bureau of Sports, Fisheries and Wildlife. Now, 1976, U.S. Fish and Wildlife Services, 1976.

**BT** – Bearing Tree.

**BACK AZIMUTH** – See GEODETIC AZIMUTH.

**BACK BEARING** – The bearing at the opposite end of a line from the observer as measured from the true meridian at the opposite end of the line. The back bearing on all lines (other than North-South lines) are different from the bearing at the observer’s station. They differ by the amount of convergency of the meridians between the two points.

**BACKSHORE (T.R. No. 4)** – That zone of the shore or beach lying between the foreshore and the coastline and acted upon by waves only during severe storms, especially when combined with exceptionally high water. See BEACH, SHORE, FORESHORE, COASTLINE.

**BACKSIGHT** – A sight on a previously established survey point. See BACKSIGHT\*.

**BANK** – The continuous margin along a river or stream where all upland vegetation ceases. See RIGHT BANK, LEFT BANK, BEDS OF NON-NAVIGABLE LAKES AND STREAMS.

**BANKHEAD-JONES LANDS** – Under Title III of the Bankhead-Jones Farm Tenant Act, of July 22, 1937, the Department of Agriculture was authorized to purchase submarginal farm lands in the Great Plains region for purposes of reclamation, conservation, etc. Approximately 2 million acres were acquired and are termed “*Bankhead-Jones Lands.*” These lands are now under the administration of the Bureau of Land Management, are in the class of Federal lands called “*acquired lands*” and are not subject to entry or disposal under the general public land laws. See ACQUIRED LANDS.

**BARGAIN AND SALE** – In conveyancing, the transferring of property from one to another, upon valuable consideration, by way of sale. A “*bargain and sale*” deed usually means one which carries no warranty. See DEED, WARRANTY and PATENT.

**BARK SCRIBE** – To bark scribe a tree monument or bearing tree is to lightly cut the appropriate marks into the bark of the tree without blazing. In the case of certain smooth and thin barked trees, marks thus made will last as long as the tree remains sound. See BLAZE.

**BASE LANDS** – In a lieu selection or exchange, the lands to which the applicant relinquishes his rights as a basis for his selection. See LIEU SELECTION.

**BASELINE** – A line fixed by sovereigns along their coasts which is fundamental toward determining the seaward extent of the boundaries. See RULE OF TIDEMARK, STRAIGHT BASELINE.

**BASE LINE** – A line which is extended east and west on a parallel of latitude from an initial point, and from which are initiated other lines for the Cadastral Survey of the public lands within the area covered by the principal meridian that runs through the same initial point. See BASE LINE\*, BASIS PARALLEL.

**BASE PLAT** – A drawing containing only those details essential to the identification of the legal subdivisions shown on it. Under the manuals of surveying instruction preceding that of 1930, the base plat also contained all cultural and topographic features thought to be desirable. The *1930 and 1947 Manuals of Surveying Instructions* called for the use of transparent color overlays to show these features when required. Overprints are not needed where such features may be readily shown on the base drawing without risk of obscuring any essential cadastral data. Color overlays have been used with base plats of areas surveyed by photogrammetric methods.

**BASIN** – The entire area drained by a main stream and its tributaries.

**BASIS PARALLEL** – The Base Line, as termed in early surveys.

**BATTURE** – A marine term, used to denote a bottom of sand, stone or rock mixed together and rising towards the surface of the water; but it is sometimes used to signify the island formed when it has risen above the surface of ordinary high water. Batture differs from alluvium in that batture is the addition of soil to the bed of a stream or lake, while alluvium is an addition to the shores. Hence by reason of such fact the ownership thereof is determined

largely along a different line. Both “*batture*” and alluvium are often referred to as “*accretions*.” Technically however, the term “*accretion*” refers to the legal result occurring from the effect of the deposit of alluvium and batture.

**BAYOU\***.

**BEACH (T.R. No. 4)** – The zone of unconsolidated material that extends landward from the low water line to the place where there is marked change in material or physiographic form or to the line of permanent vegetation (usually the effective limit of storm waves). The seaward limit of the beach – unless otherwise specified – is the mean low water line. A beach includes foreshore and backshore. (Refer to Figure 1). See SHORE, FORESHORE, BACKSHORE, TIDELANDS.

**BEARING** – The horizontal angle which a line makes with the meridian of reference adjacent to the quadrant in which the line lies. Bearings are classified according to the meridian of reference, as: astronomic, geodetic, magnetic, grid, assumed, etc. When no reference is specified on a plat or in a document, astronomic meridian is presumed. A bearing is identified by naming the end of the meridian from which it is reckoned, either north or south, and the direction of that reckoning, either east or west. Thus, a line in the northeast quadrant making an angle of 50° from the reference meridian will have a bearing of N. 50° E.

**BEARING OBJECT** – A corner accessory which may be a natural object that can be readily identified by its distance and direction from the corner being recorded. These objects may not be of a character that can be marked, but in the case of a rock cliff or boulder a cross mark and the letters “*BO*” will be chiseled into the bearing object. The record should be clear enough to enable another surveyor to determine just where the marks will be found. The rock bearing object is the most permanent of all accessories; it is used wherever practicable, and within a distance of 5 chains. a connection to any permanent artificial object or improvement may be included in this general class of corner accessories. The field notes should be explicit in describing such objects, and indicate the exact point to which a connection is made, as “*pipe of Smith’s windmill.*” No marks are made on private property. See BEARING TREE, MOUND AND PITS, LAND MARK, ACCESSORIES, CORNER.

**BEARING TREE** – A marked tree used as a corner accessory; its distance and direction from the corner being recorded. Bearing trees are identified by prescribed marks cut into their trunks; the species and sizes of the trees are also recorded.

**BED** – In mining, a stratum in the earth’s crust which has been formed in an approximately horizontal layer. If of rock, it is termed “*bedrock.*” Also See BEDS OF NONNAVIGABLE LAKES AND STREAMS.

**BEDS OF NONNAVIGABLE LAKES AND STREAMS** – The areas within the mean high-water lines of a lake, stream or river which are kept practically bare of vegetation from year to year by the wash of the waters; although parts of them are left dry for months at a time. Title to the beds of nonnavigable bodies of water remains in the United States until the shore lands have passed into private ownership. See PROTRACTION, RIPARIAN BOUNDARIES and PARTITION LINES.

**BLACK HILLS MERIDIAN** – The principal meridian governing surveys in the western part of South Dakota, it was established in 1878.

**BLANK LINE** – 1) Where bearings and distances are shown, for information purposes only, across areas not then subject to survey. 2) In *Manual of Surveying Instructions 1834*, “thence north on a blank line; ...” appears used as a random line in specimen field notes.

**BLAZE** – A mark made upon a tree trunk usually at about breast height. The bark and a small amount of the live wood are removed with an axe or other cutting tool, leaving a flat, smoothed surface which forever brands the tree. On rough-barked tree monuments or bearing trees the appropriate marks are scribed into a smooth, narrow, vertical blaze the lower end of which is about 6 inches above the root crown. The blaze should be just long enough to allow the markings to be made. See OVERGROWTH.

**BLAZED LINE** – A sufficient number of trees differing from line trees in that they stand within 50 links of and on either side of the line, rather than being intersected by it, are blazed on two sides quartering toward the line. This is done to make the survey line more conspicuous and readily traced in either direction. The blazes are made opposite each other coinciding in direction with the line where the trees stand very near it. They are made closer to each other, toward the line, the farther they are from the line. R.S. sec. 2395; 43 U.S.C. 751 is the law authorizing the marking of trees along surveyed lines, and its requirements are as positive in this matter as are those requiring the erection of monuments. See LINE TREE.

**BLOCK** – A subdivision of a town site.

**BOARD OF LAND APPEALS** – Under the direction of a Board Chairman, the board exercises jurisdiction over cases involving appeals from decisions rendered by departmental officials relating to the use and disposition of public lands and their resources and the use and disposition of mineral resources in certain acquired lands and in the submerged lands of the Outer Continental Shelf. Persons adversely affected by a decision of a BLM officer or

examiner have the right to appeal to the board. The Board is in the Office of Hearings and Appeals, the office of the Secretary of the Department of the Interior, as provided at 35 F.R. 10010, June 18, 1970 – 43 C.F.R. 1842.2 (Now 43 C.F.R. part 4). Decisions of the Board on such appeals shall be final for the Department.

**BOG** – A shallow, low-lying, virtually undrained body of water, where partially decayed vegetation accumulates on the bottom and on the surface to form a mat. Mosses, sedges, grasslike plants and small shrubs eventually take root in the surface mat forming a “*boggy*” or spongy form of ground. In an advanced stage the water area becomes completely filled and may become what is known as a “*peat bog*.” See MARSH and SWAMP.

**BOISE MERIDIAN** – The principal meridian governing surveys in Idaho; it was established in 1867.

**BONA FIDE** – In or with good faith; honestly, openly and sincerely. Without deceit or fraud. Actual and genuine.

**BONA FIDE RIGHTS** – Rights, such as in ownership of land, which are real, actual, genuine and worthy of acceptance. Rights acquired in good faith under the law.

**BOUNDARIES, NATIONAL** – Boundaries between countries are established by treaties made by the sovereign powers concerned.

**BOUNDARIES, STATE** – A boundary between two States of the United States may be changed by agreement of the State legislatures, but this agreement must be approved by Congress. The United States Congress cannot change a State boundary without the consent of the State, nor can two States by mutual agreement change their common boundary without the consent of Congress. The consent of Congress to change a boundary need not be granted by a special act but may be inferred from subsequent legislation. Several times Congress has given its consent in advance for adjoining States to fix an indefinite water boundary between them. A boundary between a State and a territory is fixed by joint action of Congress and the State. Boundaries between territories are fixed by congressional action alone. Disputes between States regarding boundaries must be settled by the United States Supreme Court, whose decisions are final. It is a well-established principle, recognized by the courts and by Congress, that a State or national boundary line as marked on the ground and accepted by the parties interested is the legal boundary for all purposes whether or not it is the place designated by statute. Nearly all boundaries of States west of the Mississippi, as well as those of many central and southern States, were surveyed under the direction of the General Land Office. Notes of all such surveys, and plats for most of them, are now on file in the Bureau of Land Management, Dept. of Interior, or in the Cartographic Records Div., National Archives and Records Service, Washington, D.C.

**BOUNDARY, LAND** – A line of demarcation between adjoining parcels of land. The parcels of land may be of the same or of different ownership, but distinguished at some time in the history of their descent by separate legal descriptions. A land boundary may be marked on the ground by material monuments placed primarily for the purpose; by fences, roads, and other service structures along the line – or defined by astronomically described points and lines.

**BOUNDARY LINE** – A line along which two areas meet. A boundary line between privately owned parcels of land is usually termed a property line. If a boundary is a line of the United States public land surveys, it is given a particular designation, such as section line or township line.

**BOUNDARY MONUMENT** – A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.

**BOUNTY LANDS** – Portions of the public domain given or donated as a bounty for services rendered, chiefly for military service. See 43 U.S.C.A., sec. 791.

**BROKEN BOUNDARY** – 1) A boundary of the rectangular system which is a series of line segments representing a boundary which is not a straight line. 2) A boundary consisting of straight line segments which is not part of the rectangular system.

**BROKEN BOUNDARY ADJUSTMENT** – A general term which indicates a distribution of a closing error. Included are: (1) A mathematical adjustment applied to record meander courses which have since become nonriparian; is identical to the compass rule. (2) A mathematical adjustment applied to the record courses of a grant or reservation boundary; it is a rotation and scale change that will retain the original angles and change the lengths of each line segment proportionately according to the record. See GRANT BOUNDARY, IRREGULAR BOUNDARY, NON RIPARIAN BROKEN BOUNDARY ADJUSTMENT, ADJUSTMENT\*.

**BUREAU OF LAND MANAGEMENT, THE** – An agency of the Department of the Interior, it was created July 16, 1946, pursuant to Presidential Reorganization Plan No. 3 of 1946, which consolidated the functions and activities of the General Land Office and the Grazing Service.

## C

**CA (Land Status Records)** – Communitization Agreement.

**CA** – California.

**CAD (Land Status Records)** – Cadastral.

**CALIF.** – California.

**CANC (Land Status Records)** – Cancellation, Cancelled.

**CBWR (Land Status Records)** – Coos Bay Wagon Road.

**CC (Land Status Records)** – Cash certificate.

**CC** – Closing Corner.

**CDI (Land Status Records)** – Control Document Index.

**CDS (Land Status Records)** – Coal declaratory statement.

**CE (Land Status Records)** – Cash entry.

**CERT (Land Status Records)** – Certificate.

**CFR (Land Status Records)** - Code of Federal Regulations.

**C & GS** – (United States) Coast and Geodetic Survey.

**CH, CHS (Land Status Records)** – Chain, Chains.

**CHE (Land Status Records)** – Commuted homestead entry.

**CHG (Land Status Records)** – Change.

**CHIC MER (Land Status Records)** – Chickasaw Meridian.

**CHOC MER (Land Status Records)** – Choctaw Meridian.

**CIM MER (Land Status Records)** – Cimarron Meridian.

**CIRC (Land Status Records)** – Circular.

**C/L (Land Status Records)** – Commissioner of Lands.

**CL (Land Status Records)** – Classification.

**CO (Land Status Records)** – Company.

**CO** – Colorado, Colo.

**C of E (Land Status Records)** – Corp of Engineers.

**COLO.** – Colorado.

**COMM P (Land Status Records)** – Community Pit.

**COMM S (Land Status Records)** – Communication Site.

**CONDEMN (Land Status Records)** – Condemnation.

**CORP (Land Status Records)** – Corporation.

**CPG (Land Status Records)** – Campground.

**CRE (Land Status Records)** – Credit entry.

**CR MER (Land Status Records)** – Copper River Meridian.

**CR PER (Land Status Records)** – Crossing Permit.

**C/T (Land Status Records)** – Color of Title.

**CT** – Connecticut.

**CUR PAT (Land Status Records)** – Curative patent.

**CWS** – Community watershed.

**CADASTRAL ENGINEER** – A former title of a Cadastral Surveyor or Land Surveyor in the Bureau of Land Management and the General Land Office.

**CADASTRAL ENGINEERING STAFF OFFICER** – Former title of the Chief, Division of Cadastral Surveys.

**CADASTRAL SURVEY** – A survey which creates, marks, defines, retraces or reestablishes the boundaries and subdivisions of the public land of the United States.

**CADASTRAL SURVEY APPROVAL AUTHORITY** – Prior to becoming an official cadastral survey the field notes must be approved and the plat, field notes and survey must be accepted on behalf of the Director of the Bureau of Land Management by the officer to whom he has delegated this responsibility. See OFFICIAL CADASTRAL SURVEY.

**CADASTRAL SURVEY AUTHORITY** – The authority derived from the statutory directive (43 U.S.C. 2) that “*The Secretary of the Interior or such officer as he may designate shall perform all executive duties appertaining to the surveying ... of the public lands.*” Other statutory declarations affecting the cadastral survey program are: 25 U.S.C. 29 and 30; 43 U.S.C. 52-60, 751-775 and 1364.

**CALL** – A reference to, or statement of, an object, course, distance or other matter of description in a survey or grant requiring or calling for a corresponding object, or other matter of description, on the land. See PASSING CALLS.

**CANAL GRANT** – A grant made to a State to aid in the construction of canals.

**CANCELLATION** – The annulment of a former accepted survey. This action may be taken only by the Director of the Bureau of Land Management. It requires ample justification such as the showing of gross irregularities. The unreasonable distortion of section boundaries in both length and direction and/or lines which are shown on the

record without ever having existed in fact may be deemed justification for cancellation. This action applies to the public land, and has no bearing on the identification of the alienated subdivisions described in terms of the prior survey.

**CANCELLATION (Lands)** – An abrogation of a right in the public lands because of noncompliance with the public land laws or because of expiration of time limits. See ABROGATE.

**CARDINAL** – The cardinal directions; north, south, east and west.

**CAREY ACTS** – The acts of August 18, 1894 (28 Stat. 372), and March 15, 1910 (36 Stat. 237, 43 U.S.C. sec. 643), which provide for grants of desert lands to States for disposition to bona fide settlers.

**CASH CERTIFICATE** – A final certificate issued in connection with a cash entry.

**CASH ENTRY** – An entry that covered public lands for which the entryman paid cash or its equivalent.

**CEDED INDIAN LANDS** – Public lands, Indian tribal title to which was relinquished to the United States by the Indians on condition that part or all of the proceeds from their sale or other disposition would be covered in the Treasury in trust for the Indians.

**CEMETERY-SITE ENTRY** – A cash entry of public lands which are to be used for cemetery purposes.

**CENTERLINE** – The line connecting opposite corresponding quarter corners or opposite subdivision-of-section corners or their theoretical positions. Applied to a street, right of way or any other strip of land of uniform width “*centerline*” defines the line midway between the side lines of said strip. See END LINE, SIDE LINE.

**CERTIFICATE OF APPROVAL** – A written statement certifying that the field notes of a cadastral survey have been critically examined and found correct, and are thereby approved. It is a statement that follows, and is a part of the same document as, a “*certificate of survey*.” It is dated and signed by the Chief, Division of Cadastral Survey. See CERTIFICATE OF SURVEY and CERTIFICATE OF TRANSCRIPT.

**CERTIFICATE OF COMPLIANCE** – See FINAL CERTIFICATE.

**CERTIFICATE OF SURVEY** – A document containing a statement dated and signed by a cadastral surveyor to the effect that a survey has been executed in strict conformity with the special instructions, the Manual of Instructions, and in the specific manner described in the field notes with which it is filed. See CERTIFICATE OF APPROVAL and CERTIFICATE OF TRANSCRIPT.

**CERTIFICATE OF TRANSCRIPT** – A statement dated and signed by the Chief, Division of Cadastral Surveys as to the accuracy of the transcript of the original field notes of a particular survey. The certificate is a part of the same document as the “*certificate of survey*” and the “*certificate of approval*.” See CERTIFICATE OF SURVEY, CERTIFICATE OF APPROVAL.

**CERTIFICATION** – The act of final approval of a State selection by the Director of the BLM; also, the document which passes title to the selected lands to the State; also, a document which attests to the truth or authenticity of papers attached to it.

**CERTIORARI** – A written instruction issued by a higher court to a lower court requiring the records of a trial be submitted for review or inquiry. If such higher court finds no reason to re-examine the records based on arguments submitted by attorneys, the ruling of the court is “*Certiorari denied*.”

**CESSION OF PUBLIC DOMAIN** – See ORIGINAL PUBLIC DOMAIN ACQUISITIONS.

**CHAIN** – The unit of length prescribed by law for the survey of the public lands of the United States. The chain is equivalent to 66 feet or 4 rods, poles or perches. 10 square chains equals one acre.

**CHAINING** – The operation of measuring a distance on the earth, using a chain or tape. The corresponding operation, in private surveys, is taping.

**CHAINMEN** – Those who measure and record the distances in chaining.

**CHAIN OF TITLE** – A term applied metaphorically to the series of conveyances, or other forms of alienation, affecting a particular parcel of land, arranged consecutively from the Government or original source of title down to the present holder, each of the instruments included being terms a “*link*.”

**CHANCERY** – See EQUITY.

**CHANNEL (T. R. No. 4)** – 1) A natural or artificial waterway of perceptible extent which either periodically or continuously contains moving water, or which forms a connecting link between two bodies of water; 2) The part of a body of water deep enough to be used for navigation through an area otherwise too shallow for navigation; 3) A large strait, as the English Channel; 4) The deepest portion of a stream, bay, or strait through which the main volume or current of water flows. See CHANNEL, MAIN; GRADIENT BOUNDARY; THALWEG; RULE OF THALWEG.

**CHANNEL, MAIN** – As called for as a boundary between Nations or States, the “*main channel*” of a navigable stream refers to the deepest and most navigable channel as it existed at the time the boundary was surveyed. In the Red River case of Oklahoma vs. Texas in 1923 (260 US 606, 261 US 340, 265 US 493), which involved a non-navigable river, the Supreme Court of the United States declared by unprecedented action that the Texas-Oklahoma boundary

was to be determined by a medial line between gradient lines on each bank. It was decided that “... *channel extending from one cut-bank to the other, which carries the water in times of a substantial flow... was the only real channel and therefore the main channel.* – So its medial line must be what was designated as the boundary.” (Oklahoma vs. Texas, 258US574). If the river had been navigable, the “*rule of thalweg*” would have applied, but that section of the Red River is, in fact, not navigable. See MEDIAL LINE, RULE OF THALWEG, GRADIENT BOUNDARY, RED RIVER CASE.

**CHICKASAW MERIDIAN** – The principal meridian which governs surveys in the northern part of Mississippi; it was established in 1833.

**CHIEF, DIVISION OF CADASTRAL SURVEYS** – The current title of the BLM officer charged with the survey of the public lands. The title of this officer has changed and evolved over the years since the passage of the Ordinance of May 20, 1785. It has been Geographer of the United States; Surveyor General of the United States; United States Supervisor of Surveys; Chief, Branch of Cadastral Surveys and Cadastral Engineering Staff Officer.

**CHOCKTAW MERIDIAN** – the principal meridian governing surveys in the central part of Mississippi; it was established in 1821.

**CHORD** – In surveying and geometry; a straight line joining any two points on an arc, curve, circumference, or surface.

**CIMARRON MERIDIAN** – The principal meridian which governs surveys in the Oklahoma panhandle; it was established in 1881.

**CLAIMANT** – An individual, corporation, association, State or local government, etc., asserting title to, or rights in, public lands.

**CLAIM JUMPING** – Illegally taking possession of a mining claim previously staked by and in legal possession of another. Prior to the passage of statutory laws governing mining claims, claim jumping sometimes took the simple form of staking over another person’s claim and then holding it by force. See RELOCATION.

**CLASSIFICATION** – Designation of public lands as being valuable or suitable for specific purposes, uses, or resources. See LAND, MINERAL, POWER SITE, and SMALL TRACT.

**CLASSIFICATION WITHDRAWAL** – A withdrawal of public lands which is made pending examination of the lands to determine their suitability for certain purposes and for classification for those purposes.

**CLEAR LIST** – A selected list of public lands which has been prepared for approval by the Secretary of the Interior or the Director of the Bureau of Land Management; also, an official statement from an interested Federal agency or official which indicates that no apparent objection exists to a proposed action with respect to public lands.

**CLEAR LIST, APPROVED** – An approved clear list or certification is used to convey legal title to lands under certain grants made by Congress. An approved clear list conveys a fee-simple title to public lands identified in a selection list made by a State and approved by the Bureau of Land Management.

**CLINOMETER** – A hand held instrument used to measure vertical angles or the inclination of a slope. Also called an Abney Level.

**CLOSED LAND STATES** – The public-land states in which records have been turned over to the State except for the State of Washington wherein the records are kept in Portland, Oregon, viz., Alabama, Arkansas, Florida, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, and Wisconsin.

**CLOSING CORNER** – A corner established where a survey line intersects a previously fixed boundary at a point between corners. The closing corner is located by law at the actual point of intersection without regard to its monumented location. See CLOSING SUBDIVISION OF SECTION CORNER, CLOSING TOWNSHIP CORNER, CROSSING CLOSING CORNER.

**CLOSING ERROR** – See MISCLOSURE.

**CLOSING SUBDIVISION-OF-SECTION CORNER** – A corner set where a subdivision of section line closes on a State, reservation, grant or private claim boundary or on some other previously established survey which is irregular as to plan.

**CLOSING TOWNSHIP CORNER** – 1) The point of intersection of a guide meridian or a range line with a previously fixed standard parallel or base line. 2) The point of intersection of any township or range line with a previously fixed boundary at a point between previously established corners.

**CLOSURE** – The process of measurement in a closed figure for a check on horizontal or vertical precision. See CLOSURE\*.

**CLOUD ON TITLE** – An outstanding claim or encumbrance which, if valid, would affect or impair the title of the owner of a particular estate. A mortgage judgment or tax levy may in some cases constitute a cloud on title.

**COAL DECLARATORY STATEMENT** – An affidavit filed by a claimant under now obsolete laws, describing lands known to contain coal deposits. The filing segregated the lands. A Cash Entry patent was issued, giving the surface and the minerals to the patentee.



**COAL ENTRY** – A cash entry, under laws now repealed, covering public lands which contain valuable coal deposits or covering such coal deposits only.

**COAL LANDS** – Surveyed public lands chiefly valuable for their deposits of coal.

**COAL LICENSE** – An authorization to mine coal on the public lands free of charge for local domestic use.

**COAST** – The zone of land of indefinite width (perhaps 1 to 3 miles) that extends inland from the shore to the first major change in terrain features. See BEACH, BACKSHORE, FORESHORE, SHORE.

**COASTAL SALT MARSH** – A marsh located along or near the sea coast, the surface of which lies below the elevation of mean high water. See SWAMP, SWAMP AND OVERFLOWED LANDS, MARSH, TIDELANDS.

**COASTLINE** – Technically, the line that forms the boundary between the coast and the shore and marks the seaward limit of the permanently exposed coast. The U.S.C.&G.S. (now N.O.S.) uses the words “*coastline*” and “*shoreline*” as synonymous and defines these as being the mean high water line. In the Submerged Lands Act, 43 U.S.C. 1301(c): “*The term “coast line” means the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters.*” When using the term “*coastline*” the user should specify what line is intended. See BEACH, SHORE, SHORE LINE, FORESHORE, BACKSHORE, MEAN HIGH WATER, TIDELANDS, INLAND WATERS.

**CODICIL** – A supplement or an addition to a will.

**COLLATERAL EVIDENCE** – Additional or auxiliary evidence. Accompanying or acting as secondary evidence. Evidence which supports or reinforces evidence already in hand. See EVIDENCE.

**COLLATERAL EVIDENCE (CADASTRAL SURVEY)** – Such things as acts and testimony of interested landowners, competent surveyors, other qualified local authorities or some acceptable record evidence that may be used along with other evidence in identifying the true original position of a corner.

**COLOR OF TITLE** – If a claim to a piece of real property is based upon some written instrument, although a defective one, the person is said to have “*color of title.*” A claim which has as its basis that which the law considers prima facie a good title, but which, by reason of some defect not appearing on its face, is not in fact a title. Federal withdrawn land is not subject to the Color-of-Title Act. See COLOR-OF-TITLE ACT, COLOR-OF-TITLE ENTRY, and PRIMA FACIE.

**COLOR-OF-TITLE ACT** - The Act of December 22, 1928 (43 U.S.C., sec. 1068), as amended. Under the terms of and provisions of this act, a patent may be issued for a parcel of not more than 160 acres of public lands. The land must have been possessed in good faith by a claimant, his ancestors or grantors for a period of more than 20 years. See ADVERSE POSSESSION, COLOR OF TITLE, COLOR-OF-TITLE ENTRY.

**COLOR-OF-TITLE ENTRY** – A cash entry made by an entryman relying upon erroneous evidence of title. The Color-of-Title Act provides for this type of entry. However, land attaching to Federal withdrawn land by accretion becomes withdrawn and is not public land subject to color-of-title applications even when later separated from the withdrawn land by avulsions. See COLOR OF TITLE, ACCRETION, AVULSION, COLOR OF TITLE ACT, and WITHDRAWAL.

**COMMISSIONER OF THE GENERAL LAND OFFICE** – The official who was the head of the General Land Office. See GENERAL LAND OFFICE.

**COMMUNITIZATION AGREEMENT** – A contractual arrangement which combines separate land holdings for purposes of drilling for oil and gas.

**COMMUNITY WATERSHED** – An obsolete term which identified watershed planning areas. An area selected for such study is now simply a “*Watershed Area.*”

**COMMUTED HOMESTEAD ENTRY** – For certain classes of homestead entries it was possible to substitute payment of the minimum statutory price for part of another form of “*payment*” which consisted of residence for a certain number of years and/or other requirements. This substitution of one form of payment for another is called commutation.

**COMPASS SURVEY** – A survey, which was executed using the magnetic compass.

**COMPASS RULE** – See NON RIPARIAN BROKEN BOUNDARY ADJUSTMENT.

**COMPLETION SURVEY** – Executed to finish a partially subdivided township or section, or to finish parts of boundaries of townships or sections which are unsurveyed. See EXTENSION SURVEY and COMPLETION\*.

**CONDEMNATION** – In real property law, the process by which property of a private owner is taken for public use, without his consent, but upon the award of payment of just compensation. It has the nature of a forced sale and the condemner has the position toward the owner of a buyer toward a seller.

**CONFLICT** – 1) The overlap of the exterior lines of a claim onto a prior survey or other senior claim. 2) A variance or disagreement between what is written in the field notes and what is represented on the plat. 3) An apparent disagreement or ambiguity between various parts of the field notes. 4) A different representation on one plat compared to hand drafted copies thereof or compared to plats of adjacent surveys. 5) Any factor in the land status

which serves as a bar to approval of an application, particularly an application or entry for similar rights on the same land.

**CONFLICTING EVIDENCE** – A contradiction or disagreement of the actual ground conditions compared to the record, usually regarding topographic calls or characteristics of corner monumentation. See EVIDENCE.

**CONFLICTING TESTIMONY** – A contradiction or ambiguity of facts, evidence, or statements made previously or made by other witnesses. See TESTIMONY.

**CONFLUENCE** – Literally, flowing together. The joining of two or more streams of water. Considering two major streams, the precise point of confluence is where the flow direction of water along the thread of the smaller stream reasonably parallels and joins the flow in the larger stream. In field notes the point where the thread of a smaller non-meandered stream crosses the meander line of the larger stream is the confluence.

**CONFORMED ENTRY** – Used in independent resurveys to indicate that an entry according to the original survey agrees with the subdivisional lines of the resurvey, or that the entryman will accept the subdivisional lines of the resurvey as properly locating his claim.

**CONNECTED SHEETS** – Sometimes called “*Connection Sheets*,” they are diagrams drawn from the official record on a section by section basis, but with peripheral overlap between diagrams. In this way the continuous relationship between irregular land line conditions, particularly mining claims, is shown. These diagrams are not official documents; they are a working index tool of the Bureau of Land Management.

**CONNECTING LINE** – 1) A survey line connecting one survey to another. Generally used on the older plats and in mineral surveys. 2) A line calculated from beginning to end of a traverse.

**CONTERMINOUS UNITED STATES** – The 48 contiguous States and the District of Columbia; all of the States which have common boundaries and are not separated by foreign territory or the high seas. The United States, exclusive of Alaska and Hawaii. See CONTINENTAL UNITED STATES.

**CONTEST** – To make defense to an adverse claim in a court of law; to oppose, resist, or dispute the case made by a plaintiff. To strive to win or hold; to controvert, litigate, challenge; to defend, as a suit or other proceeding.

**CONTIGUOUS LAND** – Generally speaking, two parcels of land having a common boundary line. See CORNER CONTIGUITY.

**CONTINENTAL CONGRESS** – Either of two assemblies of representatives from American colonies during the Revolutionary period. The first of these was held in 1774 to express grievances against British colonial policy; the second convened in 1775, created the Continental Army, issued the Declaration of Independence (1776) and the Articles of Confederation (1778). It operated as the legislative body of the United States for several years.

**CONTINENTAL DIVIDE** – The ridge in the Rocky Mountain system which divides the waters of the continent.

**CONTINENTAL SHELF** – The part of a continental mass extending from the shore outward beneath the shallow seas to the continental talus where the bottom slopes down rapidly to the ocean depths. See CONTINENTAL SHELF\*.

**CONTINENTAL UNITED STATES** – Includes the Conterminous United States and the State of Alaska. Hawaii alone of the 50 States is not a part of the continental of North America. See CONTERMINOUS UNITED STATES.

**CONTOUR\***.

**CONTRACT** – A binding legal relationship obligating the seller to furnish personal property or nonpersonal services (including construction) and the buyer to pay for them. Contracts include all types of commitments obligating the Government to an expenditure of funds, and are usually in writing.

**CONTRACT ADMINISTRATION** – The activities involved in enforcing the terms of the contract, and in carrying out the Government’s responsibilities as stated in the contract.

**CONTRACTING OFFICER** – The employee delegated contracting authority who signs a contract in behalf of the Government.

**CONTRACTING OFFICER’S AUTHORIZED REPRESENTATIVE** – The employee designated in writing by the Contracting officer to provide contract administrative services.

**CONTRACT SYSTEM** – The contracting of the public land surveys. Between 1796 and 1910 the public land surveys were executed by deputy surveyors who had entered into contracts with the Surveyors General for the performance of the field work and preparation of the field notes of the surveys. See DIRECT SYSTEM OF SURVEYS.

**CONTROL DOCUMENT** – Any legal document which affects the ownership or use of the public lands and resources. See LAND STATUS RECORDS, PATENT.

**CONTROL DOCUMENT INDEX** – A reference file consisting of microphotographic copies of legal documents mounted in aperture tabulating cards arranged by State, meridian and township. See LAND STATUS RECORDS, CONTROL DOCUMENTS, SERIAL REGISTERS.

**CONTROL, GEODETIC** – A system of monumented stations having known, precise positions established by geodetic methods. See CONTROL SURVEY CLASSIFICATION\*.

**CONTROL LINES** – The primary control of the public land surveys of the United States consists of base lines, standard parallels (correction lines), principal meridians and guide meridians. Among field surveyors a control line is a survey line to the nearest identified corner in directions necessary for restoration of a corner. See **OUTBOUNDARIES**.

**CONTROLLING BOUNDARIES** – See **OUTBOUNDARIES**.

**CONTROVERTED** – Disputed; denied; opposed or contested.

**CONVEY** – The act of deeding or transferring title to another.

**CONVEYANCE** – In real property law, a transfer of legal title to land. An instrument, such as a deed, by which interest in real property is created or by which title to real property is transferred from grantor to grantee.

**COORDINATES** – A set of numbers used in specifying the location of a point.

**COORDINATE SYSTEM** – A mathematically defined method for specifying the locations of points. Distances or angles from suitable references locate the points within the system. See **STATE COORDINATE SYSTEMS**, **STATE PLANE COORDINATES**, **GEODETIC COORDINATES**, **UNIVERSAL TRANSVERSAL MERCATOR**, **GEOGRAPHIC COORDINATES**, **PLANE COORDINATES**, **SPHERICAL COORDINATES**.

**COOS BAY EXCHANGE** – See **O&C EXCHANGE**.

**COOS BAY HOMESTEAD ENTRY** – A homestead entry, not exceeding 160 acres, on Coos Bay Wagon Road lands which are agricultural in character.

**COOS BAY WAGON ROAD LANDS** – Public lands in western Oregon which were granted to the State of Oregon to aid in the construction of the Coos Bay Military Wagon Road, but which were later forfeited and returned to the Federal Government by reconveyance. See **OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION**.

**COPPER RIVER MERIDIAN** – The principal meridian governing surveys in the southeastern part of Alaska; it was adopted in 1905.

**COPPERWELD** – A brand-name for a copper coated steel rod with a brass cap which may be authorized for use in monumentation of corners in certain areas where the use of a regulation iron post is not practical.

**CORNER** – A point on the surface of the earth, determined by the surveying process, which defines an extremity on a boundary of the public lands. See **CLOSING CORNER**, **CLOSING TOWNSHIP CORNER**, **DOUBLE CORNER**, **EXISTENT CORNER**, **FOUND CORNER**, **LOST CORNER**, **MEANDER CORNER**, **OBLITERATED CORNER**, **QUARTER-SECTION CORNER**, **SECTION CORNER**, **SIXTEENTH-SECTION CORNER**, **STANDARD CORNER**, **TOWNSHIP CORNER**, **WITNESS CORNER**. Also see **MONUMENT**.

**CORNER ACCESSORIES** – Nearby physical objects to which corners are referenced for their future identification or restoration. accessories include bearing trees, mounds, pits, ledges, rocks and other natural features to which distances or directions (or both) from the corner or monument are known. Such accessories are actually a part of the monumentation. See **BEARING TREE**, **BEARING OBJECT**, **MOUNDS AND PITS** and **LANDMARK**.

**CORNER CONTIGUITY** – When parcels of land or mining claims have angle points (corners) in common – though they do not share a common boundary line – they are said to have "*corner contiguity*."

**CORNER DESCRIPTION** – The specific data (both old and new) about a corner monument and its accessories which include marks, positions, and physical characteristics. Corner monument markings – letters, numerals, lines, grooves or notches used to mark corner monuments. The markings usually indicate the location of the corner.

**CORNER MOVE** – The computed directions and distances FROM a temporary point TO the true point for a corner as computed from the retracement data. See **RANDOM LINE**.

**CORNER OF MAXIMUM CONTROL** – A section corner of maximum control fixes the position of, or controls, the position of four sections; likewise, a township corner of maximum control, controls four townships. A quarter-section corner of maximum control, controls the subdivision of two sections. See **CORNER OF MINIMUM CONTROL**.

**CORNER OF MINIMUM CONTROL** – A section corner of minimum control fixes the position of, or controls less than four sections; likewise, a township corner of minimum control, controls less than four townships. A quarter-section corner of minimum control fixes the subdivisions of one section only.

**CORPOREAL PROPERTY** – Property which may be seen and touched, as distinguished from incorporeal property which exists only in contemplation. A house is corporeal, but annual rent which may be payable for its occupation by another is incorporeal. See **INCORPOREAL**.

**CORRECTION LINE** – See **STANDARD PARALLEL**.

**CORRECTIVE RESURVEY** – A survey made to correct an erroneous omission of original corner evidence discovered after a survey has been approved.

**CORRESPONDING CORNERS** – Opposite, like corners of a subdivisional unit which control the subdivision of that unit.

**CORROBORATING EVIDENCE** – Evidence supplementary to that already given and tending to strengthen or confirm it. Additional evidence of a different character to the same point. see COLLATERAL EVIDENCE and COLLATERAL EVIDENCE (CADASTRAL SURVEY).

**COUNTRY ROCK** – The rock beyond the walls of a lode. The strata between or across which the lode is found.

**COURSE** – In surveying; the direction of a line with reference to a meridian; also, the direction of flow of the water in a stream. See BEARING.

**COURTHOUSE-SITE RESERVE** – A reservation of public lands in Alaska in territorial days for use as a Territorial Courthouse site.

**COURTS OF CHANCERY** – See COURTS OF EQUITY.

**COURTS OF EQUITY** – Courts which administer justice according to the system of equity, and according to the rules, principles and procedures of chancery; as distinguished from a court having the jurisdiction, rules, principles and practice of the common law. The terms “*chancery*” and “*equity*” and “*court of chancery*” and “*court of equity*” are used as synonymous in the United States, probably because the jurisdiction exercised by courts of equity is similar to that of the English chancery courts. In some States, courts called chancery courts possess general equity powers.

**CROSSCUT** – Something that cuts across or through. Specifically: a mine working driven horizontally and at right angles to an adit, drift or level.

**CROSSING CLOSING CORNER** – A term used to describe a corner set where a township or section line intersects (crosses) the line of a surveyed mineral claim, forest claim or the like. Crossing closing corner monuments are usually not set at these intersections unless such corners are required to provide an interval of monumentation of at least one-half mile. In instances where they may be required for operational or litigation purposes they will be provided for in the Special Instructions.

**CURATIVE PATENT** – See PATENT, CURATIVE.

**CURTESY** – The right which a husband has in his wife’s estate at her death. The state to which by common law a man is entitled, on the death of his wife, in the lands or tenements of which she is seised in possession in fee-simple or in tail during her coverture, provided they have had lawful issue born alive which might be capable of inheriting the estate. It is a freehold estate for the term of his natural life. See DOWER.

**CUT** – In mining, a surface opening in the ground intersecting a vein. See CUT\*.

## D

**D (Land Status Records)** – Director.

**DC** – District of Columbia.

**DC (Land Status Records)** – Donation claim. See DONATION LAND CLAIM.

**D/C (Land Status Records)** – Ditches and/or Canal.

**DDB** – Directives Digest Bulletin.

**DE** – Delaware.

**DED (Land Status Records)** – Dedication.

**DEF (Land Status Records)** – Deficiency.

**DEP** – Department (of a traverse).

**DEPT OF AGRI (Land Status Records)** – Department of Agriculture.

**DEPT OF INT (Land Status Records)** – Department of the Interior.

**DES (Land Status Records)** – Designated or Designation.

**DET (Land Status Records)** – Determination.

**DI-10** – A brand name of electronic measurement equipment.

**DLC** – Donation land Claim.

**DLE (Land Status Records)** – Desert Land Entry.

**DM (Land Status Records)** – District Manager.

**DMD** – Double meridian distance.

**DOC (Land Status Records)** – Document.

**DPD** – Double parallel distance.

**DSC** – Denver Service Center.

**DANGER ZONE** – In regard to the rectangular limits of township boundaries, the “*danger zone*” is placed at theoretical bearings exceeding 14 minutes of arc from cardinal. In respect to lengths of lines, the “*danger zone*” occurs when adjustments exceed 33 links per mile, as defined in Manual of Surveying Instructions.

**DATUM** – In ordinary survey usage, a defined reference for survey measurements. The plural form is datums. See GEODETIC DATUM, TIDAL DATUM, NORTH AMERICAN DATUM OF 1927\*, MEAN SEA LEVEL, LEVEL DATUM\*.

**DECISION** – a decision is the reduction to writing of the adjudicative process. A decision orders the disposition of a case in a certain way, and contains a statement of the facts, laws and reasoning which require that disposition.

**DECLINATION** – An angle of difference. See ASTRONOMIC DECLINATION, MAGNETIC DECLINATION, VARIATION.

**DECLINATION, ASTRONOMIC** – The angular distance of a celestial body north or south of the celestial equator. Astronomic declination on the celestial sphere corresponds with latitude on the earth. It is noted as positive (+) when north and negative (-) when south of the celestial equator.

**DEED** – A document which transfers title to real property. In those instances where a complicated metes and bounds description is the only description available, a deed may be used to transfer fee simple interest in public lands. A patent would be issued under normal conditions where a cadastral survey plat shows a description by legal subdivisions. See PATENT, WARRANTY, BARGAIN AND SALE, QUITCLAIM DEED, and DESCRIPTION BY LEGAL SUBDIVISIONS.

**DEFENDANT** – The person defending or denying; the party against whom relief or recovery is sought in an action or suit. See PLAINTIFF.

**DEFICIENCY** – The amount by which a boundary is less than the nominal amount which is usually 80 chains.

**DEFLECTION ANGLE** – The angular difference from a straight line at an angle point in a traverse.

**DE MINIMIS NON CURAT LEX** – The law does not care for, or take notice of, very small or trifling matters; the law does not concern itself about trifles. a surveyor's return of 29 inches length for a location monument should be considered a trifling difference. See also RULE OF APPROXIMATION.

**DEMUR** – To take exception. To make an objection. To present a demurrer. See DEMURRER.

**DEMURRER** – An answer to a legal action that assumes the truth of the matter alleged by the opposite party. It then sets up the defense that the complaint is insufficient in law to sustain his claim or that there is some other defect constituting a legal reason why the opposing party should not be allowed to proceed further. Also, one who demurs.

**DEPARTURE\***.

**DEPENDENT RESURVEY** – A retracement and reestablishment of the lines of the original survey in their true original positions according to the best available evidence of the positions of the original corners. It includes the restoration of lost corners in accordance with procedures described in the Manual of Surveying Instructions. See RESURVEY, INDEPENDENT RESURVEY, RETRACEMENT, and RESTORATION.

**DEPOSIT** – In mining, a quantity of mineral substances occurring naturally in the earth; as, a deposit of gold, oil, etc.

**DEPOSIT SURVEY** – A cadastral survey made under certain public land laws which allow or require that the claimant make a deposit of money in the estimated amount of the cost of the survey.

**DEPOSITION** – The testimony of a witness taken under oath and reduced to writing, authenticated, and intended to be used upon the trial of an action in court. A written declaration under oath, made upon notice to the adverse party for the purpose on enabling him to attend and cross-examine; or upon written interrogatories. It is the giving of notice to the adverse party which especially distinguishes a deposition from an affidavit. See AFFIDAVIT, INTERROGATORIES.

**DEPUTY SURVEYOR** – A surveyor who entered into a contract to survey a portion of the public lands under the system in existence prior to 1910 was commissioned by the Surveyor General as his deputy. See CONTRACT SYSTEM.

**DERELICTION** – Same as Reliction.

**DESCRIPTION** – See CORNER DESCRIPTION, LEGAL DESCRIPTION.

**DESCRIPTION BY LEGAL SUBDIVISION** – Definition of a unit or units of land with reference to the rectangular system; for example, Lot 3 and SE ¼ NW ¼ sec. 6, T. 8 N., R. 20 W., 5<sup>th</sup> Prin. Mer., Arkansas.

**DESERT-LAND APPLICATION, STATE** – An application filed by a State for a grant of desert land for the purpose of disposal to bona fide settlers. See CAREY ACTS.

**DESERT LAND ENTRY** – An entry of irrigable arid agricultural public lands, under the terms of the Act of March 3, 1877, as amended, for the purpose of reclamation, irrigation and cultivation in part.

**DESERT-LAND SEGREGATION, STATE** – Arid public lands which have been selected by a State under the Carey Acts and which are set aside pending completion under State direction of an irrigation system to reclaim the lands.

**DIAGRAM, TOWNSHIP OR SECTION** – A standardized drawing of a township or of a section which shows the major legal subdivisions.

**DICTA** – Opinions of a judge which are beside the point of a case at issue before the court. See OBITER DICTUM.

**DICTIONARY** – A remark by the way. Generally, the word “*dictum*” is used as an abbreviated form of “*Obiter dictum.*” See OBITER DICTUM.

**DIKE** – 1) (noun) An embankment or barrier constructed to hold water out of a low-lying area, or to hold water within an area. 2) (verb) To surround, protect, or enclose with such an embankment. 3) (in geology) A sheet like intrusion of magma forced upward through fissures in the earth’s crust and hardened to a tabular mass of igneous rock. A volcanic dike may vary from a few inches to hundreds of feet in horizontal thickness. See LEVEE, GROIN.

**DIRECT** – 1) a transit observation on the sun used for computing bearing as opposed to use of the solar instrument. 2) The normal position of the transit’s telescope. See DIRECT TIE, DIRECT MEASUREMENT, DIRECT ANGLES\*.

**DIRECT MEASUREMENT** – Determination of a distance by physical comparison or accumulation of distance using a device calibrated in some unit of measure. See INDIRECT MEASUREMENT.

**DIRECT TIE** – A connection to another survey point by physical measurement. See DIRECT MEASUREMENT.

**DIRECTOR** – The present title of the official who is head of the Bureau of Land Management. Functions formerly assigned to the Commissioner of the General Land Office and to the Director of the Grazing Service are a part of this official’s responsibility.

**DIRECT SYSTEM** – The Interior Department appropriation Act of 1911 (June 25, 1910, 36 Stat. 703, 740), provided, under “*Surveying the Public Lands*”; “*The surveys and resurveys to be made by such competent surveyors as the Secretary of the Interior may select, ...*” This provision ended the practice of letting contracts for the surveys of the public lands, and required the “*direct*” hiring of a permanent corps of cadastral surveyors. See CONTRACT SYSTEM.

**DIRTY SHEET** – A slang term for a sketch showing the current progress and details of the field work of a cadastral survey.

**DISCOVERY** – In mining law, as the basis of the right to locate a mining claim upon the public domain, discovery means the finding of mineralized rock in place. Also, the physical exposure of the mineral vein or lode or other mineral deposit on the ground. See VEIN, DISCOVERY, and POINT OF DISCOVERY.

**DISPOSAL, LAND** – A transaction which leads to the transfer of title to public lands from the Federal Government.

**DISPOSITION** – A transaction which leads to the transfer of public lands, and/or resources in these lands from the Federal Government.

**DISTANCE, PARENTHETICAL** – See PARENTHETICAL DISTANCE.

**DISTORTION** – A greater than usual change in bearings and distances of the original survey which is reflected by a retracement or resurvey.

**DISTRICT (BLM)** – The primary administrative division of a State Director’s geographic area of responsibility. A geographic area composed of at least two (typically three or four) resource areas under the supervision of a District Manager. See DISTRICT MANAGER AND RESOURCE AREA.

**DISTRICT MANAGER (BLM)** – The principal Bureau official at the district level. He is directly accountable to the State Director. See STATE DIRECTOR.

**DISTRICT OFFICES (BLM)** – The States and cities in which BLM district offices are currently (1973) located are as follows:

Alaska – Anchorage and Fairbanks.  
 Arizona – Phoenix and Safford.  
 California – Bakersfield, Folsom, Redding, Riverside, Susanville and Ukiah.  
 Colorado – Canon City, Craig, Glenwood Springs, Grand Junction and Montrose.  
 Idaho – Boise, Burley, Coeur d’Alene, Idaho Falls, Salmon and Shoshone.  
 Montana – Billings, Dillon, Lewiston, Malta, Miles City and Missoula.  
 Nevada – Battle Mountain, Carson City, Elko, Ely, Las Vegas and Winnemucca.  
 New Mexico – Albuquerque, Las Cruces, Roswell and Socorro.  
 Oregon – Baker, Burns, Coos Bay, Eugene, Lakeview, Medford, Prineville, Roseburg, Salem and Vale.  
 Utah – Cedar City, Fillmore, Kanab, Monticello, Price, Richfield, St. George, Salt Lake City and Vernal.  
 Washington – Spokane (Administered through Oregon State Office).  
 Wyoming – Casper, Lander, Pinedale, Rawlins, Rock Springs and Worland.

See SPECIAL OFFICES (BLM), STATE OFFICES (BLM), LAND OFFICES (BLM), DISTRICT (BLM), DISTRICT MANAGER (BLM).

**DITCHES AND/OR CANALS** – Used to indicate a reservation to the United States of a right, or an easement for the construction and maintenance of ditches or canals, as stated in a particular patent.

**DIURNAL** – Daily. Usually used in reference to a natural phenomenon which occurs only once in a given day.

**DIVEST** – To deprive; take away or withdraw. Usually spoken of in reference to depriving or dispossessing one of property, title or authority.

**DIVIDE** – A ridge or area of elevated land between two basins or valleys. See CONTINENTAL DIVIDE, HYDROGRAPHIC DIVIDE and RIDGE TOP.

**DIVISION LINE BETWEEN A BOG AND AN UPLAND AREA** – The line where the area occupied by a shallow, virtually undrained bog area meets mineral soil, which lies above ordinary high water. If upland vegetation is present, the inference will be that it has been an upland site for the period equal to the age of the vegetation. See BOG and UPLANDS.

**DIVISION LINE BETWEEN A MEANDERABLE BODY OF WATER AND A SWAMP** – The line where the area occupied by the water for the greater part of each average year meets the area where the types of vegetation occur which may normally be found only within the swamp zone. For example, while certain varieties of trees are found only in upland situation, other varieties and other types of vegetation may be found only within the zone of the swamp. All such vegetation normally ends at the margin of permanent water. See SWAMP.

**DIVISION LINE BETWEEN A SWAMP AND AN UPLAND AREA** – The line where an area lying above the ordinary high water elevation meets an area of low, wet land of such character that without the construction of artificial reclamation methods it would be wet and unfit for agriculture. See SWAMP, MARSH, BOG, SALT MARSH, SWAMP AND OVERFLOWED LANDS, and UPLANDS.

**DOCUMENT** – 1) An instrument on which is recorded, by means of letters, figures, marks or symbols, information which may be relied upon as the basis, proof or support of something. A deed, agreement, title paper, letter or other written instrument used to prove a fact. 2) To furnish written evidence. To provide with factual or substantial support for statements made or a hypothesis proposed; especially, to equip with exact references too authoritative supporting information.

**DOMESDAY-BOOK (Sometimes Domesday-Book)** – A record of a survey of English lands made by order of William the Conqueror. It was begun in 1081 and finished in 1086. It is a description of the land, with the names of the owners, and the nature and extent of their holdings. It was, in effect, a cadastral survey.

**DONATION** – The voluntary conveyance of private property to public ownership and/or use, without compensation to the owner.

**DONATION ACT OF SEPTEMBER 27, 1850** – Provided for grants of 320 acres to all White American citizens or those who intended to become citizens and who had resided in Oregon Territory and cultivated the land 4 years; wives to have an additional 320 acres. All white male citizens or intended citizens who emigrated there between Dec. 1, 1850 & Dec. 1, 1853, and who met the other requirements, were to have 160 acres or 320 acres, depending on their marital status. See DONATION LAND CLAIM.

**DONATION LAND CLAIM** – The land, 320 or 640 acres, that was allocated to an Oregon settler under the Donation Act of September 27, 1850. See DONATION ACT OF SEPTEMBER 27, 1850, ACT OF AUGUST 4, 1842, ACT OF JULY 22, 1854, and DONATION LANDS.

**DONATION LANDS** – Lands granted from the public domain to an individual or, as in the case of lands donated or granted to railroads as an incentive for construction, to corporations. See also DONATION.

**DOUBLE CENTERING\***.

**DOUBLE CORNER** – Normally the two sets of corners along a standard parallel; the standard township, section, and quarter-section corners placed at regular intervals of measurement; additionally, the closing corners established on the line at the points of intersection of the guide meridians, range and section lines of the surveys brought in from the south. In other cases, not fully in conformity with the rectangular plan, two corners, each common to two townships only, instead of one corner of the four townships. Similarly, two corners, each common to two sections; and two quarter-section corners, each referring to one section only. The term is sometimes used incorrectly to denote two lines established on the ground although the field-note record indicates only one line, thus creating a hiatus or overlap.

**DOUBLE MERIDIAN DISTANCE** – 1) The sum of the distances from the end points of a line to an arbitrary reference north-south line used for area computations. Sometimes considered as twice the distance from the midpoint of a line, which is mathematically equivalent. 2) The method of computing areas using DMDs or DPDs.

**DOUBLE PARALLEL DISTANCE** – The sum of the distances from the end points of a line to an arbitrary east-west line used for checking area computations by the DMD method.

**DOUBLE PROPORTIONATE MEASUREMENT (Also called “4-Way” proportion)** – A method of restoring a lost corner of four townships or four interior sections. It gives concordant relation between all parts of the times. The new values given to the several parts, as determined by remeasurement shall bear the same relation to the record lengths as the new measurement of the whole line bears to that record. In cases of distorted lines subject to double proportion, measurements are comparable only when reduced to their equivalent latitudes and departures. See SINGLE PROPORTIONATE MEASUREMENT and PROPORTIONATE MEASUREMENT.

**DOWER** – The portion of, or interest in, the real estate of a deceased husband which the law gives to his widow for life. The extent varies with statutory provisions. See CURTESY.

**DRAINAGE ENTRY** – An entry, not exceeding 160 acres, on public lands. Under Federal statutory authority, a non-Federal tax, or drainage charge, is levied against such lands to defray the costs of draining swamp and overflowed lands. Also Drainage Homestead Entry.

**DRIFT** – In mining, an underground passage driven horizontally along the course of a mineralized vein or approximately so. See SHAFT, TUNNEL, ADIT, CROSSCUT, DRIFT\*.

**DUE** – Directly or exactly; in a cardinal direction with the usual precision of that survey.

## E

**E (Land Status Records)** – East.

**EC STATION** – 1) Extended control station\*. 2) Electronic control station.

**EDM** – Electronic Distance Measurement.

**EDP** – Electronic Data Processing.

**EFF (Land Status Records)** – Effective.

**E.G.** – An abbreviation of “*exempli gratia*,” which means: For the sake of an example.

**EHE (Land Status Records)** – Enlarged homestead entry.

**ELIM (Land Status Records)** – Elimination.

**ENLGMT (Land Status Records)** – Enlargement.

**EO (Land Status Records)** – Executive Order.

**ES (Land Status Records)** – Exchange survey.

**ESLO** – Eastern States Land Office. The Eastern States Land Office is in Silver Springs, Maryland. (Now designated Eastern States Office, ESO).

**ESMT (Land Status Records)** – Easement.

**ET AL** – An abbreviation of *et alii*, “*and others*,” or *et alius*, “*and another*.”

**ETC.** – The common abbreviation for “*et cetera*.” And others; and other things; and others of like character; and others of like kind; and the rest; and so on; and so forth.

**ET CON.** – An abbreviation meaning “*and husband*.”

**ET SEQ.** – An abbreviation for *et sequentes* or *et sequentia*, “*and the following*.” A reference to *p. 3 et seq.*” means “*page number 3 and the following pages*.” It is also abbreviated “*et sqq.*,” in some works, when the reference is to more than one following page.

**ET UX.** – An abbreviation for *et uxor*, “*and his wife*.”

**EXCL (Land Status Records)** – Excluding, excluded.

**EXP (Land Status Records)** – Expire(d).

**EX REL** – (See word listing below).

**EXT (Land Status Records)** – Extended, extension, extend.

**EASEMENT** – An interest or right in land owned by another that entitles its holder to a specific limited use; such as laying a sewer, crossing over property or putting up power lines.

**EGRESS** – A right to go upon the land of another. Often used interchangeably with the word “*access*.” See ACCESS, INGRESS, ENGRESS and REGRESS.

**ELDER SURVEY** – See SURVEY, ELDER.

**ELECTRONIC CONTROL SURVEY** – A survey, using theodolites and electronic equipment, whereby a control network is established and monumented to facilitate the placement of the rectangular survey grid. See ELECTRONIC DISTANCE MEASUREMENT\*.

**ELLCOTT’S LINE** – The meridian northward from the point of beginning of the first United States cadastral survey – a point established on August 20, 1785 on the north bank of the Ohio River – was named for Andrew Ellicott, and is known as Ellicott’s Line. It is also the Ohio-Pennsylvania boundary line.

**ELLCOTT’S LINE OF DEMARCATION** – Andrew Ellicott was appointed by President George Washington to work with Spanish surveyors in running and marking the boundary between Mississippi Territory and Spanish Florida as determined by the treaty dated Oct. 27, 1795. This boundary along the 31<sup>st</sup> parallel of north latitude is called Ellicott’s Line of Demarcation.

**ELONGATED SECTION** – A section which exceeds 85 chains in either length or width as originally surveyed and platted.

**EMINENT DOMAIN** – The right of governmental agencies to take private property for public use.



**ENABLING ACT** – In reference to admission of new States into the Union, it is an act passed by Congress empowering the people of a territory to frame a constitution and lay down certain requirements that must be met prerequisite to statehood.

**ENCROACHMENT** – An unlawful and adverse intrusion within the boundary of a property, such as cultivation of the soil, enclosure by fence, the construction of an improvement, extension of a tunnel, underground operation or comparable act.

**ENCUMBRANCE** – Any right to or interest in land which makes it subject to a charge or liability. Encumbrances include mortgages, judgment liens, attachments, leases, deed restrictions, unpaid taxes, inchoate rights of dower and so forth. See INCHOATE.

**END LINE** – In mining law, the end lines of a claim, as platted or laid down on the ground, are those which mark its boundaries on the shorter dimension, where it crosses the vein. If the claim as a whole crosses the vein, instead of following its course, the end lines are still the boundaries of the shorter dimension, even though they are along the course of the vein. See SIDE LINE.

**ENLARGED HOMESTEAD ENTRY** – A homestead entry, not exceeding 320 acres, initiated under the act of Feb. 19, 1909 (35 Stat. 639), or the act of June 17, 1910 (36 stat. 531, 43 U.S.C. sec. 218), which provide for the homesteading of nonirrigable agricultural lands in the West.

**ENTRY** – An application to acquire title to public lands. See ORIGINAL ENTRY, FINAL ENTRY, CASH ENTRY, and COMMUTED HOMESTEAD ENTRY.

**ENTRY ALLOWED** – An application to acquire title to public lands which has been approved, either as an original entry or a final entry. See ORIGINAL ENTRY and FINAL ENTRY.

**ENTRYMAN** – One who makes an entry of land under the public land laws of the United States.

**ENTRY UNPERFECTED** – An original entry which has been allowed, but under which the entryman has not met all the requirements of the law and/or regulations to permit him to make final entry for patent to the land. See FINAL ENTRY.

**EPHEMERIS** – Any tabular statement of the assigned places of a celestial body for regular intervals. The current Ephemeris of the Sun, Polaris and Other Selected Stars with Companion Data and Tables, which has been published annually in advance since 1910 as a supplement to the various Manuals of Surveying Instructions, is available through the U.S. Government Printing Office in Washington, D.C.

**EQUATION** – The relationship between two stationing values for the same point in route surveying such as 123 + 45.6 back = 124 + 00 ahead.

**EQUITABLE** – 1) Just; conformable to the principles of right and justice. Just, fair and right in consideration of the facts and circumstances of an individual case. 2) Existing, available or sustainable only in equity or by the rules and principles of equity. See EQUITY.

**EQUITY** – A system of law originating in the English chancery and comprising a settled and formal body of legal and procedural rules and doctrines that supplement, aid or override common and statute law. Rules of equity are designed to protect rights and enforce duties as created and defined by law. In another legal meaning, “equity” is the remaining interest belonging to one who has pledged or mortgaged his property, or the surplus of value which may remain after the property has been sold to satisfy liens. The amount of value of a property above the total liens or charges. See COURTS OF EQUITY.

**EROSION** – In riparian law, the washing away of land by the sea or a river’s flow. Usually considered as an imperceptible action, the rate of erosion may be quite rapid in total effect and may be distinguished from avulsion by the absence of identifiable upland between former and new channels. See RIPARIAN LAW.

**ERRONEOUS LOCATION** – Where it is evident that lands have been occupied in good faith but boundaries as occupied are clearly in disagreement with the demonstrated position of the legal subdivision called for in the description, it is regarded as a case of “*erroneous location.*” See AMENDED ENTRY.

**ERRONEOUSLY OMITTED AREAS** – See OMITTED LANDS.

**ERRONEOUS MEANDERS** – Error or mistake in position rather than in procedure. See MEANDERS.

**ESCHEAT** – In English feudal law, the reversion of lands to the lord of the fee in consequence of a want of an individual competent to inherit. In modern law, the State is deemed to occupy the place and hold the rights of the feudal lord. Real property may be claimed by the State where there is no will and/or no competent inheritors can be found. Also termed “*escheated property*” or “*escheatage.*” See INTESTATE.

**ESCROW** – The state or condition of a deed which is conditionally held by a third person, or the possession and retention of a deed by a third person pending performance of a condition. While in the possession of the third person, and subject to condition, it is called an “*escrow.*”

**ESTATE** – The interest which anyone has in lands or in any other property. “*Estate*: is used in conveyances in connection with the words “*right*,” “*title*” and “*interest*.” It is, in a great degree, synonymous with all of them. See CONVEYANCE, REAL ESTATE, PROPERTY, REAL PROPERTY and PERSONAL PROPERTY.

**ESTOPPEL** – The stopping of a person from asserting a claim by reason of his own previous representations which refute his new claim. The new claim may in fact be true, however, he may be prevented from exerting that claim by “*estoppel*.” See RES JUDICATA.

**EVIDENCE** – Testimony, physical objects, marks, traces of former objects or relationship between any of these which may furnish proof or part of a proof of a corner location or line location. See COLLATERAL EVIDENCE.

**EVIDENCING OF TITLE** – The submission of proof of title to a tract of land as shown by an abstract of the recorded patent and deeds of transfer, inheritance, court decree, or other means of establishing the title.

**EXCEPTION** – In deeds or conveyances, a clause used by the grantor to retain some part of the former estate by excluding it from the deed or grant. “*Except*” means “*not including*.”

**EXCHANGE** – A transaction whereby the Federal Government receives land in exchange for other land and/or timber. See PRIVATE EXCHANGE, STATE EXCHANGE and TAYLOR ACT EXCHANGE.

**EXCHANGE SURVEY** – A Cadastral Survey of lands to be exchanged.

**EXISTENT CORNER** – A corner whose position can be identified by verifying the evidence of the monument, or its accessories, by reference to the description that is contained in the field notes, or where the point can be located by an acceptable supplemental survey record, some physical evidence or testimony.

**EX OFFICIO** – From office; powers exercised by an official not specifically conferred on him but necessarily implied in his office.

**EXPERT WITNESS** – A witness is a person who testifies as to what he has observed by sight, sound etc. An “*expert witness*” may testify additionally as to matters of opinion on subjects within fields for which he is qualified. Thus, a cadastral surveyor may interpret the meanings of the symbols, letters and numbers on a plat but he may say nothing to add to or subtract from the official record, which speaks for itself by definition. See EVIDENCE, TESTIMONY, QUALIFIED (as a witness).

**EX REL** – Ex Relation; Upon relation or information. Legal proceedings which are instituted by the Attorney General (or other proper person) in the name and behalf of the State, but on the information and at the instigation of an individual who has a private interest in the matter, are said to be taken “*on the relation*” (ex relatione) of such person, who is called the “*relator*.” Such cause is usually entitled thus: “*State ex rel. Doe v. Roe*.”

**EXTENSION SURVEY** – Executed to add to an existing survey. An “*extension survey*” does not, however, complete a survey of boundaries of townships or sections or the subdivision of a township or a section, it only adds to an existing partial survey. See COMPLETION SURVEY.

**EXTINGUISHMENT** – To render legally nonexistent; to destroy or render void; to nullify; to void, as by payment, treaty, setoff, or limitation of actions, merger of an interest in a great one, etc. Extinguishment is distinguished from the mere transfer, passing, or suspension of a right or obligation.

**EXTRALATERAL RIGHTS** – In mining, the right to mine ore downward along a lode or vein beyond the side lines of a mining location (claim). The right is limited to claims which contain the apex of the vein at or very near the surface, which are oriented with the lode line substantially along the vein and which have the end lines substantially parallel. The right does not extend beyond planes passing vertically through the end lines. Extralateral rights of claims filed before May 10, 1872, were determined according to the previous law of 1866 and by miner’s local rules and they were not dependent upon parallel end lines. Various States have modified the Federal requirements. See INTRALIMITAL RIGHTS.

## F

**F.2d** – In a citation, as 22 F.2d 100, means Federal Reporter, Second Series.

**FAA (Land Status Records)** – Federal Aviation Administration.

**FBX MER (Land Status Records)** – Fairbanks Meridian.

**FC (Land Status Records)** – Final Certificate.

**FED (Land Status Records)** – Federal.

**FED** – Federal. If shown as a citation [198 Fed. 125 (1912)], it means “*Federal Reporter*.”

**FF LSE (Land Status Records)** – Fur farm lease.

**FFMC (Land Status Records)** – Federal Farm Mortgage Corporation.

**FHA (Land Status Records)** – Farmers Home Administration.

**FIS (Land Status Records)** – Fissionable materials.

**FL** – Florida.

**FLA.** – Florida.

**FLPMA** – Federal Land Policy and Management Act, of 1976.

**FLS (Land Status Records)** – Forest lieu selection.

**FLUP** – Free land use permit.

**FM U (Land Status Records)** – Farm unit.

**FPA (Land Status Records)** – Federal Power act.

**FPAS ACT** – The Federal Property and Administration Services Act of 1949, as amended, sets forth the basic contracting procedures and principles which all civilian agencies must follow.

**FPC (Land Status Records)** – Federal Power Commission.

**FPR** – Federal Procurement Regulations.

**FR (Land Status Records)** – Federal Register.

**FRAC (Land Status Records)** – Fractional.

**FRAC INT PAT (Land Status Records)** – Fractional Interest patent.

**FS (Land Status Records)** – Forest Service.

**F. SUPP.** – Federal Supplement.

**FUP (Land Status Records)** – Free use permit.

**F&WS (Land Status Records)** – Fish and Wildlife Service.

**FX (Land Status Records)** – Forest Exchange.

**FAIRBANKS MERIDIAN** – The principal meridian governing surveys in east-central Alaska; it was adopted in 1910.

**FALLING** – The distance by which a random line falls to the right or left of a corner on which the true line is to close. Usually the direction of falling is expressed as cardinal.

**FEDERAL LAND** – All classes of land owned by the Federal Government.

**FEDERAL POWER PROJECT RESERVATION** – A reservation of public lands for use in connection with a power development project under the jurisdiction of the Federal Power Commission.

**FEDERAL PROCUREMENT REGULATIONS** – The regulations issued by the General Services Administration implementing the Federal Property and Administrative Services Act.

**FEDERAL PROPERTY AND ADMINISTRATIVE SERVICES ACT OF 1949** – This law, as amended, sets forth the basic contracting procedures and principles which all civilian agencies must follow.

**FEE** – The true meaning of the word “*fee*” is the same as that of “*feud*” or “*fief*,” and in its original sense it is distinguished from “*alodium*,” which is defined as a man’s own land, possessed in his own right, without owing any rent or service to any superior. In modern English tenures, “*fee*” means an estate of inheritance clear of any condition, limitation, or restriction to particular heirs, but descendable to the heirs in general, male or female, lineal or collateral. In American law, the terms “*fee*,” “*fee simple*” and “*fee simple absolute*” are equivalent. See FEE SIMPLE, FEE TAIL.

**FEE SIMPLE** – The estate which a man has where lands are owned by him and his heirs absolutely, with unconditional power of disposition during his life, and descending to his heirs and legal representatives upon his death intestate. Fee simple title to public lands in conveyed by a patent, approved clear list, deed or grant without condition. See APPROVED CLEAR LIST, PATENT, DEED, GRANT, and INTESTATE.

**FEE TAIL** – An estate limited to one class of heirs.

**FIELD EXAMINATION** – An on-the-ground investigation of certain public lands in regard to valuation, land use, application for entry, mineralization, etc. See FIELD EXAMINATION (Prior to 1910 and FIELD EXAMINER (Prior to 1910).

**FIELD EXAMINATION (Prior to 1910)** – A method of checking public land survey field work under the contract system. See FIELD EXAMINER (Prior to 1910), CONTRACT SYSTEM, DIRECT SYSTEM and FIELD EXAMINATION.

**FIELD EXAMINER (Prior to 1910)** – A surveyor who was employed by the Government to inspect the accuracy and authenticity of contract surveyors’ work. See FIELD EXAMINATION, FIELD EXAMINATION (Prior to 1910), CONTRACT SYSTEM and DIRECT SYSTEM.

**FIELD NOTES** – The official written record of the survey, certified by the field surveyor and approved by proper authority. Originally, Field Notes were prepared by hand, but they are now typewritten. See FIELD TABLETS and APPROVED SURVEY.

**FIELD RETURNS** – The field notes, reports and plats submitted for acceptance or approval. See FINAL RETURNS and RETURNS.

**FIELD TABLETS** – Notebooks in which the initial information is recorded in the field, and from which the Field Notes are transcribed. See FIELD NOTES.

**FIFTH PRINCIPAL MERIDIAN** – The principal meridian governing surveys in Arkansas, Iowa, Minnesota, Missouri, North Dakota and South Dakota. It was adopted in 1815.

**FINAL CERTIFICATE** – A document which evidences that an entryman is entitled to a patent provided that no irregularities are found in connection with his entry.

**FINAL ENTRY** – Where an application to acquire title to public lands has been filed in the proper manner and all the requirements of law and the governing regulations have already been complied with, it is a final entry. Final entries may be either cash entries or commuted entries. See CASH ENTRY and COMMUTED HOMESTEAD ENTRY. Also see ENTRY and ORIGINAL ENTRY.

**FINAL RETURNS** – In cadastral surveying usage, the field returns are the field notes, reports and plats submitted for acceptance or approval. If some error or omission is found, the field work must be corrected or completed. The corrected and/or completed field returns are referred to as “*final returns*.” See FIELD RETURNS and RETURNS.

**FIRST FORM RECLAMATION WITHDRAWAL** – A reclamation withdrawal which embraces public lands that are or may be needed in connection with the construction and maintenance of a reclamation project. See SECOND FORM RECLAMATION WITHDRAWAL.

**FIRST PRINCIPAL MERIDIAN** – Sometimes called “*Ludlow’s Meridian*.” The line surveyed north from the mouth of the Great Miami River; it is also the line between Ohio and Indiana. It was adopted in 1819 and governs surveys in parts of both Ohio and Indiana. One of six principal meridians named for ordinal numbers, it is abbreviated 1<sup>st</sup> Prin Mer. See ORDINAL NUMBER.

**FIVE ACRE TRACT ACT** – See SMALL TRACT ACT.

**FIVE PERCENT RULE** – New area amounts are not usually shown on plats of dependent resurveys. They are shown if the area of a vacant subdivision as determined by the dependent resurvey differs from the former area as returned on the original approved plat by more than two acres per normal legal subdivision, or 5%.

**FIXED BOUNDARY** – An unchangeable boundary created by operation of law. Examples are: 1) a standard parallel or other control line becomes a fixed boundary on return of areas in adjacent quarter sections. 2) A median line of a nonnavigable stream becomes a fixed boundary after an avulsive change. 3) Meander lines can become fixed boundaries when omitted lands have been created by gross error or fraud in the original survey.

**FLAGMAN** – A member of a survey party who gives sights to or takes line from the instrument man and flags distant points along the survey line. Also called “*point setter*.”

**FLORIDA PURCHASE** – The second addition of territory originally claimed by a European power to the territory of the United States. It was ceded by Spain in 1819 under a treaty which settled conflicts with Spain in West Florida and defined the boundary between the United States and the Spanish possessions in the Southwest.

**FOLLOWING THE FOOTSTEPS OF THE ORIGINAL SURVEYOR** – Retracement of survey lines using field and survey record evidence to determine the direction and distances measured by the surveyor who created the boundary. The process usually requires remeasurement of topographic calls, search for evidence of the previous survey work, determination of consistent or inconsistent chaining or bearing error in the original survey, and consideration of various conditions at the time the survey was executed as well as the methods and equipment used by the surveyor to be followed.

**FORESHORE** – 1) (Shalowitz) According to riparian law, the strip of land between the high and low water marks that is alternately covered and uncovered by the flow of the tide. 2) (T.R. No. 4) The part of the shore, lying between the crest of the seaward berm (or upper limit of wave action at high tide) and the ordinary low water mark, that is ordinarily traversed by the uprush and backrush of the waves as the tides rise and fall. See BEACH, SHORE, BACKSHORE and TIDELANDS.

**FORESIGHT** – 1) A sight on a new survey point made in connection with its determination. 2) a distant object intersected by a straight survey line used for checking alinement. See **FORESIGHT\***.

**FOREWORD AZIMUTH** – See GEODETIC AZIMUTH.

**FOUND CORNER** – An existent corner of the public land surveys which has been recovered by field investigation.

**FOURTH PRINCIPAL MERIDIAN** – The part of this principal meridian which was adopted in 1815 governs surveys in part of Illinois. It was extended and the portion which was adopted in 1831 governs surveys in Wisconsin and part of Minnesota. It is abbreviated 4<sup>th</sup> Prin Mer.

**FRACTIONAL SECTION** – A section, which in its original form, contained one or more subdivisions of less than forty (40) acres due to irregular exterior boundaries, or due to the encroachment of a meandered body of water or other land which could not properly be surveyed or disposed of as an aliquot part of that section.

**FRACTIONAL TOWNSHIP** – A township containing less than 36 normal sections, usually because of invasion by a segregated body of water, or by other land which cannot properly be surveyed as part of that township or by closing

the public-land surveys on State boundaries or other limiting lines. Half ranges and half townships are fractional townships by definition.

**FRAGMENTARY SURVEYS** – Surveys required to identify parts of townships and sections not completed in original surveys. This may include partially surveyed sections, omitted public land islands and other lands of substantial value and extent that for various reasons were not included in the original surveys. Surveys of this type frequently require consideration of the question of title prior to the extension of the former surveys.

**FREE AND CLEAR** – The title to property is said to be “*free and clear*” when it is not encumbered by any lien; but it is said that agreement to convey land “*free and clear*” is satisfied by a conveyance passing a title.

**FRONTING** – Usually signifies abutting, adjoining, or bordering on, depending on the context. Land abutting on a highway, river, seashore or the like. The land extending along a road, street, river, canal or ocean. The term, as used in statutes relating to assessments for improvements, indicates that there is no intervening land. See ABUT and ADJOINING.

## G

**GA** – Georgia.

**GD (Land Status Records)** – Gold.

**GEO (Land Status Records)** – Geothermal.

**GEOL STR (Land Status Records)** – Geologic structure.

**GLO (Land Status Records)** – General Land Office.

**GR DIST (Land Status Records)** – Grazing District.

**GR LIC (Land Status Records)** – Grazing license.

**GR LSE (Land Status Records)** – Grazing lease.

**GR PER (Land Status Records)** – Grazing permit.

**GSR MER (Land Status Records)** – Gila and Salt River Meridian.

**GADSDEN PURCHASE** – A purchase from Mexico in 1853 to settle a question as to the limits of the Mexican Cession of 1848. James Gadsden, a South Carolina railroad promoter negotiated for the acquisition of 19 million acres of additional land and the settlement of the claims. The territory acquired lies in the States of Arizona and New Mexico. See GADSDEN TREATY.

**GADSDEN TREATY** – The December 30, 1853, treaty with Mexico, under the terms of which the United States acquired territory now in the States of Arizona and New Mexico. the territory thus acquired is commonly called the GADSDEN PURCHASE.

**GENERAL LAND OFFICE** – The agency which was formerly responsible for the execution of the public-land laws relating to cadastral surveys, land disposals, and to various other activities with respect to the administration and management of the public lands. It was established as a unit of the Treasury Department in 1812, and so remained until 1949, when it became a part of the newly created Department of the Interior. It was abolished in 1946 when its functions were combined with those of the Grazing Service to become the Bureau of Land Management.

**GEODETTIC AZIMUTH** – The horizontal angle at station A measured from a north south plane (perpendicular to the reference ellipsoid) clockwise to an ellipsoidal normal section passing through station B. Geodetic azimuth is determined by applying a correction to astronomic azimuth or by computations on the reference ellipsoid. The azimuth from A toward B is the forward azimuth while the azimuth from B toward A is the back azimuth of station B. See **GEODETTIC\***.

**GEODETTIC CONTROL** – A system of monumented stations having known, precise positions established by geodetic methods.

**GEODETTIC COORDINATES** – Quantities which define a horizontal position on an ellipsoid of reference with respect to a geodetic datum. See **GEOGRAPHIC COORDINATES**.

**GEODETTIC DATUM** – A reference for geodetic survey measurements consisting of fixed latitude, longitude and azimuth values associated with a defined station as well as two constants for an ellipsoid of reference. See **NORTH AMERICAN DATUM OF 1927**.

**GEODETTIC POSITION** – A position of a point on the surface of the earth expressed in terms of geodetic latitude and geodetic longitude. A geodetic position implies an adopted geodetic datum. In a complete record of a geodetic position, the datum must be stated. See **GEOGRAPHIC POSITION**.

**GEODETTIC SURVEY** – A precise survey of considerable extent which takes into account the shape of the earth.

**GEOGRAPHER OF THE UNITED STATES** – The only man to hold this title was Thomas Hutchins. He was appointed to the position under the terms of the Ordinance of May 20, 1785. The office was created for the supervision of the cadastral survey of the Territory Northwest of the Ohio River according to the rectangular system

adopted by the Continental Congress under the ordinance. The east-west line at the north of "*The Seven Ranges*" is named "*The Geographer's Line*" in his honor. His successor, Rufus Putnam, was given the title "*Surveyor General of the Northwest Territory*" under the terms of the Act of May 18, 1796. See ORDINANCE OF MAY 20, 1785, THE SEVEN RANGES, ACT OF MAY 18, 1796, THE GEOGRAPHER'S LINE, SURVEYOR GENERAL, UNITED STATES SUPERVISOR OF SURVEYS and CHIEF, DIVISION OF CADASTRAL SURVEY.

**GEOGRAPHER'S LINE, THE** – The first line surveyed under the rectangular system. This line, which extends the width of the Seven Ranges (42 miles), is named for Thomas Hutchins, the Geographer of the United States. Under the Ordinance of May 20, 1785, the geographer was to "*personally attend to the running of*" a line westward from the "*Point of Beginning.*"

**GEOGRAPHIC COORDINATES (U.S.C. & G.S. Sp. PUB. 242)** – An inclusive term, used to designate both geodetic coordinates and astronomic coordinates.

**GEOGRAPHIC MIDDLE OF A RIVER** – See MEDIUM FILUM ACQUAE.

**GEOGRAPHIC POSITION** – The coordinates of a point on the surface of the earth expressed in terms of latitude and longitude, either geodetic or astronomic.

In determining the geographic positions of monuments of the public land surveys, reference is made to USC & GS, NGS, USGS, or other acceptably determined stations.

**GEOID** – The figure of the earth considered as a mean sea-level surface extended continuously through the continents. See SPHEROID and GEOID\*.

**GEOLOGICAL SURVEYS. (GLO)** – The first Geological Surveys of the public lands were initiated in 1844 by the General Land Office, in Michigan. Similar surveys were made in Wisconsin and Iowa during 1847; in Oregon and Washington during 1853; in Nebraska, Colorado and Wyoming during 1857. All such surveys were performed under private contracts. The Geological Survey was not established as a bureau of the Department of the Interior until 1879.

**GILA AND SALT RIVER MERIDIAN** – The principal meridian governing surveys in nearly all of Arizona; it was adopted in 1865.

**GORE** – A hiatus. See HIATUS and GORE\*.

**GOVERNING BOUNDARIES** – Usually the south and east boundaries of a township, but may be termed the satisfactorily surveyed lines on which subdivisions are to be based. In rare and extreme cases, therefore, an irregular township may be without a single governing boundary.

**GOVERNING SECTION LINE** – A township subdivision line ran as the controlling boundary to rectify a defective township exterior. The line is surveyed on a bearing calculated to intersect the controlling corner on the opposite boundary. The last mile is run random and true. Completion of the subdivision of a township is based upon this boundary. See GUIDE MERIDIAN, SECTIONAL GUIDE MERIDIAN, STANDARD PARALLEL and SECTIONAL CORRECTION LINE.

**GOVERNMENT CONTEST** – See CONTEST.

**GOVERNMENT LOT** – See LOT.

**GRADIENT** – Rate of rise or fall, as "5% gradient," meaning a 5-foot vertical rise in a 100-foot horizontal distance (also recorded as 0.05). See GRADIENT BOUNDARY.

**GRADIENT BOUNDARY** – A boundary determined by the position of flowing water along a bank. First announced in Oklahoma vs. Texas by the U.S. Supreme Court (265 US 493), as follows: "*The boundary line is a gradient of flowing water in the river. It is located midway between the lower level of the flowing water that just reaches the cut-bank and the higher level of it that just does not overtop the cut-bank.. The physical top of the cut-bank, being very uneven in profile, cannot be a datum for locating the boundary line but a gradient along the bank must be used for that purpose. The highest point on the gradient must not be higher than the lowest acceptable point on the bank in that vicinity.*"

**GRADUAL AND IMPERCEPTIBLE** – Describes changes in riparian lands that bring them within the scope of the doctrine of accretion and erosion. The test of what is gradual and imperceptible has been held to be that "*though the witnesses may see, from time to time, that progress has been made, they could not perceive it while the progress was going on.*" See RIPARIAN LANDS, ACCRETION, RELICTION and EROSION.

**GRANT** – Lands, title to which has been confirmed or conferred to the United States for a particular reason or purpose. See GRANT IN PLACE, QUANTITY GRANT and PRIVATE LAND GRANT.

**GRANT BOUNDARY ADJUSTMENT** – A mathematical distribution of the closing error which consists of a uniform rotation and scale change of the record courses to conform to the retracement value between the controlling corners. See BROKEN BOUNDARY ADJUSTMENT, ADJUSTMENT\* and CLOSING ERROR.

**GRANTEE** – A person, firm or corporation to whom land, easements or other habiliments thereof are conveyed or granted.

**GRANT IN PLACE** – A grant in connection with which the Congress specifically states, or implies, the legal description of the public lands which are granted. See QUANTITY GRANT, PLACE LANDS and INDEMNITY LANDS.

**GRANT IN PRAESENTI** – See IN PRAESENTI.

**GRANTOR** – a person, firm or corporation granting or conveying land, easements or other habiliments thereof.

**GRANT, QUANTITY** – See QUANTITY GRANT.

**GRAZING SERVICE** – The agency formerly responsible for the administration of grazing on public lands which had been designated as grazing district lands. Organized in the Department of the Interior after the passage, in 1934, of the Taylor Grazing Act, it was abolished in 1946 when its functions were consolidated with those of the General Land Office and transferred to the newly created Bureau of Land Management.

**GREAT CIRCLE\***.

**GREENWICH MERIDIAN** – The Prime Meridian. The meridian which passes through the original site of the Royal Observatory at Greenwich, England was adopted in 1884 by a conference of nations as the initial or zero of longitudes. From it other longitudes are reckoned east and west. See WASHINGTON MERIDIAN.

**GRID AZIMUTH** – The angle in the plane of projection between a straight line and the central meridian (y-axis) of a plane-rectangular coordinate system. Although essentially a map quantity, a grid azimuth may, by mathematical processes, be transformed into a geodetic azimuth.

**GRID BEARING** – The smaller angle in the plane of projection between a line and a north-south grid line. Grid bearings are determined only by mathematical computations or by applying corrections to geodetic azimuths. See BEARING, BACK BEARING, GEODETIC AZIMUTH and GRID AZIMUTH.

**GRID LENGTH** – The distance between two points as obtained by inverse computation from the plane-rectangular coordinates of the points. In the state coordinate systems, a grid length differs from a geodetic length by the amount of a correction based on the scale factor for the given line.

**GROIN** – A shore protective structure, narrow in width, usually built perpendicular to the shore for purposes of trapping littoral drift, or to protect the shore from erosion. Sometimes incorrectly called a dike. See DIKE.

**GROOVES** – Elongated depressions scored into the face of a stone monument where the faces of the stone are turned to the cardinal. See NOTCHES.

**GROUP NUMBER** – A filing and record-keeping system whereby a particular cadastral survey project is identified, i.e., Group 123, Wyoming. Since the beginning of the Direct System, all cadastral survey projects authorized under one specific set of instructions have been referred to by their “*Group number.*”

**GUARANTEE OF TITLE** – A certification which insures that the title exists in fact as described. Often issued by title-guarantee companies or by the state, as in the case of a Land Court certificate. See LAND COURT.

**GUIDE LINE** – An obsolete term for random line.

**GUIDE MERIDIAN** – An auxiliary governing line projected north along an astronomical meridian, from points established on the base line or a standard parallel, usually at intervals of 24 miles east or west of the principal meridian, on which township, section, and quarter-section corners are established. See AUXILIARY GUIDE MERIDIAN.

## H

**HB** – Handbook. If in a citation, it means “*House Bill.*”

**HDQ S (Land Status Records)** – Headquarters Site.

**HDS (Land Status Records)** – Homestead declaratory statement.

**HE (Land Status Records)** – Homestead entry.

**HES (Land Status Records)** – Homestead entry survey.

**HI** – Hawaii.

**HI (Land Status Records)** – Historical Index. Se HI\*.

**HUM MER (Land Status Records)** – Humboldt Meridian.

**HUNTS MER (Land Status Records)** – Huntsville Meridian.

**HWY (Land Status Records)** – Highway.

**HACK** – A horizontal notch cut well into a tree at about breast height. In a cadastral survey, two hacks are cut to distinguish them from other, accidental marks. A vertical section of the finished hack marks resembles a double-V extending across a tree from two to six inches, depending on the diameter of the tree.

The “*blaze*” and “*hack*” marks are equally permanent, but so different in character that one mark should never be mistaken for the other.

Hacks are sometimes called “*notches*” or, in older surveys, “*chaps.*” See BLAZE.

**HALF** – A fractional part of a regular section subdivision determined according to equally divided linear measurements without consideration of the areas of the halves.

Half a regular section consists of any two quarter sections which have a common boundary, divided by a line between opposite ¼ corners.

In past years, patents for half of a Government lot have been erroneously issued. The division line was determined by equally divided linear measurements without regard to the actual area of the halves.

In private land exchanges, it is generally presumed that a conveyance for half of a parcel grants half the area unless otherwise stated.

**HALF-MILE POSTS** – In early survey practice, in parts of Alabama and Florida, so-called “*half-mile posts*” were established. In some cases the “*half-mile post*” was not at mid-point on the section line. In other cases the “*half-mile post*” was in true position for the quarter-section corner. In still other instances the “*half-mile post*” was not on true line nor at mid-point on the line. Each set of field notes regarding “*half-mile posts*” require individual consideration, as the survey practices were not uniform even within the same surveying district.

**HALF-RANGE NUMBERS** – In the instances where the distance between the regular position for township boundaries is so great that the application of normal rules would result in sections elongated in excess of 120 chains, half-range (or half-township) numbers may be created. Also used for identifying areas left unsurveyed by hiatus. See HALF-TOWNSHIP NUMBERS.

**HALF SECTION** – See SECTION, HALF.

**HALF-TIDE LEVEL** – See MEAN TIDE LEVEL.

**HALF-TOWNSHIP NUMBERS** – In the rare cases where the distance between the regular position for township boundaries is so great that the application of normal rules would result in sections elongated in excess of 120 chains, half-township (or half-range) numbers may be created. Also used for identifying areas left unsurveyed by hiatus. See HALF-RANGE NUMBERS.

**HARMONIOUSLY RELATED** – Conditions existing during the corner restoration process when a corner point under consideration reasonably conforms in position to that indicated by evidence at other corners of the survey, considering both the record and the survey conditions.

**HAWAII ANNEXATION** – The Republic of Hawaii was formally annexed to the United States by the voluntary action of its citizens and a joint resolution of Congress approved July 7, 1898. The transfer of sovereignty took place August 12, 1898. Since Hawaii had been an independent nation, it was not a public-land state.

**HEADING** – In mining, a preliminary passageway driven for exploratory purposes or to facilitate future work. Also, the forward end of a drift or tunnel.

**HEADQUARTERS ENTRY** – A cash entry of 5 acres or less of public lands in Alaska which are used as a headquarters for a productive industry.

**HEADQUARTERS SITE** – Five acres or less of public lands in Alaska which are used as, and are subject to entry as, headquarters for a productive industry.

**HEARING** – Opportunity for testimony and presentation of evidence at proceedings ordered and held pursuant to U.S.D.I. Hearing Procedures (43 C.F.R. 1850). (See 43 C.F.R. part 4)

**HEAVE** – In mining, the horizontal distance between the parts of a vein that have been separated by a fault, measured along the strike of the fault. A vertical fault can have no *heave*, and a horizontal fault can have no *throw*. See THROW.

**HEAVY BEARING** – A survey slang term for a bearing which departs markedly from cardinal. A bearing of 2 or more degrees from cardinal may be considered a “*heavy*” bearing. “*Strong bearing*” is used synonymously.

**HECTARE** – A metric unit of area equal to 100 ares or 2.471 acres.

**HEREDITAMENT** – Property subject to inheritance. See PROPERTY.

**HIATUS** – An area between two surveys, the record of which describes them as having one or more common boundary lines with no omission. See OVERLAP and HIATUS\*.

**HIGH WATER** – 1) The maximum height or stage reached by rising water. 2) (NOS) The maximum height reached by a rising tide. The height may be due solely to the periodic tidal forces or it may have superimposed on it the effects of prevailing meteorological conditions.

**HIGH WATER LINE (NOS)** – The intersection of the land with the water surface at an elevation of high water.

**HIGH WATER MARK** – 1) The line which the water impresses on the soil by covering it for sufficient periods to deprive it of upland vegetation. 2) (NOS) A line or mark left upon tide flats, beach, or alongshore objects indicating the elevation of the intrusion of high water. The mark may be a line of oil or scum on alongshore objects, or a more or less continuous deposit of fine shell or debris on the foreshore or berm. This mark is physical evidence of the general height reached by wave run-up at recent high waters. It should not be confused with the mean high water



line or mean higher high water line. See LOW WATER MARK and ORDINARY HIGH WATER. For tidal conditions, See MEAN HIGH WATER and MEAN LOW WATER.

**HIGHWAY ABANDONMENT** – Non-use of public roads, usually defined by statute law in the various states.

**HISTORICAL INDEX** – A chronological summary of all actions which affect, have affected, or will affect the title to, disposition of, or use status of lands and resources within a township. See LAND STATUS RECORDS.

**HISTORIC COAST LINE** – The coast line position at date of statehood from which seaward distances may be measured to determine territorial waters of some States, Florida and Texas for example.

**HOME-SITE ENTRY** – The terms of the Act of May 14, 1898, provided for each entry of 5 acres or less of public lands in Alaska used for residence purposes.

**HOMESTEAD ENTRY** – An entry under the United States land laws for the purpose of acquiring title to a portion of the public domain under the homestead laws, consisting of an affidavit of the claimant's right to enter, a formal application for the land, and payment of the money required.

**HOMESTEAD ENTRY, ORIGINAL** – An original entry under the homestead laws, also, the first homestead entry which was made by any individual, also, a homestead entry which was made pursuant to the first homestead law, the act of May 20, 1862 (12 Stat. 392) as codified in Sec. 2289 of the Revised Statutes. A second homestead entry was permitted under specific conditions as provided in the public land laws.

**HOMESTEAD ENTRY SURVEY** – A metes and bounds of lands entered under the Act of June 11, 1906 (34 Stat 233), as amended.

**HOMESTEAD SETTLEMENT, ALASKA** – Settlement, for homestead purposes, of unsurveyed or surveyed public land in Alaska according to the provisions of the Act of May 14, 1898 (30 Stat. 409; 48 U.S.C. 371; 43 C.F.R. Subpart 2567 et. seq.), as amended, which extended the homestead laws to Alaska. All homestead claims in Alaska must be perfected in accordance with the 3-year homestead law of June 6, 1912 (37 Stat. 123; 43 U.S.C. 164, 169, 218).

**HOVERSIGHT\***

**HUMBOLDT MERIDIAN** – The principal meridian governing surveys in northwestern California; it was adopted in 1853.

**HUNTSVILLE MERIDIAN** – The principal meridian governing surveys in northern Alabama and a small part of Mississippi; it was adopted in 1807.

**HYDROGRAPHIC DIVIDE** – Ridge or elevated land area which separates the direction of flow of streams and rivers. The division of the watersheds. See CONTINENTAL DIVIDE.

## I

**IA** – Iowa.

**IA (Land Status Records)** – Indian Allotment.

**IAS** – Indian Allotment Survey.

**IBID.** – An abbreviation for “*ibidem*,” a Latin term meaning “*in the same place*,” “*in the same book*,” “*on the same page*,” etc. It usually refers to an immediately preceding citation with an identical page reference. See ID.

**IBLA** – Interior Board of Land Appeals. See BOARD OF LAND APPEALS.

**IC (Land Status Records)** – Interim Conveyance.

**ID.** – Abbreviation for “*idem*,” a Latin term meaning “*the same*.” It indicates an immediately preceding citation but a different page reference. See IBID.

**ID** – Idaho.

**ID (Land Status Records)** – Interior Decisions.

**IDEN (Land Status Records)** – Identify, Identification.

**ID EST** – That is. Commonly abbreviated “*i.e.*”

**I.E.** – That is. The common abbreviation for the Latin “*id est*.”

**IL** – Illinois.

**IL (Land status Records)** – Indemnity list.

**ILL.** – Illinois.

**INC (Land Status Records)** – Including, Inclusive.

**IN** – Indiana.

**IND.** – Indiana.

**IND FEE (Land Status Records)** – Indian Fee.

**IND HD TR PAT (Land Status Records)** – Indian homestead trust patent.

**IND MER (Land Status Records)** – Indian Meridian.

**IND RES (Land Status Records)** – Indian Reservation.

**IND TR (Land Status Records)** – Indian Trust.

**INTPR (Land Status Records)** – Interpretation.

**IPS** – Iron Pipe Size. Also plural for Iron Post.

**IS (Land Status Records)** – Indemnity selection.

**IT (Land Status Records)** – Isolated tract.

**IMPERCEPTIBLE** – See Gradual & Imperceptible.

**INCHOATE** – Imperfect; partial; unfinished. Begun but not completed; as a contract not signed by all the parties or a wife’s interest in the lands of her husband during his life, which may become a right of dower upon his death. See DOWER.

**INCHOATE TITLE** – The beginning of a title or one not yet perfected into a legal title. When only a portion of the requirements for title has been completed, the title is “*inchoate*.”

**INCORPOREAL PROPERTY** – That which cannot be seen or touched. Property, such as a right, which exists only in contemplation, as distinguished from corporeal property which has a material existence and which may be seen and touched. See CORPOREAL.

**INCREMENT BORER** – Sometimes called increment boring tool, it is a tool used to cut a plug from a tree to permit a count of the growth rings in determining the age of the tree.

**INDEMNITY LANDS** – Alternate lands granted to states under the public land laws when granted lands were unavailable. See INDEMNITY LIMITS, SCHOOL-LAND INDEMNITY SELECTION and LIEU LANDS.

**INDEMNITY LIMITS** – In railroad and wagon road grants, the strips of land lying within a specified distance on each side of, and adjacent to, the primary limits, within which the grantee could make lieu selections for lands lost to the grantee in the primary limits; also, the outside boundaries of these strips. See RAILROAD LIEU SELECTION.

**INDEMNITY SCHOOL SELECTION** – See SCHOOL-LAND INDEMNITY SELECTION.

**INDEMNITY SELECTION** – See LIEU SELECTION.

**INDENTURE** – In conveyancing, formal written instrument made between two or more persons; the name is derived from the ancient practice of indenting or cutting the deed in a waving or saw-tooth line. In this way a part could be proved genuine by the way in which it fit into the angles cut into the other part.

**INDEPENDENT RESURVEY** – An official rerunning and remarking intended to supersede the records of the original survey and establish new section lines and subdivisions on public lands only. Any patented lands involved must be identified and segregated according to the original survey. Only remaining areas of the public lands may be resurveyed without regard to the original survey. See DEPENDENT RESURVEY and RESURVEY.

**INDEX CORRECTION** – 1) As used in the resurvey of the public lands, an average error in the lines of the original survey. The average error in the lines of an original survey (if conclusive) may be in alinement, or measurement, or both. 2) A correction applied to a reading to compensate for displacement of the zero mark.

**INDIAN ALLOTMENT** – An allocation of a parcel of public lands or Indian reservation lands to an Indian for his individual use; also, the lands so allocated.

**INDIAN CLAIMS COMMISSION ACT** – The act of Aug. 13, 1946, under which Indian claims to land based upon fair and honorable dealings that are not recognized by any existing rule of law or equity may be submitted to the Commission with right of judicial review by the United States Court of Claims.

**INDIAN EXCHANGE** – See INDIAN RESERVATION EXCHANGE.

**INDIAN FEE PATENT** – An Indian patent which conveys fee title.

**INDIAN HOMESTEAD ENTRY** – A homestead entry which is made by an Indian.

**INDIAN LANDS** – See CEDED INDIAN LANDS and INDIAN RESERVATION.

**INDIAN MERIDIAN** – The principal meridian which governs surveys in all of Oklahoma except the “panhandle;” it was adopted in 1870.

**INDIAN PATENT** – A patent which is issued to an Indian.

**INDIAN POWER RESERVE** – A power-site reserve within an Indian reservation.

**INDIAN PUEBLO** – An Indian reservation for the Pueblo Indians in New Mexico.

**INDIAN PUEBLO ENTRY** – A claim by a non-Indian for a patent to land within an Indian pueblo.

**INDIAN RESERVATION** – Lands reserved for the use of native Indians and, in Alaska, for Aleuts and Eskimos.

**INDIAN RESERVATION EXCHANGE** – An exchange whereby the Federal Government receives title to lands within an Indian reservation.

**INDIAN TRUST PATENT** – An Indian patent which is issued with the condition that title to the land remains for a specified period of time in the United States in trust for the patentee.

**INDICATED CORNER** – A term adopted by the USGS to designate a corner of the public land surveys whose location cannot be verified by the criteria necessary to class it as a found or existent corner, but which is accepted

locally as the correct corner and whose location is perpetuated by such marks as fence-line intersections, piles of rock, and stakes or pipes driven into the ground, which have been recovered by field investigation. See OBLITERATED CORNER.

**INDIRECT MEASUREMENT** – Determination of a distance using a method, i.e., triangulation or traverse, which employs both direct measurement and calculation. Also, determination of distance by use of photogrammetry, or timed travel of light or sound waves. See DIRECT MEASUREMENT.

**INDIVIDUAL LIEU SELECTION, RAILROAD** – See RAILROAD LIEU SELECTION.

**IN FEE** – Ownership in land. See FEE SIMPLE.

**INFORMATIVE TRAVERSE** – A survey made to obtain topographic data or to define the present river bank in front of patented lands. In the second case the informative traverse is used to apportion the lands formed by accretion to the public lands.

**INFRA** – Below. Under. When used in text it refers to matter in a later part of the publication. See SUPRA, OP. CIT. SUPRA.

**INGRESS** – The right to enter a tract of land. In the law of riparian rights, the right of return to his land from navigable water which a riparian owner enjoys. See ACCESS, EGRESS, INGRESS.

**INGRESS, EGRESS AND REGRESS** – These words express the right of a lessee to enter, go upon, and return from the lands in question. See ACCESS, EGRESS and INGRESS.

**INITIAL MONUMENT** – A physical structure which marks the location of an initial point in the rectangular system of surveys. See INITIAL POINT.

**INITIAL POINT** – A point which is established under the rectangular system of surveys and from which is initiated the cadastral survey of the principal meridian and base line that controls the cadastral survey of the public lands within a given area. See PRINCIPAL MERIDIAN, BASE LINE, RECTANGULAR SYSTEM OF SURVEYS and INITIAL MONUMENT.

**INITIAL POINT OF A METES AND BOUNDS SURVEY** – Also called “*beginning point*.” In a survey such as the survey of the boundaries of an Indian reservation, each angle point is monumented and assigned a number. The numbers are in series with number 1 at the initial point.

**INITIAL POINT, PUBLIC LAND SURVEYS WITHOUT** – There are eight public-land surveys, seven in Ohio and one in Indiana, which have no initial point as origin for township and range numbers. They are: The Ohio River Survey, started in 1785, in which townships are numbered North from the Ohio River and ranges are numbered West from the west boundary of Pennsylvania; The U.S. Military Survey, started in 1797, in which townships are numbered North from the south boundary of the military grant and ranges are numbered West from the west boundary of the Seven Ranges; The West of the Great Miami, started in 1798, in which townships are numbered North from the Great Miami River and the ranges are numbered East from the Ohio-Indiana boundary; The Ohio River Base (Indiana), started in 1799, in which the townships are numbered North from the Ohio River and the ranges are numbered from the Ohio-Indiana boundary and its projection south; The Scioto River Base, started in 1799, in which the townships are numbered North from the Scioto River and the ranges are numbered West from the west boundary of Pennsylvania; The Muskingum River Survey, started in 1800, in which the townships are numbered 1 and 2 and the range in number 10; The Between the Miamis, north of Symmes Purchase, started in 1802, in which the townships are numbered EAST from the Great Miami River and the ranges are numbered NORTH from the Ohio River (as a continuation of the numbering of Symmes Purchase) and the Twelve-Mile-Square Reserve, started in 1805, in which the townships are numbered 1,2,3 and 4 and there is no range number.

**INLAND WATERS** – Such waters as canals, lakes, rivers, watercourses, inlets and bays, exclusive of the open sea, though the water in question may open or empty into the ocean.

**IN PRAESENTI** – At the present time. The Swamp Lands Act of 1850 is an example of a grant taking effect *in praesenti*, that is, on the date of the passage of the act.

**INSTRUMENT** – An angle measuring device such as a compass, transit or theodolite. See INSTRUMENT, LEGAL.

**INSTRUMENT, LEGAL** – A written document. A formal or legal document in writing, such as a contract, deed, lease, will, bond or other writing of a formal or solemn character, such as a document given as a means of affording evidence. See DOCUMENT.

**INTEREST** – As applied to lands, “*interest*” means any direct or indirect ownership in whole or in part of the lands and resources of the lands. It includes any participation in the earnings therefrom, or the right to occupy or use the property or to take any benefits therefrom based upon lease or rental agreements, or upon any formal or informal contract with a person who has such an interest. It includes membership in a firm, or ownership of stock or other securities in a corporation which has such an interest.

**INTERIOR ANGLE\***.

**INTERIOR BOARD OF LAND APPEALS** – See BOARD OF LAND APPEALS.

**INTERIOR DECISIONS** – Decisions of the Department of the Interior. Prior to 1932 these decisions were called “*Land Decisions*” and included volumes 1 thru 52. Since 1932 they have been published and referred to as “*Interior Decisions*,” and are cited thus: 60 I.D. 85. See LAND DECISIONS and BOARD OF LAND APPEALS.

**INTERNAL IMPROVEMENT GRANT** – A grant made to aid in the construction of roads, canals, railroads, or for other public improvements.

**INTERPRETATION OF PLAT** – Deductions which are based on symbols, bearings, areas and dates of approval shown on plats and which are used to determine the probable intention when information is missing or ambiguous, or when data shown on various plats needs clarification. See PROTECT THE PLAT.

**INTERROGATORIES** – A set or series of questions drawn up in writing for the purpose of being propounded to a party in equity, a garnishee, or a witness whose testimony is taken on deposition. In taking evidence on depositions, the interrogatories are usually prepared and settled by counsel, and reduced to writing prior to the examination. See DEPOSITION.

**INTERSECTION** – 1) The method of establishing the legal center of section and the centers of the various quarter sections. 2) The point at which a survey line passes through an object, such as a tree. 3) The point of crossing of two or more survey lines with each other, usually a junior line crossing a senior line. 4) The legal point of closing where a junior line closes on a senior (fixed) line. 5) The confluence of two or more streams of water. 6) The cutting or crossing in any combination of straight lines, curves, or semitangents to curves. 7) Area where two streets or roads intersect, generally including the space enclosed by the right-of-way lines as extended plus any transition curved boundaries. See LINE TREE, JUNIOR LINE, SENIOR LINE, INTERSECTION\* AND CONFLUENCE\*.

**INTESTATE** – Without making a will. A person is said to die “*intestate*” when he dies without leaving a valid will to testify what his wishes were with respect to the disposal of his property after his death. The word is also used to signify the person himself, as “*the intestate’s property*.”

**INTRALIMITAL RIGHTS** – In mining, rights extending downward within the limits of the claim to center of the earth. All surface rights and everything within the limits of his intralimital rights, except the extralateral rights attached to other veins apexing in another’s claim, belong to the owner of the claim. There are no rights to explore in another’s land or to approach the vein from any location other than the vein itself. If veins intersect, all the ore within the intersection belongs to the senior claimant, but a right of way through the intersection is assured. See EXTRALATERAL RIGHTS.

**INURE** – To take effect; to result. Provide service to the use or benefit of a person.

**INVESTIGATIVE SURVEY** – A preliminary survey made to determine the physical condition of existing Cadastral Survey evidence.

**IPSO FACTO** – By the mere fact itself.

**IPSO JURE** – By the law itself; by the mere operation of the law.

**IRON POST** – The iron post adopted by BLM for monumenting the surveys of the public lands evolved after passage of the 1908 act which provided for the purchase of the 1908 act which provided for the purchase of metal monuments to be used for public-land survey corners wherever practicable. Specifications for the brass-capped survey marker call for zinc-coated pipe cut to 30-inch lengths. One end of the pipe is split and the two halves are spread to form flanges. The dimension from the top of the pipe to the top of the brass cap is from ¼ to ½ inch. The measurement from tip to tip of the flanges is specified at 4½ inches. The measurement from the foot of the flange to the top of the marker is 28 inches, more or less. The inside diameter of the pipe is 2 inches. The weight is approximately 9 pounds. The words “*U.S. DEPT. OF THE INTERIOR BUR. OF LAND MANAGEMENT – UNLAWFUL TO DISTRUB – CADASTRAL SURVEY*” and (at least for the next several years), the numerals “19,” are cast into the brass cap.

**IRREGULAR** – As applied to units of the rectangular system, exceeding the rectangular limits.

**IRREGULAR BOUNDARY** – Township or section lines not originally established as straight lines or which a retracement reveals as not having been surveyed as a straight line. See IRREGULAR BOUNDARY ADJUSTMENT.

**IRREGULAR BOUNDARY ADJUSTMENT** – A modified form of single proportionate measurement used in restoring some lost corners. Sometimes considered as a Broken Boundary Adjustment. See IRREGULAR BOUNDARY, BROKEN BOUNDARY ADJUSTMENT and ADJUSTMENT\*.

**IRREGULAR SECTION** – A section having two or more adjacent boundaries, as returned on the original survey, that are not within 0° 21’ of cardinal or exceed 25 links from 40 chains in measurement.

**ISLAND** – A body of land extending above and completely surrounded by water at ordinary high water. See ORDINARY HIGH WATER and ISLAND\*.

**ISOLATED TRACT** – a parcel of vacant public lands, not exceeding \*1,520 acres, which is surrounded by appropriated lands.

## J

**JURIS (Land Status Records)** – Jurisdiction.

**JACOB'S STAFF** – A single staff or pole used for mounting a surveyor's compass or other instrument. Used instead of a tripod, a Jacob's staff is fitted with a ball-and-socket joint at its upper end, by means of which the instrument is adjusted to a level position; the foot is fitted with a metal shoe which facilitates pressing the staff firmly into the ground. many of the early land surveys in this country were made with surveyor's compasses mounted upon Jacob's staffs.

**JAIL-SITE RESERVE** – A reservation of public lands in Alaska, not exceeding 4,000 square feet originally for use as a Territorial Jail Site.

**JOINDER OF ACTIONS** – This expression signifies the uniting of two or more demands or rights of action in one action or lawsuit.

**JUDGMENT** – In law an official formal decision given by a court, in another meaning, an obligation (as a debt) created by the decree of the court.

**JUNIOR CORNER** – A corner which is part of a survey occurring at a date subsequent to a prior (senior) survey.

**JUNIOR LINE** – Survey lines created at different times have different standings. The "*junior*" line would be the line created subsequent to an earlier line. See JUNIOR RIGHTS.

**JUNIOR RIGHTS** – Subordinate to the senior rights. The later patent issued usually has the subordinate right in a situation where a later survey is in conflict with an earlier survey. The first patent issued usually has the superior (senior) right and the second patent usually has the subordinate (junior) right, regardless of the dates of the original surveys.

**JUNIOR SURVEY** – A survey made subsequent to an earlier survey. See SENIOR SURVEY.

## K

**KAN** – Kansas.

**KCLA (Land Status Records)** – Known Coal Leasing Area.

**KGRA (Land Status Records)** – Known Geothermal Resource Area.

**KGS (Land Status Records)** – Known Leasing Area.

**KR MER (Land Status Records)** – Kateel River Meridian.

**KS** – Kansas.

**KY** – Kentucky.

**KATEEL RIVER MERIDIAN** – The principal meridian governing surveys in western central Alaska; it was adopted in 1956.

**KINKAID HOMESTEAD ENTRY** – A homestead entry, not exceeding 320 acres (formerly, 640 acres), initiated under the act of April 28, 1904 (33 Stat. 547, 43 U.S.C. sec. 224), which provides for the homesteading of nonirrigable agricultural lands in parts of Nebraska.

**KNOWN ALL MEN** – Used in conveyancing. A form of public address, of great antiquity, and with which many written instruments such as bonds, deeds, letters of attorney, etc., still begin.

## L

**LA.** – Louisiana.

**LA MER (Land Status Records)** – Louisiana Meridian.

**LAT (Land Status Records)** – Latitude.

**LCR** – Lower Colorado River.

**LD (Land Status Records)** - Interior Land Decisions.

**LH (Land Status Records)** – Light House.

**LIC (Land Status Records)** – License.

**LM** – See UNITED STATES LOCATION MONUMENT.

**LO (Land Status Records)** – Land Office.

**LOC (Land Status Records)** – Location.

**LONG (Land Status Records)** – Longitude.

**L&R** – Division of Lands and Recreation.

**LS** – Land Surveyor – if followed by a number it indicated the land surveyor’s registration number.

**LS (Land Status Records)** – Lieu selection.

**LSBL (Land Status Records)** – Leaseable.

**LSE (Land Status Records)** – Lease.

**LTR (Land Status Records)** – Letter.

**LU (Land Status Records)** – Land Utilization.

**LACHES** –(pronounced as door latches) Failure to do something which should be done or to claim or enforce a right at a proper time.

**LAKES, MEANDERED** – From 1851 until the issuance of the Manual of Surveying Instructions, 1973, all lakes of the area of 25 acres or more were meandered. Now, all lakes of the area of 50 acres and upwards are meandered. Exceptions to this rule include artificial lakes and reservoirs (unless the instructions specifically provide for their meandering) and shallow or poorly defined “*lakes*” which are actually pools that collect due to permafrost and lack of drainage, or which are desert playas. See PLAYA AND PERMAFROST.

**LAMBERT CONFORMAL CONIC MAP PROJECTION** – A map plotting system in which points on the ellipsoid are mathematically projected onto a cone with its axis identical with the polar axis. The cone surface may be tangent to the ellipsoid or it may cut below the surface (secant) creating two parallels where the scale is exact. The secant form of this projection is the basis of State Plane Coordinate Systems where the zone extends more east-west than north-south.

**LAND CLAIM** – See PRIVATE LAND CLAIM and DONATION LAND CLAIM.

**LAND COURT** – A tribunal established for the purpose of administering legislative statutes relating to land boundaries and titles. There are Land Courts in California, Colorado, Georgia, Hawaii, Illinois, Massachusetts, Minnesota, North Carolina, North Dakota, New York, Ohio, Oregon, South Dakota, Texas, Utah, Virginia, and Washington.

**LAND DECISIONS** – Decisions of the Department of the Interior relating to the Public lands. The decisions made prior to June 30, 1932 are published in volumes 1 thru 52 and are referred to as “*Land Decisions*” and cited as “*L.D. ’s, thus, 47 L.D. 10.*” See INTERIOR DECISIONS and BOARD OF LAND APPEALS.

**LAND DEPARTMENT** – The generalized term adopted in legal literature to denote the Secretary of the Interior, the Commissioner of the General Land Office, and currently (1973) the Director of the Bureau of Land Management, and their predecessors, together with subordinate officials, when acting in their capacity as administrators of the public-land laws.

**LAND DISTRICT** – the area administered by a particular land office. The act of may 10, 1800, provided for the creation of the first four land districts in “*The territory northwest of the Ohio and above the mouth of the Kentucky River,*” as follows:

DISTRICT	LAND OFFICE
Land below the Little Miami .....	Cincinnati
Land east of the Scioto .....	Chillicothe
Land east of the sixteenth range of townships ....	Marietta
Other land.....	Steubenville

As the public land surveys spread, new land districts were created. As the disposition of the public lands progressed and the work in a land district lessened, the land districts were abolished. A provision of the Act of July 31, 1876, abolished the land districts in Ohio, Indiana and Illinois. This was about the same time as the creation of new land districts in Utah, Washington and Wyoming (43 U.S.C.A., sec. 121, Historical Note). See LAND OFFICE, LAND OFFICES (BLM) and DISTRICT OFFICES (BLM).

**LAND LINE ADJUSTMENT\***.

**LANDMARK** – 1) Any monument or material mark or fixed object used to designate the location of a land boundary on the ground. 2) Any prominent object on land which can be used in determining a location or a direction. 3) A landmark decision; a judicial decision considered a turning point or highpoint of the era.

**LAND OFFICE** – A Government office, subordinate to the General Land Office. These offices were established in various parts of the United States for the transaction of local business relating to the survey, location, settlement, pre-emption and sale of the public lands. The brisk and extensive business in these offices gave a new phrase to our language – “*a land-office business.*” See LAND DEPARTMENT, LAND DISTRICT, GENERAL LAND OFFICE.

**LAND OFFICE STATUS PLAT** – The triplicate plat of a survey used to be referred to as the *status plat.*” It was the companion record, in graphic form, to the tract book. These records together constituted, prior to the beginning of the Records Improvement Program in 1955, the records required in accordance with 43 C.F.R. 1813.1-1. To protect the plats from continual wear and damage and to preserve the information they contain, a system was developed whereby the old status plats are microfilmed before they are retired to a Federal Records Center. Through BLM’s

Records Improvement Project, new records were developed. See MASTER TITLE PLAT, USE PLAT, HISTORICAL INDEX and TRACT BOOK.

**LAND ORDINANCE OF 1785** – See ORDINANCE OF MAY 20, 1785.

**LAND REGISTRATION (Torrens system)** – See TORRENS REGISTRATION SYSTEM.

**LANDS OPEN TO MINERAL LOCATION** – Lands held by the United States for disposal under the land laws are open to mineral location. Land specifically withdrawn, such as national parks, national monuments, military reservations and Indian lands are not subject to location. Minerals found within a national forest are subject to location provided the discovery is such that it would justify an ordinary prudent person his expenditure of time and effort in developing a paying mine. Without the existence of commercial value, mineral claims within a national forest are not valid locations. Lands such as the beds of navigable bodies of water and land between high and low-water mark are not subject to location under the Federal mining laws. See also STATES EXEMPT FROM FEDERAL MINING LAW.

**LANDS SUBJECT TO SURVEY** – In accordance with legal requirements, the public domain lands of the United States that have not yet been surveyed under the system of rectangular surveys are subject to survey. It is a well settled principle of law that the United States, through the Department of the Interior, Bureau of Land management, has the authority and duty to extend the public land surveys as may be necessary. Lands erroneously omitted from earlier surveys are, for example, subject to survey.

**LAND STATUS RECORDS** – Those records maintained by the Bureau of Land management, showing ownership of the public lands and the availability of the lands for use under the public land laws. The land status records include the Master Title Plat, Supplemental Master Title Plat, Use Plat, Historical Index, Control Document Index, Miscellaneous Document Index, Serial Register, Mineral Location and Contest Index, Tract Books, Plat Books, Patents, Deeds Name Index Card File, and the Working and Reference Records.

**LAND SURVEYING** – The practice of land surveying includes surveying of areas for their correct determination and description and for conveyancing, or for the establishment or reestablishment of land boundaries and the plotting of lands and subdivisions thereof. See CADASTRAL SURVEY.

**LASER\***.

**LATERAL BOUNDARIES** – Side boundaries; boundaries between adjacent states extending from shore to their seaward boundaries under Public law 31; boundaries between adjacent nations through the marginal sea and the contiguous zones.

**LATITUDE** – 1) The distance on the earth's surface, north or south of the Equator, expressed in either linear or angular measurements. 2) The north-south component of a traverse course. See GEODETIC LATITUDE\* and ASTRONOMIC LATITUDE\*.

**LEAGUE** – A marine measure of distance. In different times and countries it has varied from 2.4 miles to 4.6 miles. See MARINE LEAGUE\*.

**LEASABLE MINERALS** – Oil and gas; oil shale; coal; potash; phosphate; sodium; sulphur in Louisiana and New Mexico; gold, silver, and quicksilver in certain private land claims; and silica deposits in certain parts of Nevada. See MINERAL LEASE and PLACER Law of 1897.

**LEASE** – 1) A contract granting possession or control of real property for a determined period. 2) The act of granting the lease. 3) The act of the lessee in taking the lease.

**LEASE MAP** – Former name for the Outer Continental Shelf Official Protraction Diagrams.

**LEDGE** – In mining law, and in popular usage in the Western States, it is synonymous with “*lode*” and “*vein*.” See LODE.

**LEFT BANK (River)** – The bank on the left-hand side of a stream or river as one faces downstream. See RIGHT BANK (River).

**LEGAL DESCRIPTION** – A written statement recognized by law as to the definite location of a tract of land by reference to a survey, recorded map or adjoining property.

**LEGAL SUBDIVISION** – The subdivision of a township, such as a section, half-section, quarter-section, quarter-quarter or sixteenth-section, or lotting, including the lot, section, township and range numbers and the description of the principal meridian to which referred, all according to the approved township plat. See SUBDIVISION, SMALLEST LEGAL; ALIQUOT PARTS and MINOR SUBDIVISIONS.

**LEGEND** – A description, explanation or table of symbols printed on a map or chart to permit a better understanding or interpretation of it.

**LETTER “E”** – Under a General Land Office system of paperwork classification, Letter “E” documents originated to the Washington Office and referred to engineering functions.

**LEVEL\***.

**LEVEE** – An embankment alongside a river to prevent high water from flooding bordering lands.

**LIEU LANDS** – Former public lands within specified limits (Indemnity Limits) which were granted instead of (in lieu of) areas intended to be granted but which were already patented or otherwise not available. See INDEMNITY LIMITS, PLACE LANDS and LIEU SELECTION.

**LIEU SELECTION** – An application to acquire title to public lands in exchange for which the applicant relinquishes his rights or title to other lands which he, for some reason, cannot or does not wish to acquire or hold.

**LIMITED DEPENDENT RESURVEY** – A dependent resurvey limited to a certain portion of a township.

**LIMITING BOUNDARY** – The boundary of lands actually surveyed.

The term is usually used to describe a particular boundary in special cases. For example: a fictitious or grossly erroneous meander line may be held to be a fixed and “*limiting boundary*” of the lands actually surveyed; the exterior boundaries of an area to be independently resurveyed may be termed the “*limiting boundary*” of that project area. See OUTBOUNDARIES and FIXED BOUNDARY.

**LINE, RANDOM** – See RANDOM LINE.

**LINE TREE** – A tree intersected by a surveyed line, reported in the field notes of the survey, and marked with two hacks or notches cut on each of the sides facing the line. Originally, these trees were called “*station trees*,” and they are sometimes called “*sight trees*,” but since the line intersects them, the term “*line tree*” is preferred.

**LINE TREES, Ownership of** – Trees whose trunks are wholly upon the land of one owner belong exclusively to him.

Trees whose trunks stand partly on the land of two or more abutting owners belong to them in common.

**LINK** – a unit of linear measure, one hundredth of a chain and equivalent to 7.92 inches (0.66 foot). See CHAIN.

**LIQUIDATED DAMAGES** – An assessment of monetary charges determined in advance by contractual agreement as compensation for some breach of a contract.

**LITTORAL** – From the Latin “*litus*.” Of or pertaining to the shore, especially of the sea. A coastal region.

**LITTORAL CURRENTS (T.R. No. 4)** – The nearshore currents primarily due to wave action, e.g. longshore currents and rip currents.

**LITTORAL DRIFT (T.R. No. 4)** – The material moved in the littoral zone under the influence of waves and currents.

**LITTORAL OWNER** – One who owns land abutting a sea or ocean where the tide regularly rises and falls. In common usage, the word “*riparian*” is often used instead of littoral to include seashore boundaries as well as inland water boundaries.

**LIVERY OF SEISIN** – The appropriate ceremony, at common law, for transferring the possession of lands or tenements by a grantor to his grantee. This method of transfer is now replaced by granting of deeds and by Recording Statutes.

**LOBE\***.

**LOCAL CORNER** – Physical evidence accepted by local land owners to be at a corner of the public lands survey; a local point of control.

**LOCAL POINT OF CONTROL** – See LOCAL CORNER.

**LOCATION** – In mining, the perfecting of a right to possession of a mining claim for mining purposes. This includes the staking of the claim, sinking a discovery shaft, discovery of a valuable mineral, posting a notice of location and recording the claim. In a broad sense there are 4 types of location: lode or vein, placer, tunnel and mill site. In a secondary meaning, a location is the mining claim covered by an act of appropriate or location. Also See MINING CLAIM, LODGE CLAIM, PLACER CLAIM, MILL-SITE ENTRY and LOCATION NOTICE.

**LOCATION CORNER** – a term applied to a position determined and marked by the locator (claimant) to distinctly and clearly define the boundaries of a mining claim on the ground, so that it can be readily identified.

**LOCATION MONUMENT** – See UNITED STATES LOCATION MONUMENT.

**LOCATION NOTICE** – In mining, a public notice of location of a mining claim. The object of the notice is to inform the public. It must be filed and posted on the ground according to the laws of the state where located. Usually it sets forth the name of the locator, the date, the name of the claim, and a tie to a corner of the public land surveys. The essential requirement of a location notice, however, is that it must so describe and identify the location that it can be found by anyone interested in doing so, and that the boundaries may be readily traced on the ground. See LOCATION.

**LOCATION SURVEY\***.

**LODE** – Mineralized rock lying within boundaries clearly separating it from the neighboring rock and extending longitudinally in a continuous zone or belt. In mining law, and in popular usage in the Western States, it is synonymous with “*ledge*” and “*vein*.” See MINERAL SURVEY.

**LODE CLAIM** – a mining claim embracing public lands which contain minerals occurring in a vein or lode. See MINERAL SURVEY and PLACER CLAIM.



**LONGITUDE** – The distance on the earth’s surface, east or west of a defined meridian, usually the meridian of Greenwich (0° Longitude), expressed in either angular measure, such as 90° West Longitude, or in time, such as 6 hours West of Greenwich. See WASHINGTON MERIDIAN.

**LOST CORNER** – A corner whose position cannot be determined, beyond reasonable doubt, either from traces of the original marks or from acceptable evidence or testimony that bears on the original position, and whose location can be restored only by reference to one or more interdependent corners.

**LOT** – A subdivision of a section which is not described as an aliquot part of the section, but which is designated by number, e.g., LOT 2. A lot may be regular or irregular in shape and its acreage varies from that of regular subdivisions. The term “*Government Lot*” is commonly used by persons outside the Bureau of Land Management in referring to such a subdivision of a section. “*Lot*” is also the name given individual parcels of recorded subdivisions of private tracts. See TOWN LOT, TRACT and URBAN SUBDIVISION.

**LOUISIANA MERIDIAN** – The principal meridian governing surveys in the greater part of Louisiana; it was adopted in 1807.

**LOUISIANA PURCHASE** – The territory purchased from France in 1803. It was the earliest acquisition by the United States of territory claimed by a European power. It resulted in the acquisition of more than 500 million acres of public lands west of the Mississippi River.

**LOUISIANA SWAMP LAND ACT OF 1849** – The Act of March 2, 1849 (9 Stat. 352), granted to the State of Louisiana all the swamp and overflowed lands within the limits of the State for the purpose of aiding in the reclamation of said lands. See SWAMP LANDS ACT OF 1850 and SWAMP LANDS ACT OF 1860.

**LOW-WATER MARK** – The stage to which a river or other inland body of water recedes, under ordinary conditions, as its lowest stage or elevation. Low-water mark should not be used in reference to tidal waters. See MEAN LOW WATER and HIGH-WATER MARK.

**LOXODROME** – See RHUMB LINE\*.

**LUDLOW’S MERIDIAN** – See FIRST PRINCIPAL MERIDIAN.

## M

**M** – Mile, as marked on monuments and/or accessories.

**m** – Meter.

**MA** – Massachusetts.

**MAT S (Land Status Records)** – Material site.

**M&B (Land Status Records)** – Metes and Bounds.

**MC** – Meander Corner.

**MC (Land Status Records)** – Mineral Certificate; Also Min Cert.

**MCOA or MOA (Land Status Records)** – Mining Claim Occupancy Act.

**MD** – Maryland.

**MD MER (Land Status Records)** – Mount Diablo Meridian.

**ME** – Maine.

**ME (Land Status Records)** – Mineral Entry.

**MER (Land Status Records)** – Meridian.

**MES** – Mineral Entry Survey.

**MGMT (Land Status Records)** – Management.

**MI** – Michigan.

**MICH.** – Michigan.

**MICH MER (Land Status Records)** – Michigan Meridian.

**MIL PUR (Land Status Records)** – Military Purpose.

**MIL RES (Land Status Records)** – Military Reservation.

**MIL RG (Land Status Records)** – Military Road Grant.

**MIL WRG (Land Status Records)** – Military Wagon Road Grant.

**MILL S (Land Status Records)** – Millsite.

**MIN (Land Status Records)** – Mineral.

**MIN CERT or MC (Land Status Records)** – Mineral certificate.

**MINN.** – Minnesota.

**MISC (Land Status Records)** – Miscellaneous.

**MISS.** – Mississippi.

**ML (Land Status Records)** – Mineral location.

**MLCI (Land Status Records)** – Mineral Location and Contest Index.

**MM (Land Status Records)** – Mineral Monument.

**MN** – Minnesota.

**MO** – Missouri.

**MOA (Land Status Records)** – Mining Claim Occupancy Act.

**MOD (Land Status Records)** – Modification.

**MON (Land Status Records)** – Monument.

**MONT.** – Montana.

**MONT PRIN MER (Land Status Records)** – Montana Principal Meridian. See PRINCIPAL MERIDIAN, MONTANA.

**M&P FACTOR** – Meridian and Parallel Factors. See M and P Factor (below).

**M.S.** – Mineral Survey. As used in field notes.

**MS** – Mississippi.

**MS (Land Status Records)** – Mineral Survey.

**MT** – Montana.

**MTN (Land Status Records)** – Mountain.

**MTP (Land Status Records)** – Master Title Plat.

**MULT USE (Land Status Records)** – Multiple Use.

**MAGNETIC DECLINATION** – The bearing on a given date (reckoned east or west from the north branch of the celestial meridian plane) of magnetic north as determined by the positive pole of a freely suspended magnetic needle which is subject to no transient artificial disturbance.

**MAGNETIC VARIATION** – Regular or erratic change in magnetic declination. Not interchangeable with declination but old field notes use Var. as the declination of the compass.

**MAIN CHANNEL** – See CHANNEL, MAIN.

**MANAGER** – Under Reorganization Plan No. 3, which created the Bureau of Land Management in July 1946, the functions and powers of a “*Register*” were to become those of a “*Manager*” of a district land office. See REGISTER.

**M AND P FACTORS** – Tables used to convert short distances expressed in seconds of latitude (Meridional) and seconds of longitude (Parallel) into feet, or chains, at various latitudes.

**MANUAL OF INSTRUCTIONS FOR THE SURVEY OF THE PUBLIC LANDS OF THE UNITED STATES, 1973.** – Short title: “*Manual of Surveying Instructions, 1973.*” Also referred to as “*The 1973 Manual,*” “*The BLM Manual,*” “*The 1973 BLM Manual,*” “*The Manual*” and slang, the Blue Book.

**MAP** – A representation on a plane surface, at an established scale, of the physical features (natural, artificial, or both) of a part or the whole of the earth’s surface, by means of signs and symbols, and with the means of orientation indicated. See QUADRANGLE MAPS, MAP\* and MAP PROJECTION\*.

**MAPPING ANGLE\*.**

**MARGINAL DATA** – A memorandum in the margin of a cadastral survey plat. The memorandum is intended to correlate and consolidate information regarding the record of surveys as shown on the plat. Under the General land Office, the practice was to show this data in box-tabulated form on plats of original surveys.

**MARKETABILITY TEST** – Used in determining whether or not a discovered mineral deposit is “*valuable*” under the meaning of the law, it is the test of whether or not the mineral can be extracted and marketed at a profit. It is a complement to and refinement of the “*prudent man test.*” See MINERAL, VALUABLE and PRUDENT MAN TEST.

**MARSH** – An area of low-lying, wet ground subject to frequent or regular flooding or ordinarily covered with water. Marsh vegetation is composed chiefly of reeds, grasses and grasslike plants. In Cadastral Survey usage the word “*marsh*” has usually been used to refer to coastal “*salt marshes.*” See BOG, SWAMP and SALT MARSH.

**MASTER TITLE PLAT** – A composite of the survey plats of a township on which is shown the ownership and land status. See SUPPLEMENTAL MASTER TITLE PLAT and USE PLAT.

**MEAN BEARING** – 1) The average (mean) of the forward and the back bearing of a straight line. 2) The average of the bearings of an irregular boundary whose courses are nearly equal in length. 3) The weighted average of the azimuths of an irregular boundary after conversion to an equivalent bearing. 4) The average of the bearings of opposite subdivision lines. 5) The mean of a series of bearings obtained by measurement. See BACK BEARING.

**MEANDER CORNER** – A corner established at the intersection of standard, township or section lines with the meander line near banks of navigable streams or any meanderable body of water.

**MEANDER FIELD BOOK** – Page 24 of the Manual of Surveying Instructions, 1851, states: “Both banks of navigable streams are to be meandered by taking the courses and distances of their sinuosities and the same are to be entered in the meander field book.”

**MEANDER LINE** – the traverse run at the line of mean highwater of a permanent natural body of water. In original surveys, meander lines are not run as boundary lines. They are run to generally define the sinuosities of the bank or shore line and for determining the quantity of land in the fractional sections remaining after segregation of the water area.

**MEAN HIGH WATER** – 1) The elevation of the water at the margin of the area occupied by the water for the greater portion of each average year, as determined by vegetative, on topographic changes. 2) As applied by NOS, the mean of all high waters are a considerable period of time, usually 18.6 or 19 years.

**MEAN LOW WATER (USC & GS. S.P. 242)** – The mean height of all low waters at a particular point or station over a considerable period of time. For tidal waters, the cycle of change covers a period of about 18.6 years, and the mean low water is the mean of all low waters for that period. For any body of water, it is the mean of all low waters over a period of time of such length that increasing its length does not appreciably change the mean.

**MEAN SEA LEVEL** – The average height of the surface of the sea for all stages of the tide over a 19-year period, usually determined from hourly height readings.

**MEAN TIDE LEVEL** – (Also called half-tide level) a plane midway between mean high water and mean low water. Because of the lack of symmetry of the tidal curve this is not the same as mean sea level. See MEAN SEA LEVEL.

**MECHANICAL PHOTOTRIANGULATION** – This method (also known as the analogue or instrumental method) of phototriangulation establishes positions and elevations by use of an instrument viewing a spatial model. Precise connections are made between successive models which in turn are tied to vertical and horizontal control. This method which, after adjustment, allows an accurately scaled representation of the project area to be depicted, has been used for several successful cadastral survey projects. However, due to the fact that the accuracy of the data obtained by use of the analytical process is usually of a higher order than that obtained by the mechanical methods, the Bureau of Land Management has adopted analytical phototriangulation for use in photogrammetric cadastral surveys. See ANALYTICAL PHOTOTRIANGULATION.

**MEDIAL** – Situated in or pertaining to the middle; intermediate. See MEDIAL LINE.

**MEDIAL LINE** – In surveying, the term refers to a particular line which must be determined by the consideration of various factors, or the weighing of evidence, as well as the use of measurement and/or calculation. An example would be the determination of the center of the main channel of a river as distinguished from the measurement or calculation of a line midway between its banks. Occasionally used as though synonymous with “median line.” See MEDIAN LINE, CHANNEL and MAIN AND GRADIENT BOUNDARY.

**MEDIAN** – Noting or pertaining to a plane dividing something into two equal parts, especially one dividing a thing into left and right halves. In geometry, a straight line from the vertex of a triangle to midpoint on the opposite side. See MEDIAN LINE.

**MEDIAN LINE** – The “median line” of a body of water is a line, every point of which is equidistant from the nearest point on opposite banks or other reference lines. The median is a continuous line formed by intersecting straight line or curve segments. “Median line” may also refer to the average of the distances between non-parallel lines. See MEDIAL LINE and MEDIUM FILUM ACQUAE.

**MEDIATION** – The act of a third person who comes between two opposing parties in order to persuade them to compromise, adjust or settle their dispute.

**MEDIATOR** – A third person who tries to get two opposing parties to reach a compromise or otherwise settle their dispute.

**MEDIUM FILUM ACQUAE** – The geographic middle of a river supposed to divide it into two equal parts, without considering the channel or channels of the river. Identical with a median line, every point of which is equidistant from the nearest points of the baseline on the opposite shores. See THALWEG.

**MEMORIAL** – A durable article deposited in the ground at the position of a corner to perpetuate that position should the monument be removed or destroyed. The memorial is usually deposited at the base of the monument and may consist of anything durable, such as glass or stoneware, a marked stone, charred stake or a quantity of charcoal.

**MERIDIAN** – 1) A north-south line from which longitudes (or departures) and azimuths are reckoned; or a plane, normal to the geoid or spheroid, defining such a line. 2) A flag or sight near a survey camp used to test solar transit for adjustment. See PRINCIPAL MERIDIAN, GUIDE MERIDIAN, AUXILIARY GUIDE MERIDIAN, GREENWICH MERIDIAN and WASHINGTON MERIDIAN.

**MERIDIONAL LINE** – A north-south line or a line along a meridian of longitude.

**MESNE CONVEYANCE** – Pronounced “mean.” An intermediate conveyance, one occupying an intermediate position in a chain of title between the first grantee and the present holder.

**METER\*.**

**METES AND BOUNDS** – A method of describing a parcel of land by citing the owners of abutting lands and describing the length of each course of a boundary as “*along*” some apparent line, such as, “*along a stream*” or “*along the road.*” In modern usage, a metes and bounds description includes the bearings and distances of each course.

**METES-AND-BOUNDS SURVEY** – A survey of an irregularly shaped tract of land, not conforming to the rectangular system of surveys.

**MEXICAN CESSION** – Territory included approximately within the present limits of California, Nevada, Utah, and parts of Colorado, New Mexico and Arizona, ceded to the United States in 1848 under the terms of the Treaty of Guadalupe Hidalgo. See TREATY OF GUADALUPE HIDALGO.

**MICHIGAN MERIDIAN** – The principal meridian governing surveys in Michigan and in the extreme northwestern part of Ohio.

**MICRONESIA** – See TRUST TERRITORY OF THE PACIFIC ISLANDS.

**MILE CORNER** – The “*mile corner*” of a state, reservation or grant boundary does not mark a point of a subdivision; it is a station along the line. Long usage has given acceptance to the term. Sometimes called “*mile posts.*”

**MILE POST** – See MILE CORNER.

**MILITARY BOUNTY LAND WARRANT** – Authorization to obtain public lands as a reward for military service. It was issued in the form of scrip which could be exchanged for specified amounts of land in designated areas.

**MILITARY RESERVATION** – Federal lands which have been dedicated for military purposes of the Department of the Army. See NAVAL RESERVE.

**MILITARY WAGON ROAD GRANT** – See WAGON ROAD GRANT.

**MILL SITE** – Up to 5 acres of public land may be claimed for the purpose of processing minerals. Mill sites are limited to lands that do not contain valuable minerals.

**MILL SITE ENTRY** – A cash entry of nonmineral public lands which are to be used as a mill site for the reduction of ore in the development of a lode claim.

**MINERAL EXAMINER** – An employee of the Bureau of Land Management who, prior to patent, conducts a field examination to determine the validity, under the law, of a mining claim. To be a bona fide claim, for example, the discovered mineral deposit must be valuable. See MINERAL, VALUABLE; PRUDENT MAN TEST and MARKETABILITY TEST.

**MINERAL LOCATION AND CONTEST INDEX** – A component of the land status records; it is a listing by township and range of mineral location notices filed under special mining claim recording laws, abandonments and relinquishments of mining claims secured by the Government, and of actions initiated to determine the validity of mineral, agricultural and other claims on national resource lands. See LAND STATUS RECORDS.

**MINERAL ADVERSE CLAIM** – A notice of protest filed by a rival claimant against the approval of a mineral application.

**MINERAL APPLICATION** – An application to purchase public lands which are held as a mining claim or which are desired as a mill site. See MINERAL LAND ENTRY.

**MINERAL CLASSIFICATION** – Classification of public lands as being valuable for a specified mineral (or minerals); also, the public lands so classified.

**MINERAL DISCOVERY** – See DISCOVERY.

**MINERAL DISTRICT** – A general designation sometimes used in acts of Congress in reference to regions of the country where valuable minerals are mostly found, or where the business of mining is chiefly carried on. It carries no precise meaning and is not a legally recognized term. See ORGANIZED MINING DISTRICT and UNORGANIZED MINING DISTRICT.

**MINERAL INVESTIGATION** – Synonymous with field examination.

**MINERAL LAND ENTRY** – Filing a claim to hold or purchase lands belonging to the public domain and valuable for the minerals they contain, implying a prior discovery of ore and the opening of a mine.

**MINERAL LANDS** – Public lands which have been classified as containing, or are known to contain, valuable minerals.

**MINERAL LEASE** – A lease under the Act of Feb. 25, 1920 (The Mineral leasing Act), as amended and supplemented. It authorizes the development and production of certain leasable minerals from public lands. See LEASABLE MINERALS and PLACER LAW OF 1897.

**MINERAL LOCATION** – A mining claim.

**MINERAL MONUMENT** – A term formerly used; it has been discontinued. See UNITED STATES LOCATION MONUMENT.

**MINERAL RESERVATION** – A clause in a patent which retains minerals in Federal ownership.

**MINERAL RIGHTS** – Rights which attach only to mineral deposits. See SURFACE RIGHTS.

**MINERAL SEGREGATION SURVEY** – The measurements and corner restorations needed to define the boundaries between a mineral claim and other public lands for administrative purposes. Even though it also defines the boundaries of the mineral claim, in whole or in part, that is merely incidental and does not confer any rights to the mineral claimant.

**MINERAL SURVEY** – A cadastral survey of a lode claim, placer claim or millsite with all its notes and plats. This type of survey is executed by a U.S. Mineral Surveyor for the purpose of marking the legal boundaries of mining claims on the public domain. The location and estimated value of mining improvements are returned by the survey but no reference is made to mineral deposits. See APPROVED SURVEY.

**MINERAL, VALUABLE** – A deposit of a mineral ore or substance which is useful in commerce or the arts, occurring in quantity and quality sufficient to justify its mining and removal for sale; also, any quantity of such ore or substance in a vein or lode, the size and continuity of which are such as to justify an ordinarily prudent man in the expenditure of his labor and means in an effort to develop a paying mine.

**MINERAL WITHDRAWAL FOR CLASSIFICATION** – A withdrawal of public lands which are potentially valuable for leasable minerals. The withdrawal precludes the disposal of the lands except with a mineral reservation clause unless the lands are found, upon examination or by other competent evidence, not to contain a valuable deposit of minerals.

**MINE SURVEY** – A survey to determine the positions and dimensions of underground passages of a mine; also of the natural and artificial features – surface and underground – relating to the mine. As cadastral surveys, they are made to detect, or determine the extent of, underground trespass. See MINERAL SURVEY.

**MINING ACT OF 1866** – The 1866 bill known as H.R. 365 was, most emphatically, a lode mining bill. It became mining law on July 26, 1866, under the astonishing title: “*An act granting the Right of Way to Ditch and Canal Owners over the Public Lands, and for other purposes.*” See PLACER ACT OF 1870 and MINING LAW OF 1872.

**MINING CLAIM** – A parcel of land probably containing valuable mineral in its soil or rock, and appropriated by an individual, according to established rules, by the process of “*location.*”

**MINING CLAIM OCCUPANCY ACT** – The Act of October 23, 1962 as amended (76 Stat. 1127; 30 U.S.C. 701-704), authorized the Secretary of the Interior to convey to qualified applicants, under its provisions and requirements, maximum tenure consistent with the public interest in the lands which they occupy. This law expired June 30, 1971.

**MINING DISTRICT** – See ORGANIZED MINING DISTRICT and UNORGANIZED MINING DISTRICT.

**MINING LAW, STATES EXEMPT FROM** – See States Exempt From Federal Mining law.

**MINING LOCATION** – See LOCATION and MINING CLAIM.

**MINOR SUBDIVISIONS** – A quarter-quarter section subdivided into quarter-quarter-quarter sections (1/64 or 10 acre units), or aliquot parts as small as 1/256 (2.5 acres).

**MISCELLANEOUS CONTROL** – A mathematical recovery of a lost corner by allowing every known corner within a reasonable radius which was tied to the missing corner to enter into the control, each control corner being given a weight inversely proportional to its distance from the missing corner.

**MISCELLANEOUS DOCUMENT INDEX** – A list, by State, of those documents which apply to lands not specifically described on which conditions may exist that would restrict disposition or use of the lands. See LAND STATUS RECORDS.

**MISCLOSURE** – 1) The amount by which a series of survey measurements fail to yield a theoretical or previously determined value for a survey quantity; hence a measure of the accumulated errors and blunders in the work. Also termed “*closing error,*” or “*error of closure.*” 2) An error of closure in excess of specified limits, as in “*out of limits.*” See RESIDUAL ERROR.

**MISSION-SITE ENTRY** – A grant, to a religious society, of public lands which it occupies as a missionary station in Alaska.

**MONTANA PRINCIPLE MERIDIAN or MONT. PRIN. MER.** – As shown on some MT plats. Technically Principal Meridian, Montana, NOT Montana Principal Meridian. Principal Meridian governs surveys in Montana. It was adopted in 1867.

**MONUMENT** – A physical structure, such as an iron post, marked stone or tree in place, which marks the location of a corner point established by a Cadastral Survey. Objects, to be ranked as monuments, should have certain physical properties such as visibility, durability and stability, and they must define location without resorting to measurements. “*Monument*” and “*corner*” are not synonymous, although the two terms are often used largely in the same sense. See CORNER.

**MONUMENT, LEGAL** – The courts and the general public refer to “*monument*” as if the term includes such things as reference to an adjoining title, a plat, or physical evidence of a boundary, such as a fence. Occasional reference will be made to natural monuments which would more precisely be classed as topography. See **MONUMENT**.

**MORE OR LESS** – When used in connection with quantity or distance in a conveyance of land are considered words of safety or precaution, intended to cover some slight or unimportant inaccuracy. The same applies to the use of the word “about.”

**MOUNDS AND PITS** – A system of witnessing corner stakes in prairie country.

**MOUNT DIABLO MERIDIAN** – The principal meridian governing surveys in much of California and all of Nevada; it was adopted in 1851.

**MOVE** – A correction in position to be applied to a temporary stake so that the resulting point will be located at its proper position. Usually calculated as a distance north or south as well as a distance east or west, the plural is common, i.e.; the moves are 6.5 lks. south and 2.1 lks. east. See **CORNER MOVE**.

**MUNICIPAL RESERVES** – Areas within a townsite which are reserved for the town. Areas within a townsite which are surveyed and set aside for the purposes of the legally incorporated or duly authorized association of the inhabitants of this town. See **TOWNSITE**.

## N

**N (Land Status Records)** – North.

**NA (Land Status Records)** – Native Allotment.

**NAV MER (Land Status Records)** – Navajo Meridian.

**NB** – Nebraska.

**NC** – North Carolina.

**nc (Land Status Records)** – Noncompetitive.

**ND** – North Dakota.

**N. DAK.** – North Dakota.

**NE (Land Status Records)** – Northeast.

**NEB.** – Nebraska.

**N.E.P.A.** – National Environmental Policy Act of 1969.  
The Act of Congress of January 1, 1970, Public Law 91-190, 83 Stat. 852, 42 U.S.C. 4321, et seq.

**NEV.** – Nevada.

**NF (Land Status Records)** – National Forest.

**NGS** – National Geodetic Survey.

**NG SEL (Land Status Records)** – Native Group Selection.

**NH** – New Hampshire.

**NIT (Land Status Records)** – Nitrate.

**NJ** – New Jersey.

**NM** – New Mexico.

**N. MEX.** – New Mexico.

**N MEX PRIN MER (Land Status Records)** – New Mexico Principal Meridian.

**N MON (Land Status Records)** – National Monument.

**N.M.P.M. (Private Practice of Surveying)** – New Mexico Principle Meridian.

**NOAA** – National Oceanic and Atmospheric Administration.

**NOE (Land Status Records)** – Not Open to Entry.

**NOL (Land Status Records)** – Not Open to Lease.

**NOM (Land Status Records)** – Not Open to Mining.

**NOS** – National Ocean Survey.

**NP (Land Status Records)** – National Park.

**NPPR (Land Status Records)** – Native Primary Place of Residence.

**N.P.S., NPS** – National Park Service.

**NRL (Land Status Records)** – National Resource lands.

**NV** – Nevada.

**NW (Land Status Records)** – Northwest.

**NWR (Land Status Records)** – National Wildlife Refuge.

**NY** – New York.

**NATIONAL FOREST** – A reservation of a forest or watershed which is administered by the Forest Service, United States Department of Agriculture.

**NATIONAL FOREST EXCHANGE** – An exchange whereby the Federal Government receives title to lands within a National Forest,

**NATIONAL FOREST HOMESTEAD ENTRY** – A homestead entry, not exceeding 160 acres, initiated under the Act of June 11, 1906 (34 Stat. 233, 16 U.S.C. sec. 506), which provided for the homesteading within National forests of public lands classified and listed as more valuable for agricultural than the forestry purposes. (Repealed October 23, 1962.)

**NATIONAL FOREST HOMESTEAD ENTRY SURVEYS** – Under the Act of June 11, 1906 (34 Stat. 233, 16 U.S.C. sec. 506), surveys of homestead entries within national forests were performed, usually, by Forest Service surveyors under Special Instructions from, and subject to approval by the General Land Office. This Act was repealed Oct. 23, 1962 (76 Stat. 1157), and these surveys are no longer executed.

**NATIONAL FOREST HOMESTEAD LANDS** – Public lands in National Forests which were opened to National Forest homestead entry.

**NATIONAL FOREST LIEU SELECTION** – A parcel of land chosen to replace land located within a national forest, the rights to which were relinquished prior to March 3, 1905.

**NATIONAL MEMORIAL** – A reservation embracing memorials of national interest which is administered by the National Park Service, United States Department of the Interior.

**NATIONAL MONUMENT** – A reservation embracing objects of historic and scientific interest which is administered by the National Park Service, United States Department of the Interior.

**NATIONAL PARK** – A reservation embracing recreational areas which is administered by the National Park Service, United States Department of the Interior.

**NATIONAL RESOURCE LANDS** – All of the lands administered by the Bureau of Land Management.

**NATIVE ALLOTMENT (Alaska)** – Under the terms and provisions of the Act of May 17, 1906, as amended, the Secretary of the Interior is authorized to allot not to exceed 160 acres of vacant, unappropriated and unreserved nonmineral land in Alaska; or, subject to the provisions of the Act of March 8, 1922, of vacant, unappropriated and unreserved public land in Alaska that may be valuable for coal, oil or gas deposits; or, under certain conditions, of National Forest Lands in Alaska, to any Indian, Aleut or Eskimo of full or mixed blood who resides in and is a native of Alaska, and who is the head of a family, or is twenty-one years of age. An allotment will not be made until the lands are surveyed by BLM, and until satisfactory proof of 5 years continuous use and occupancy by the applicant has been approved by the Director of BLM.

**NATIVE TOWNSITE (Alaska)** – the Act of May 25, 1926, provides for the townsite survey and disposition of public lands set apart or reserved for the benefit of Indian or Eskimo occupants in trustee townsites in Alaska, and for the survey and disposal of the lands occupied as native towns or villages. The Act of Feb. 26, 1948, provides for the issuance of an unrestricted deed to any competent native for a tract of land claimed and occupied by him within any such trustee townsite. Native towns occupied partly by white occupants are to be surveyed under the provisions of both the Act of March 3, 1891, and the Act of May 25, 1926.

**NAVAJO EXCHANGE** – An exchange whereby the Federal Government receives title to lands within the Navajo Indian Reservation.

**NAVAJO LIEU SELECTION** – A lieu selection in connection with which the applicant relinquishes rights to land within the Navajo Indian Reservation.

**NAVAJO MERIDIAN** – The principal meridian governing surveys in a small part of northeastern Arizona; it was adopted in 1869. Originally, it also governed surveys in a small part of northwestern New Mexico. Only a few townships governed by it were surveyed in New Mexico and no disposals based upon those surveys were made. The Commissioner of the General Land Office, by letter dated July 28, 1936, canceled the Navajo Meridian and the surveys based on it in the State of New Mexico.

**NATIONAL RESERVE** – A reservation for naval purposes.

**NAVIGABILITY, LEGAL CONCEPT OF** – The doctrine laid down by the Supreme Court in *The Daniel Ball*, 10 Wall. 557 (1871), to wit: *“Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade or travel on water.”*

**NAVIGABLE WATERS** – Waters which afford a channel for useful commerce or travel. The beds of navigable bodies of water are not public domain and are not subject to survey and disposal by the United States. Under the laws of the United States the navigable waters have always been and shall forever remain common highways. This

includes all tidewater streams and other important permanent bodies of water whose natural and normal condition as the date of the admission of a State into the Union was such as to classify the same as navigable water.

**NEAP TIDES** – Tides of decreasing range occurring semimonthly as the result of the moon being in quadrature; that is, when the tidal forces of sun and moon act at right angles to each other on the waters of the earth. Tides during these periods do not rise as high or fall as low as during the rest of the month. See TIDE.

**NEW MEXICO PRINCIPAL MERIDIAN** – The principal meridian governing surveys in New Mexico and the southwestern part of Colorado; it was adopted in 1855.

**NONIUS** – A scale featuring concentric circles used in determining angles. It was named for a Portuguese mathematician and geographer, Nunez (1492-1577). Later, the nonius was replaced by the vernier scale (named for Dutch mathematician Peter Werner who, in his writings, used the name “*Pierre Vernier*”). As late as 1879, in Germany, a vernier was called a nonius.

**NONNATIVE TOWNSITES, ALASKA** – The entry of public lands in Alaska for townsite purposes, by such trustee or trustees as may be named by the Secretary of the Interior for that purpose, is authorized by section 11 of the act of March 3, 1891.

**NONRESPONSIVE BIDS** – Contract bids not conforming to the substance of the bid invitation are non responsive and may not be considered for award. The substance of the invitation includes the terms, conditions and specifications which affect price, quality, quantity and delivery terms.

**NON RIPARIAN BROKEN BOUNDARY** – A colloquial term which refers to the meander lines along a water boundary. The water is the actual (riparian) boundary and the meander line is the representative (nonriparian) boundary.

**NON RIPARIAN BROKEN BOUNDARY ADJUSTMENT** – 1) A mathematical solution for restoring or determining the position of angle points of record courses by applying a correction to each record course based proportionately upon the length of the course. 2) The method generally used to mathematically close (balance) a figure in order to determine area. 3) May be referred to as the “*Compass Rule*.” See NON RIPARIAN BROKEN BOUNDARY, BROKEN BOUNDARY ADJUSTMENT, COMPASS RULE and ADJUSTMENT\*.

**NON RIPARIAN MEANDER LINE** – Any meander line which is surveyed as a fixed boundary or is reestablished as a fixed boundary. See FIXED BOUNDARY.

**NORTHWEST ORDINANCE (1787)** – An ordinance enacted by the Congress of the Confederation to provide for government of the Old Northwest Territory (Territory northwest of the Ohio River), and for the formation and admission of new states. The provisions were reenacted on Aug. 7, 1789 following the adoption of the Constitution. See TERRITORY NORTHWEST OF THE OHIO RIVER.

**NORTHWEST TERRITORY** – See TERRITORY NORTHWEST OF THE OHIO RIVER.

**NOTCHES** – V-shaped indentations cut upon the exposed vertical edges of a stone monument where the vertical edges of the stone have been turned to the cardinal.

## O

**O** – Ohio.

**O (Land Status Records)** – Order.

**OAS** – Office of Aircraft Services.

**OCS** – Outer Continental Shelf.

**O&C (Land Status Records)** – Oregon and California (revested lands).

**OE (Land Status Records)** – Open to Entry.

**OG (Land Status Records)** – Oil and gas.

**OK** – Oklahoma.

**OKLA.** – Oklahoma.

**OP. CIT. SUPRA** – An abbreviation for opus citum supra meaning “*in the work cited above*.” Used to avoid repeating a full citation when referring to a book previously cited. Sometimes Op. Cit. See SUPRA and INFRA.

**OPER (Land Status Records)** – Operation.

**OR** – Oregon.

**ORE.** – Oregon.

**OS (Land Status Records)** – Oil Shale.

**OBITER DICTUM** – Also called “*dictum*.” That which is said in passing. Where the court, in rationalizing its position, uses language broader than is needed for disposition of the point at issue. If the court’s statement is merely illustrative or background material not required in the determination of the issues presented, it is within the category



of obiter dictum. Dictum lacks the force of an adjudication and does not fall within the doctrine of stare decisis. See STARE DECISIS and ADJUDICATION.

**OBLIQUE MERCATOR PROJECTION** – A map plotting system in which points on the ellipsoid are mathematically projected onto a cylinder oriented tangent to an oblique line at the map center; used in one of the Alaska State Plane Coordinates systems.

**OBLITERATED CORNER** – An obliterated corner is one at whose point there are no remaining traces of the monument, or its accessories, but whose location has been perpetuated, or the point for which may be recovered beyond reasonable doubt, but the acts and testimony of the interested landowners, competent surveyors, or other qualified local authorities, or witnesses, or by some acceptable record evidence.

**OCCUPY** – 1) To set a surveying instrument over a point for the purpose of making observations. 2) To take or enter upon possession of land.

**O & C EXCHANGE** – An exchange, by the Federal Government, of revested Oregon and California Railroad Co. or reconveyed Coos Bay Wagon Road lands for other lands. See O&C LANDS.

**O & C HOMESTEAD ENTRY** – An entry, not exceeding 160 acres, on revested Oregon and California Railroad Co. lands which are agricultural in character.

**O & C LANDS** – Public lands in western Oregon which were granted to the Oregon Central railroad companies (later the Oregon and California Railroad Co.) to aid in the construction of railroads, but which were later forfeited and returned to the Federal Government by Congressional revestment of title. The term “*O and C Lands*” is often used to include Coos Bay Wagon Road Lands, which were reconveyed, not revested, lands. See OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION and COOS BAY WAGON ROAD LANDS.

**O.C.S. OFFICIAL PROTRACTION DIAGRAM** – A drawing showing approved subdivisions of the Outer Continental shelf, usually for leasing purposes.

**OFFICIAL CADASTRAL SURVEY** – The public lands are deemed to be surveyed when the survey has been accepted and the plat thereof has been filed in the appropriate land office by direction of the Bureau of Land Management. No subdivisions of the public lands may be conveyed or in any way disposed of until so identified. See ACCEPTED SURVEY.

**OFFICIAL RETURNS** – The Field Notes and Plats of an official cadastral survey accepted and approved by the proper authority.

**OFFICIAL SURVEY** – A public land survey which has the field notes approved, the plat accepted, and has been filed in the proper BLM land office after publication in the Federal Register, if necessary. See ACCEPTED SURVEY, APPROVED SURVEY and MINERAL SURVEY.

**OFF-LINE CLOSING CORNER** – A closing corner monument that was not actually located on the line that was closed upon. Such a monument controls the direction of the closing line, but is not its legal terminus.

**OFFSET** – 1) Moving over to a parallel line in order to avoid an obstacle. 2) A process in the running of a parallel of latitude by means of a straight line with measured (offset) distances to the curve.

**OMITTED LANDS** – Lands that were in place at the time of survey but are not shown on the original township plat, and which are so situated as to have been excluded from the survey by some gross discrepancy in the location of a meander line as given by the field-note record. This term is not applicable to areas where changes can be traced to erosion, accretion or changes in the water level subsequent to survey. See OMITTED LAND SURVEY.

**OMITTED LAND SURVEY** – The survey of substantial areas of lands fronting surveyed meanders of rivers or lakes, which after investigation are known to have been omitted from the original survey through gross error or fraud.

**ONE-EIGHT (1/8) CORNER** – A one-sixteenth (1/16) section corner. The designation “*1/8 corner*” was used in some of the older subdivision-of-section surveys.

**ONE THIRTYSECOND (1/32) CORNER** – A one-sixtyfourth (1/64) section corner. The designation “*1/32 corner*” was used in some of the older subdivision-of-section surveys, especially the 20 acre Indian Allotment surveys.

**OPUS CITUM SUPRA** – In the work cited above. Usually abbreviated “*op. cit. supra*” or “*op. cit.*”

**ORDINAL NUMBER** – A number designating the place (as first, second, third) occupied by an item in an ordered sequence. There are six principal meridians named ordinal numbers, beginning with the First Principal Meridian.

**ORDINANCE OF MAY 20, 1785** – The first land ordinance, it was entitled “*An Ordinance for ascertaining the mode of disposing of lands in the western territory.*” It was adopted by the Continental Congress on May 20, 1785. Under its terms the rectangular system of surveys was inaugurated. Six-mile square townships extended north from the Ohio River and were numbered south to north. Ranges were numbered east to west. Sections (called lots) were numbered from 1 to 36 from south to north in each range with number 1 in the southeast corner. Also included was the provision that, in each township, section 16 would be set aside for the maintenance of public schools. See SEVEN RANGES, THE; GEOGRAPHER’S LINE, THE.

**ORDINARY HIGH WATER** – When used in reference to tidal waters, synonymous with mean high water. When referring to inland streams and lakes it is the same as mean high-water. See HIGH-WATER MARK and MEAN HIGH WATER.

**OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION** – A branch of the General Land Office which was charged with the administration of the O & C and Coos Bay Wagon Road Lands. See O & C LANDS and COOS BAY WAGON ROAD LANDS.

**OREGON TERRITORY CESSION** – Under the terms of the Oregon Compromise, in 1846, the territory now occupied by the States of Idaho, Oregon and Washington and parts of Montana and Wyoming was ceded to the United States by Great Britain. This cession provided the United States with more than 183 million additional acres of public lands.

**ORGANIZED MINING DISTRICT** – A section of the country usually designated by name and described or understood as being confined within certain natural boundaries, in which the precious metals (or their ores) are found in paying quantities, and which is worked therefore, under rules and regulations prescribed or agreed upon by the miners therein. See MINERAL DISTRICT and UNORGANIZED MINING DISTRICT.

**ORIGINAL ENTRY** – When application to acquire title to public lands and the applicant is permitted to proceed with earning title to the land under the governing laws and regulations. See ENTRY, FINAL ENTRY, CASH ENTRY and COMMUTED HOMESTEAD ENTRY.

**ORIGINAL PUBLIC DOMAIN ACQUISITIONS** – All the lands, regardless of whether they are still Federal ownership or not, which the Federal Government obtained by cession from the 13 Original States (1789-1802), by the Louisiana Purchase (1803), by the cession from Spain (1819), by the occupation of the Oregon Territory (1846), by the Mexican Cession (1848), by the purchase from Texas (1850), by the Gadsden Treaty (1853), and by the purchase of Alaska (1867). The drainage basin of the Red River of the North, south of the 49<sup>th</sup> parallel and west of the cessions by the 13 Original States, is a part of the original public domain. Authorities differ as to the method and to the exact date of its acquisition by the United States, some holding that it was part of the Louisiana Purchase. The area included within the present boundaries of the State of Tennessee, although included in the cessions of the 13 Original States, is usually not considered a part of the original public domain because, by the terms of its cession, the State of North Carolina passed title to only a small acreage in that area to the United States. The United States in turn ceded its unappropriated lands to the State of Tennessee. The submerged lands granted to the states under Public Law 31 (the Submerged Lands Act) have been held to be a part of the original public domain (U.S. Supreme Court decision of Mar. 15, 1954). See PUBLIC DOMAIN, PUBLIC LANDS and PUBLIC LAND STATES.

**ORIGINAL SURVEY** – A cadastral survey which creates land boundaries and marks them for the first time.

**OUT** – a measurement term used in some field notes and deeds in the early 1800's, it is the equivalent of 5 chains. Tiffin's 1815 instructions called for the use of "*a two pole chain of 50 links,*" so when the chainman was "*out*" of chaining pins he had covered a distance of 5 chains. See POLE AND OUTKEEPER.

**OUTBOUNDARES** – The township and range lines around the perimeter of a survey area, particularly the controlling lines around the perimeter of an independent survey.

**OUTER CONTINENTAL SHELF** – That portion of the continental shelf seaward of state boundaries as defined in the Submerged Lands Act (43 U.S.C.A., sec. 1301 et seq.). It is spoken of, generally, as that part of the continental shelf beyond the "*three mile limit.*" It extends from there to the continental talus, a depth of approximately 100 fathoms. See CONTINENTAL SHELF, CONTINENTAL TALUS, SUBMERGED LANDS ACT and OUTER CONTINENTAL SHELF LANDS ACT.

**OUTER CONTINENTAL SHELF LANDS ACT** – Also known as Public Law 212. An act passed during the 1<sup>st</sup> session of the 83<sup>rd</sup> Congress and signed into law Aug. 7, 1953. It provides for the jurisdiction, control and administration by the United States over the submerged lands seaward of the state's boundaries as defined in the Submerged Lands Act (Public Law 31); that is over the outer continental shelf. Senate Report 411, regarding this act, made it clear that the outer edge of the shelf is the point where the continental slope leading to the true ocean bottom begins and that this point is generally regarded as the depth of approximately 100 fathoms. At the 1958 Geneva Conference, the Geneva Convention on the Continental Shelf adopted the 100-fathom depth curve as a minimum limit and beyond that if exploitation is feasible. See CONTINENTAL SHELF, SUBMERGED LANDS ACT, CONTINENTAL TALUS and OUTER CONTINENTAL SHELF.

**OUTKEEPER** – On older style surveyor's compasses, a scale numbered 1 to 16, with a pointer that was turned by a milled knob to keep track of the "*Outs*"; 8 Outs equal 40 chains; 16 Outs equal 80 chains. See OUT.

**OUTLINES** – An obsolete term sometimes used in older manuals of surveying instruction to refer to township boundaries.

**OUT OF LIMITS** – Exceeds linear and/or angular limits as set forth in the Manual of Surveying Instructions. Also, outside rectangular limits. See RECTANGULAR LIMITS.

**OVERFLOWED LANDS** – Lands which are annually or periodically subject to natural flooding during the normal planting, growing or harvesting seasons of a region to such an extent that they are rendered wet and unfit for the cultivation of the staple crops of that region, unless artificially drained or protected. See SWAMP, SWAMP AND OVERFLOWED LANDS and SWAMP LANDS ACTS.

**OVERLAP** – Lands surveyed in conflict. A common area included in separate surveys. That portion of area which one survey extends over and covers a part of a different survey as is shown by the evidence on the ground.

**OVERGROWTH** – The growth of a tree as it heals over survey markings. See BARK SCRIBE.

## P

- Property Line.

**PA** – Pennsylvania.

**PAR (Land Status Records)** – Parcel.

**PART (Land Status Records)** – Partially.

**PAT (Land Status Records)** – Patent.

**PC** – Point of curve.

**PCC** – Point of Compound Curve.

**PCS** – Point of Curve to Spiral.

**PD (Land Status Records)** – Public Domain.

**PE** – Professional Engineer.

**PE and LS** – Professional Engineer and Land Surveyor.

**PER (Land Status Records)** – Permit.

**PET RES (Land Status Records)** – Petroleum Reserve.

**PHO (Land Status Records)** – Phosphate.

**PI** – In highway surveying, Point of Intersection of two tangents.

**PL (Land Status Records)** – Public Law.

**PLC (Land Status Records)** – Private land claim.

**PLO (Land Status Records)** – Public Land Order.

**POL** – Point on line.

**POST** – In highway surveying, Point on semi tangent.

**POT (Land Status Records)** – Potassium.

**POT** - In highway surveys, Point on Tangent.

**PPS (Land Status Records)** – Primary Place of Business.

**PR PER (Land Status Records)** – Prospecting permit.

**PRE (Land Status Records)** – Preemption.

**PRIN MER (Land Status Records)** – Principal Meridian.

**PROC (Land Status Records)** – Proclamation.

**PROJ (Land Status Records)** – Project.

**PROP (Land Status Records)** – Propose, Proposed.

**PROT WDL (Land Status Records)** – Protective Withdrawal.

**PS (Land Status Records)** – Public Sale.

**PS** - Point of Spiral (curve).

**PSC** – Point of Spiral to Curve.

**P.S.C.** – Private survey claim. Used in the specimen field notes in the General Instructions of 1855.

**PST** – Point of Spiral to Tangent.

**PU (Land Status Records)** – Public Use.

**PUR (Land Status Records)** – Purchase.

**PW RES (Land Status Records)** – Public water reserve.

**PWR PROJ (Land Status Records)** – Power Project.

**PWR S (Land Status Records)** – Power site.

**PX (Land Status Records)** – Private Exchange.

**PANELING\***.

**PARALLEL** – See STANDARD PARALLEL; STANDARD PARALLEL, AUXILIARY and PARALLEL\*.

**PARALLEL OFFSET METHOD** – A method of traversing around obstacles and maintaining a line parallel to, and offset a measured distance from, the survey line.

**PARENTHETICAL DISTANCE** – Distances noted on the plats in parentheses are those regular and fractional portions of lines constituting the boundaries of the quarter-quarter sections and fractional subdivisions bounded thereby. Parentheses are used where the record is not supplied by the field notes, indicating that the distance was not measured on the ground. The figures show what was used in the calculation of areas. The same lengths are to be adopted proportionately whenever there is a need for an establishment of sixteenth-section corners on the section boundaries, and for control points for the subdivision of sections. See PROTRACTION and PROTRACTION DIAGRAM.

**PARK ENTRY** – A cash entry by an incorporated municipality of public lands which will be used for municipal park purposes.

**PAROL (Parole)** – Executed by word of mouth, or by writing not under seal. Also means a spoken promise. In its usual usage in criminal law; the promise of a prisoner to fulfill stated conditions in consideration of his release. See PAROL AGREEMENT, PAROL CONTRACT and PAROL EVIDENCE.

**PAROL AGREEMENT** – An oral agreement between the owners establishing the boundary dividing adjacent land.

**PAROL CONTRACT** – Any contract not of record or under seal.

**PAROL EVIDENCE** – Evidence gathered by testimony of witnesses. Sometimes “*parole evidence.*” A witness who gives verbal evidence concerning positive knowledge of the location of an original monument prior to its destruction is said to give “*parol evidence.*”

**PARTITION LINE** – A survey line which cuts off a required area of a given parcel of land.

**PASSING CALLS** – Found frequently in cadastral surveyor’s field notes, they are calls for (references to) cultural or topographic features along a survey line. Passing calls are sometimes used to locate a line or to recover obliterated corners.

**PATENT** – A document by which the United States conveys, to those entitled thereto, legal title to some portion of the public lands. See PATENT, TRUST; PATENT, CURATIVE; FEE SIMPLE and DEED.

**PATENT, CURATIVE** – An instrument issued to correct a patent. Patents issued in error may be annulled. Patents obtained fraudulently may be cancelled. Patents with conditions may be amended by new patents without conditions. Such actions and documents are authorized only in special situations recognized by public land laws and agency regulations.

**PATENT, TRUST** – A trust patent vests title in the Bureau of Indian Affairs as trustee for an Indian. Upon termination of the trust status of the Indian, a patent issues conveying fee-simple title to the Indian.

**PEDIS POSSESSIO** – Actual possession of real property implying actual occupancy or enclosure and use.

**PENULTIMATE** – Next to the last. The next to the last member in a series, such as the text to the last paragraph in a letter or the next to the last syllable of a word.

**PERCH** – A unit of linear measure equal to 25 links or 16½ feet. Also termed a “*pole*” or “*rod.*” In land area, a square rod; 272.25 square feet or .00625 acres.

**PERPETUATION OF CORNERS** – Establishment of points or other evidence which preserves the location of a corner. See REHABILITATE and REMONUMENTATION.

**PER SE** – Of itself; taken alone; unconnected with other matters.

**PERSONAL PROPERTY** – In a broad and general sense, everything that is the subject of ownership, excluding real property. See REAL PROPERTY.

**PHOTOGRAMMETRIC RESURVEY** – A survey, using a system combining photogrammetry and resurvey methods to re-establish the evidence of a prior official survey.

**PHOTOGRAMMETRIC SURVEY** – An original survey in which monuments are placed at corner positions which have been pre-determined by photogrammetric techniques and equipment.

**PHOTOGRAMMETRY** – The science or art of obtaining reliable measurements by means of photographs.

**PIN, CHAINING** – A metal pin used for marking intermediate measurements on the ground. In “*tally chaining*” with a five-chain tape a set would consist of 9 pins. See OUT, TALLY and ARROW.

**PITS AND MOUNDS** – A system of witnessing public land survey corner stakes in prairie country.

**PITTMAN ACT ENTRY** – An entry of public lands in Nevada made by an individual or association of individuals who earned the right to acquire title to the lands through discovery of underground sources of water.

**PITTMAN UNDERGROUND WATER ACT** – The Act of October 22, 1919, under the terms of which an entry of public lands in Nevada could be made by an individual or association of individuals who earned the right to acquire title to a portion of the public lands through discovery of underground water sources.

**PLACE LANDS** – Lands granted in aid of a railroad company which are within certain limits on each side of the road, and which became instantly fixed by the adoption of the centerline of the railroad. See INDEMNITY LANDS, GRANT IN PLACE and QUANTITY GRANT.

**PLACER** – An alluvial or glacial deposit containing particles of valuable minerals. See PLACER CLAIM, PLACER LOCATION, MINERAL SURVEY, LODE, and VEIN.

**PLACER ACT OF 1870** – Under this act, placer claims included “*all forms of deposit, excepting veins of quartz, or other rock in place.*” It did not restrict placer claims to valuable deposits, probably due to an oversight. There was no provision for the reservation of known lodes within placer patents. Placer locations were limited to not more than 160 acres for any person or association of persons, though patents for additional acreages could be issued where adjoining claims had been purchased by the locator. See MINING ACT OF 1866, MINING LAW OF 1872 and PLACER LAW OF 1897.

**PLACER CLAIM** – A mining claim located on the public domain for the purpose of placer mining. Under U.S. mining laws, mineral deposits not veins or lodes in place, are treated as placers so far as locating, holding, surveying, and patenting are concerned. Revised Statutes, sec. 2331 (30 U.S.C., sec. 35) provides that all placer-mining claims located after May 10, 1872, shall conform as nearly as practicable with the United States system of public land surveys and the rectangular subdivision of such surveys, and such locations shall not include more than 20 acres for each individual claimant (43 C.F.R. 3842.1-2(b)).

**PLACER LAW OF 1897** – This law provided that petroleum lands might be entered and patented under the placer mining laws and led, eventually, to the leasing of public lands valuable for minerals.

**PLACER LOCATION** – A placer claim located and occupied on the public domain.

**PLAINTIFF** – A person who brings an action; the party who complains or sues in a personal action and is so named on the record. See DEFENDANT.

**PLANE COORDINATES** – In general, coordinates specifying the location of points on a plane. In surveying use, the “*plane*” is usually a projection of the earth’s surface such as a developed cone or cylinder.

**PLAT** – As used technically by the BLM, the drawing which represents the particular area included in a survey, such as a township, private land claim or mineral claim, and the lines surveyed, established, retraced or resurveyed, showing the direction and length of each such line; the relation to the adjoining official surveys; the boundaries, descriptions, and area of each parcel of land subdivided; and, as nearly as may be practicable, a representation of the relief and improvements within the limits of the survey. See BASE PLAT, SUPPLEMENTAL PLAT, MASTER TITLE PLAT, USE PLAT, STATUS DIAGRAM and APPROVED SURVEY.

**POCKET PARTS** – Revisions prepared for bound law books to keep them current. The name comes from the fact that these supplements, usually in pamphlet form, are stored in a pocket inside the back cover of the volume undated.

**POINT** – A position or location in a reference system determined by survey, See POINT\*.

**POINT OF BEGINNING, THE** – The point on the west boundary of the State of Pennsylvania at the north bank of the Ohio River is the point of beginning for the survey of the public lands of the United States. The point was marked by a stake on August 20, 1785.

**POINT OF DISCOVERY** – In mining, the precisely indicated position at which a valuable mineral is exposed to view. In the absence of proof to the contrary, the discovery point is held to be the center of the vein on the surface. See DISCOVERY and VEIN DISCOVERY.

**POINT ON LINE** – A stake or other object a surveyor has placed on a line for his convenience, such as for a back sight. In earlier times, under regulations found in various manuals of surveying instructions, surveyors were to set a Point on Line (POL) on top of ridges or spurs, at places where the line crossed trails or roads and at other like places. This was done to facilitate identification of the line. This type of point is now called a witness point. See WITNESS POINT.

**POINT SETTER** – See FLAGMAN.

**POLE** – Also termed “*perch*” and “*rod*”; a unit of length in land measurement, equal to 25 links or 16.5 feet.

**POSITION AZIMUTH DETERMINATION SYSTEM\***.

**POSSESSION** – Exercise of the right to use real property to the exclusion of others. See PEDIS POSSESSIO.

**POSSESSION IS NONE-TENTHS OF THE LAW** – This adage is not to be taken as true to the full extent. It does, however, focus light on the legal truth that every claimant must succeed by the strength of his own title and not by the weakness of his antagonist’s. Prior to passage of statutory mining laws in this country, miners made this, quite literally, their rule.

**POWER-SITE RESERVE** – A reservation of public lands which have been classified as having potential value for water power development and which have been so designated under the Act of June 20, 1910 (39 stat. 557), June 9, 1916 (39 stat. 218), or Feb. 26, 1919 (40 Stat. 1178). See FEDERAL POWER PROJECT RESERVATION.

**PRAESENTI** – See IN PRAESENTI.

**PRECISION** – A quality associated with the refinement of instruments and measurements, indicated by the degree of uniformity and repeatability of observations. See PRECISION\*.

## P

- PREEMPTION ENTRY** – An entry of public lands for purchase under the preemption laws. These laws, now repealed, gave the entryman a preferred right to acquire the land by virtue of his occupation and improvement to it.
- PREEMPTION RIGHT** – The right given to settlers upon the public lands of the United States to purchase such lands in preference to other persons. This right was granted under preemption laws now repealed.
- PRESCRIPTION** – The manner of acquiring adverse rights in another’s land. Prescriptive rights are similar to “*adverse possession*” but that term is used for title interest. “*Prescription*” refers to rights of use in land belonging to another, such as right of access, grazing rights or the right to divert flood waters. See ADVERSE POSSESSION and PRESCRIPTIVE RIGHT OF WAY.
- PRESCRIPTIVE RIGHT OF WAY** – A right of way based upon its adverse using extending to the limits of tradition and memory. In contrast, a right of way by dedication exists by the consent, either expressed or implied, of the owner of the land crossed. If a claim to a right of way is based upon the fact that the owners of a certain ranch have “*always*” driven across a portion of another ranch, that may be the basis for a “*prescriptive*” right of way. See ADVERSE POSSESSION and PRESCRIPTION.
- PRESIDENT’S SIGNATURE ON LAND PATENTS** – Prior to 1833, the President personally signed each land patent before issuance by the General Land Office. Beginning in 1833, the President’s name was written on every land patent by an authorized secretary or executive clerk. The necessity for the President’s signature on all land patents was eliminated by law on June 17, 1948.
- PRIMA FACIE** – Latin. At first sight; on the first appearance; on the face of it; a fact presumed to be true unless disproved by some evidence to the contrary. Evidence good and sufficient on its face is prima facie evidence.
- PRIMARY LIMITS** – In railroad and wagon road grants, the strip of land lying within a specified distance on each side of, and adjacent to, the right-of-way, within which (usually) every odd-numbered section was granted. Also the outside boundaries of this strip. The term “*place limits*” is sometimes used to indicate primary limits. See INDEMNITY LIMITS.
- PRINCIPALS MERIDIAN** – The meridian extended from an initial point, upon which regular quarter quarter-section, section and township corners have been or are to be established. See GUIDE MERIDIAN and AUXILIARY GUIDE MERIDIAN.
- PRIVATE CONTEST** – See CONTEST.
- PRIVATE EXCHANGE** – An exchange between the Federal Government and any landowner other than a State. See EXCHANGE, STATE EXCHANGE and TAYLOR ACT EXCHANGE.
- PRIVATE LAND CLAIM** – A claim to a tract of land which is based on the assertion that title thereto was granted to the claimant or his predecessors in interest by a foreign government before the territory in which it is situated was acquired by the United States; also, the land so claimed. See DONATION LAND CLAIM.
- PRIVATE LAND GRANT** – Land, title to which was conferred by a predecessor government and confirmed by the Federal government after the territory in which it is situated was acquired by the United States, i.e., the Spanish land grants in the Southwest.
- PROJECT INSPECTOR** – An employee designated by the Contracting Officer’s Authorized Representative to directly inspect the work and enforce the terms of the contract.
- PROPERTY** – Used commonly to denote everything which is the subject of ownership. It extends to every species of valuable right and interest, and includes real and personal property. See PERSONAL PROPERTY, REAL PROPERTY and REAL ESTATE.
- PROPORTIONATE MEASUREMENT** – A proportionate measurement is one that applies an even distribution of a determined excess or deficiency of measurement, ascertained by retracement of an established line, so as to give concordant relation between all parts; that is, the new values given to each of the several parts, as determined by the measurement, shall bear the same relation to the record lengths as the new measurement of the whole line bears to that record. It should be noted that the rule is not ordinarily applicable in treating gross error or blunder, if the latter can be definitely segregated. See DOUBLE PROPORTIONATE MEASUREMENT and SINGLE PROPORTIONATE MEASUREMENT.
- PRORATION** – Proportionate measurement, division, distribution or adjustment. See PROPORTIONATE MEASUREMENT.
- PROTECT THE PLAT** – The responsibility of the surveyor to examine, weigh and interpret the available evidence in respect to the execution of a resurvey, looking to the protection of the valid rights acquired under the original survey as shown by the plat. The bona fide rights of claimants are protected under the Constitution and the Act of March 3, 1909 as amended by the Act of June 25, 1910, and by provisions under the Act of September 21, 1918. See INTERPRETATION OF PLAT.

**PROTEST** – A formal statement of objection, dissent, or disapproval in regard to some act about to be done or already performed, such as an objection to an application, entry, claim, etc.

**PROTRACTION** – The word means extension; prolongation. An example of its use would be the representation on paper of the fractional lots in the north and west tiers of sections within a township. These lines are not monumented on the ground. They are shown on the plat as protractions (dashed lines) indicating that they were not run in the field. The distances given are parenthetical until they are actually surveyed. See PROTRACTION DIAGRAM.

**PROTRACTION DIAGRAM** – It is prepared for the purpose of describing unsurveyed land areas. The diagram is approved for the Director by the Chief, Division of Cadastral Survey, and filed in the respective state offices of the BLM – after public notice in the Federal Register.

**PRUDENT MAN TEST** – Also called “*prudent man rule.*” In determining whether or not a mineral deposit is “*valuable*” under the meaning of the law, discovered deposits must be of such a character that a person of ordinary prudence would be justified in the expenditure of his labor and means, with a reasonable prospect of success, in developing a paying mine. See MARKETABILITY TEST.

**PUBLIC DOMAIN** – The term applied to any or all of those areas of land ceded to the Federal Government by the Original States and to such other lands as were later acquired by treaty, purchase or cession, and are disposed of only under the authority of Congress. See ORIGINAL PUBLIC DOMAIN ACQUISITIONS, PUBLIC LANDS, PUBLIC LAND STATES and FEDERAL LAND.

**PUBLIC-LAND LAWS** – The laws which have been passed by the Congress concerning the administration of the public lands and the resources thereon.

**PUBLIC LAND ORDER** – An order effecting, modifying or canceling a withdrawal or reservation. Such an order is issued by the Secretary of the Interior pursuant to powers delegated to the Secretary by the Federal Land Policy and Management Act of 1976, Sec. 204 (a) PL94-579, dated Oct. 21, 1976. (90 stat. 2751).

**PUBLIC LANDS** – (1) The term “public lands” means any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except – (a) lands located on the Outer Continental Shelf; and (b) lands held for the benefit of Indians, Aleuts, and Eskimos. Sec. 103(e) 43 U.S.C. 1702. (2) Includes a) the remaining public domain of the United States, b) reservations, other than Indian reservations, created from the public domain, c) lands withdrawn, reserved or withheld from private appropriation and disposal under the public land laws, including the mining laws, d) outstanding interests of the United States in lands which have been patented or otherwise conveyed under the public land laws, e) National Forests, f) wildlife refuges and ranges, and g) the surface and subsurface resources of all such lands. See ORIGINAL PUBLIC DOMAIN ACQUISITIONS, PUBLIC DOMAIN, PUBLIC LAND STATES and FEDERAL LAND.

**PUBLIC LAND STATES** – Those states created out of the public domain of the United States. They are: Alabama, Alaska, Arizona, Arkansas, California, Colorado, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Ohio, Oklahoma, Oregon, South Dakota, Utah, Washington, Wisconsin and Wyoming.

**PUBLIC LAW 31 (MAY 22, 1953)** – See SUBMERGED LANDS ACT.

**PUBLIC LAW 167** – (July 23, 1955, 69 Stat. 357). Provides for multiple use of mining claims, and for a procedure where the Government may determine that it has the right to manage surface resources not required for mining purposes.

**PUBLIC LAW 212 (August 7, 1953)** – See OUTER CONTINENTAL SHELF LANDS ACT.

**PUBLIC LAW 359** – (Aug. 11, 1955, 69 Stat. 681). Provides for the location of mining claims on lands reserved or withdrawn for power or powersite purposes.

## Q

**QCD (Land Status Records)** – Quitclaim deed.

**QS (Land Status Records)** – Quicksilver.

**QUADRANGLE MAP** – A map of a four sided figure bounded by parallels of latitude and meridians of longitude. See STANDARD QUADRANGLE MAP\* and MAP SERIES\*.

**QUALIFIED (as a witness)** – Persons who are accepted by the court as being professionally skilled and knowledgeable in a particular field of study or science, as surveying. See WITNESS and EXPERT.

**QUANTITY GRANT** – A grant in connection with which the Congress specifies only the number of acres or the general type of public lands which are granted and which the grantee will secure by making selections from available public lands. See GRANT IN PLACE, INDEMNITY LANDS and PLACE LANDS.

**QUARTER-QUARTER SECTION CORNER** – See SIXTEENTH SECTION CORNER.

**QUARTER-SECTION CORNER** – A corner at an extremity of a boundary of a quarter section. Written as ¼ section corner, not as one fourth section corner.

**QUARTER SECTION** – One-fourth of a section, containing 160 acres more or less. See SECTION, QUARTER.

**QUASI** – As if. Almost as if it were. Seen often in terms such as “*quasi-legal*” or “*quasi-judicial*.”

**QUIET TITLE** – In the legal proceeding called “*action to quiet title*,” the word “*quiet*” means to pacify; to render secure or unassailable by the removal of unsettling causes or disputes. Under this proceeding, the plaintiff’s title to land is established by bringing into court an adverse claimant and there compelling him either to establish his claim or be forever estopped from asserting it. See ESTOPPEL.

**QUITCLAIM DEED** – A deed in the nature of a release containing words of conveyance as well as release. It conveys any interest the maker may have in the property described without any representations or liability of any kind as to title conveyed or encumbrances that may exist thereon. A patent from the Government is a quitclaim deed.

**Q.V.** – An abbreviation of “*quod vide*,” used to refer a reader to the word, chapter etc., the name of which it immediately follows. Quod vide means which see.

## R

**R (Land Status Records)** – Range.

**RB (Land Status Records)** – River Basin.

**RCPL (Land Status Records)** - Reciprocal.

**RD (Land Status Records)** – Road.

**RDS (Land Status Records)** – Reservoir declaratory statement.

**re (Land Status Records)** – Reference.

**RE-CL (Land Status Records)** – Reclassified.

**REC LSE (Land Status Records)** – Recreation lease.

**RECL WDL (Land Status Records)** – Reclamation withdrawal.

**RECON (Land Status Records)** – Reconveyed.

**RECON.** – Reconnaissance\*.

**REC & PP** – Recreation and Public Purposes.

**REG (Land Status Records)** – Regional.

**REJ (Land Status Records)** – Rejected and rejection.

**REL – (Land Status Records)** – Relinquished or Relinquishment.

**RES (Land Status Records)** – Reservation or Reserve.

**RESC (Land Status Records)** – Rescind, Rescinded.

**REST (Land Status Records)** – Restoration or Restored.

**RESVR (Land Status Records)** – Reservoir.

**REV (Land Status Records)** – Revocation or Revoked.

**RF** – Representative Fraction.

**RFG (Land Status Records)** – Refuge.

**RGR STA (Land Status Records)** – Ranger Station.

**RHE (Land Status Records)** – Reclamation homestead entry.

**RI** – Rhode Island.

**RI (Land Status Records)** – Range Improvement.

**RIP** – Branch of Records Improvement (Original name was “*Records Improvement Project*.”).

**RMKS (Land Status Records)** – Remarks.

**R&PP (Land Status Records)** – Recreation and Public Purposes.

**R&R (Land Status Records)** – Register and Receiver.

**RR (Land Status Records)** – Railroad.

**RRG (Land Status Records)** – Railroad Grant.

**RRIS (Land Status Records)** – Railroad indemnity selection.

**RRLS (Land Status Records)** – Railroad lieu selection.

**RS** – Registered Surveyor.

**RS (Land Status Records)** – Revised Statutes.

**RSB (Land Status Records)** – River sub-basin.

**RSTD (Land Status Records)** – Restricted.



**RVST (Land Status Records)** – Revested.

**R/W (Land Status Records)** – Right-of-way.

**RY (Land Status Records)** – Railway.

**RAILROAD GRANT** – Usually, title to railroad grant lands passed under patent conveyances. These grants were made to railroads to aid in their construction, and covered designated sections within specified grant limits. Prior to 1875, railroad right-of-way grants conveyed a hybrid type of interest in the public lands. Laws authorized each grant and set forth the limits of the grant and the lands granted. In determining these limits, and ascertaining the interests obtained under the various grants, legal advice may be required. See INDEMNITY LANDS; PLACE LANDS; RAILROAD GRANT, ADJUSTED OR UNADJUSTED; RAILROAD INDEMNITY SELECTION and RAILROAD LIEU SELECTION.

**RAILROAD GRANT, ADJUSTED OR UNADJUSTED** – If the legal processing (adjudication) was terminated, and the grantee received all the lands to which entitled or as much as it was possible to give under the terms of the grant, prior to the Transportation Act of 1940, it is termed an “*adjusted*” railroad grant. If the adjudication was not completed prior to that time, it is called an “*unadjusted*” railroad grant. See RELEASED RAILROAD CLAIM.

**RAILROAD INDEMNITY SELECTION** – A lieu selection, which is made by a railroad, based upon rights to railroad grant lands lost to the railroad within the primary limits, selection being made within the indemnity limits. See RAILROAD LIEU SELECTION.

**RAILROAD LIEU SELECTION** – A lieu selection, which is made by an applicant other than a railroad, based upon the relinquishment of rights to land within a railroad grant. See RAILROAD INDEMNITY SELECTION.

**RAILROAD TOWN-SITE RESERVATION** – A reservation, along a proposed or existing railroad line in Alaska, of public lands which are valuable or potentially valuable as a town site.

**RANDOM LINE** – a trial line run from one monument toward the next monument so that the difference in latitude and departure between monuments may be determined and the true line may be computed. On the trial line, temporary intermediate corners are set. Offsets may then be computed from the temporary corners to the correct positions on the true line. See TRUE LINE, RANDOM AND TRUE AND CORNER MOVE.

**RANDOM AND TRUE** – A survey method whereby a trial line is run to connect two monuments. With the data obtained while running the trial line, the true line is computed and rerun.

**RANGE** – A north-south tier of townships or sections. A range of townships is described by its relationship to the principle meridian.

**RANGE LINE** – A boundary of a township surveyed in a north-south direction. See TOWNSHIP LINE.

**REACH (of a river)** – A continuous unbroken portion of a river, particularly a straight stretch.

**REACQUIRED LANDS** – See ACQUIRED LANDS.

**REAL ESTATE** – An ownership interest in real property. In common usage it has come to mean the property itself. See REAL PROPERTY.

**REAL PROPERTY** – Land and generally whatever is erected upon, growing on or affixed to the land. See PROPERTY.

**RECEIVER** – An official in the Washington office of the General Land Office who was authorized to accept cash payments for the public lands and resources. Receivers could not be appointed until there was sufficient land surveyed to authorize the opening of land offices since they were assigned to land offices to perform their duties. All reference to Receivers was dropped following the Act of March 3, 1925, which provided for the consolidation of the offices of Receiver and Register. See REGISTER.

**RECESSION OF WATER** – A legal expression that is applied to the gradual, natural and more or less permanent lowering of the surface elevation of a lake, or its complete disappearance, when referred to what at one time has been regarded as the normal (as at the date of an established survey). See RELICTION.

**RECLAMATION HOMESTEAD ENTRY** - An entry initiated under the act of June 17, 1902 (32 Stat. 338; 43 U.S.C., sec. 43 et seq.), which provides for the issuance of patents to entrymen who settle upon and improve agricultural public lands, not exceeding 160 acres in size, within reclamation projects.

**RECLAMATION PROJECT** – A water development project, for irrigation of arid lands and for other purposes, which is administered by the Bureau of Reclamation, United States Department of the Interior.

**RECLAMATION STATES** – The public-land States in which the Bureau of Reclamation is authorized to function, viz., Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

**RECLAMATION TOWN LOT** – A town lot of a town site which is within a reclamation project.

**RECLAMATION WITHDRAWAL** – A withdrawal of public lands in connection with a reclamation project. See FIRST FORM RECLAMATION WITHDRAWAL and SECOND FORM RECLAMATION WITHDRAWAL.

**RECONSTRUCTED** – The same as “*rehabilitated.*” Used in section 215 of the 1930 Manual of Surveying Instructions as follows: “ ... *such original corners, if not in a good state of preservation, will be reconstructed in first-class order ....*”

**RECONVEYED LANDS** – Lands once granted but later forfeited and returned to Federal ownership by reconveyance. See COOS BAY WAGON ROAD LANDS.

**RECORD** – 1) The approved field notes and plat of a survey. 2) A value of area, bearing or distance from the approved field notes. 3) The act of recording a document as in a county. 4) All of the documents pertaining to title and boundaries including status, group files, county surveyor information as well as field notes and plats, when used as “*to search the record.*”

**RECORDING** – See REGISTERING.

**RECREATIONAL ENTRY** – A cash entry for public lands by a State, county, municipality, or other local governmental agency, or by a nonprofit organization, which are to be used for recreational purposes.

**RECREATIONAL WITHDRAWAL** – A reservation of public lands which have been designated as chiefly valuable for recreational purposes and as suitable for State exchange, recreation entry, or recreational lease pursuant to the act of June 14, 1926 (44 Stat. 741, 43 U.S.C. sec. 869).

**RECTANGULAR COORDINATES** – See PLANE COORDINATES and COORDINATE SYSTEM.

**RECTANGULAR LIMITS** – The amount by which a section, or its aliquot parts, may vary from the ideal section and still be considered regular.  
The rectangular limits are: a) For alinement, the section’s boundaries must not exceed 21’ from cardinal in any part, nor may the opposite (regular) boundaries of a section vary more than 21’. b) For measurement, the distance between regular corners must be within 25 links in 40 chains.

**RECTANGULAR SYSTEM OF SURVEYS** – A system inaugurated by the Continental Congress on May 20, 1785, for the survey of the public lands of the United States. Its distinguishing characteristic is that in the main, and in all cases where practicable, its units are in rectangular form.

**RED BOOK, THE** – Slang for Standard Field Tables and Trigonometric Formulas, a supplement to the Manual of Surveying Instructions which was first published by the General Land Office in 1910; the eighth edition was published in 1956. The tables and data are designed for use by Cadastral Surveyors in the field and office.

**RED RIVER CASE** – When oil was discovered in the Red River Valley between Oklahoma and Texas, land prices soared. The location of the Oklahoma-Texas boundary line, once a part of the boundary between the United States and the Spanish holdings in the Southwest, became a matter of great importance. Any rights to the bed or the banks of the river were dependent upon the wording of the treaty of 1819. In 1919 Oklahoma entered in suit against Texas and the United States intervened as a protection of the rights of Iowa and Comanche Indians. The suits involved amounts of more than \$100 million. The U.S. Supreme Court proceedings fill 5,510 printed pages in nine volumes and the case required more than five years to settle. As a result of this landmark case, a new and unprecedented principle of law for the establishment of river boundaries came into being. (260 U.S. 606, 261 U.S. 340, 265 U.S. 493). See GRADIENT BOUNDARY.

**RED RIVER OIL LANDS** – Public lands, containing oil and gas, which are located in the south half of the Red River, Oklahoma, from the 98<sup>th</sup> Meridian to the North Fork.

**REEF (T.R. No. 4)** – A chain or range of rock or coral, elevated above the surrounding bottom of the sea, generally submerged and dangerous to surface navigation. A barrier reef roughly parallels the land but is some distance offshore, with deeper water intervening.

**REFERENCED** – Bearings and distances from a monument to described or identified points to be used for future corner point determination are said to be “*referenced.*”

**REFERENCE MONUMENT** – An iron post or rock cap accessory used where the point for a corner monument is such that, for practical purposes, a permanent corner monument cannot be established, or if monumented, a full complement of bearing trees or bearing objects are not obtainable.

**REGIMEN** – The condition of a stream and its channel with respect to stability. A river or canal is “*in regimen*” if its channel has reached a stable form as a result of its flow characteristics.

**REGIONS (BLM)** – From 1946 until the mid 1950’s, the direction of the public land surveys was conducted through regional offices of the Bureau of Land Management. The original regions were:

1. Washington, Oregon & Idaho (Headquarters, Portland, Oregon)
2. California & Nevada (Headquarters, San Francisco, California)
3. Montana, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, Iowa & Missouri (Headquarters, Billings, Montana)
4. Utah & Colorado (Headquarters, Salt lake City, Utah)
5. Arizona, New Mexico, Texas, Oklahoma, Arkansas & Louisiana (Headquarters, Albuquerque, New Mexico)

6. the remaining states (headquarters, Washington D.C.)

7. Alaska (Headquarters, Anchorage, Alaska)

In 1950, the Bureau of Land Management prepared a wall chart showing that Region 6 had been increased to include Iowa & Missouri (from Region 3) and Arkansas & Louisiana (from Region 5). Alaska was a territory during the period in which BLM regions existed. See AREAS (BLM).

**REGISTER** – An official in the General Land Office who was in charge of a land office subordinate to that agency.

The reference to “*register*” was changed to “*officer designated by the Secretary of the Interior*” under the 1946 reorganization plan which created the Bureau of Land Management. See MANAGER and REGISTER\*.

**REGISTERING (Deeds)** – The main object of the registration or recording of deeds is to give constructive notice of such conveyance to purchasers and creditors. A deed may be valid between the grantor and grantee but will fail to give constructive notice to others if not so registered or recorded.

**REGRESS** – The right to return to land. See EGRESS and INGRESS.

**REGULAR CORNER** – Corners which are established or indicated by the survey according to the normal plan of the rectangular system.

**REGULAR ORDER** – The prescribed procedure and method of establishing the rectangular system of surveys.

**REGULAR SECTION** – A section whose boundaries, as returned on the original survey, are within 21’ of cardinal and with 25 links from each 40 chains in measurement. See REGULAR SECTION SUBDIVISION and REGULAR SUBDIVISIONS OF A SECTION.

**REGULAR SECTION SUBDIVISION** – The plan whereby a section is divided into the maximum number of aliquot parts. See ALIQUOT PARTS, SUBDIVISION-OF-SURVEY and REGULAR SECTION.

**REGULAR SUBDIVISION OF A SECTION** – The aliquot parts. See ALIQUOT PARTS.

**REGULAR TOWNSHIP** – A township which is surveyed with four complete boundaries every part of which is within allowable limits and is subdivided into 36 sections according to the regular method of subdivision.

**REGULATION IRON POST** – See IRON POST.

**REHABILITATION** – The restoration of a corner monument or its accessories to original conditions but not the addition of new accessories or any altering of the record. See REMONUMENTATION.

**REIMBURSABLE SURVEY** – A survey or resurvey authorized by law and made with BLM funds which are repaid, according to the terms of written agreements.

**RELEASED RAILROAD CLAIMS** – The lands any potential claim to which was relinquished by railroads pursuant to the Transportation Act of 1940, viz, all railroad grant lands within the primary limits of the unadjusted railroad grants for which a patent or its equivalent had not been issued and all public lands within the indemnity limits of such grants which might have been available for the selection by the railroads in satisfaction of their grants. The railroads did not relinquish rights to lands for which they had received patents (or their equivalent) or which they had sold to bona fide purchasers prior to September 18, 1940.

**RELICTION** – The gradual and imperceptible recession of the water resulting in an uncovering of land once submerged. Also known as dereliction. See ACCRETION.

**RELICTION, ARTIFICIAL** – A recession of the waters of a stream or lake uncovering riparian land where the recession was caused or induced by man’s activities.

**RELOCATION** – The legal appropriation of a claim previously staked and held by either the relocater or another. The term implies that there was a former mining location which once had legal significance but has become open to forfeiture by abandonment, laches or the like. The burden of proof is on the relocater. See CLAIM JUMPING.

**REMANDER** – To establish new meanders along a riparian boundary replacing previous meanders.

**REMEASUREMENT** – A term applied to a survey made for the purpose of verifying or determining distances as opposed to a retracement, which is done to verify or determine both bearings and distances. It also differs from a resurvey, which is the rerunning and remarking of lines represented in the field notes and on the plat of a previous official survey. See RESURVEY and RETRACEMENT.

**REMONUMENTATION** – The construction of a corner monument (iron post, rock cap or concrete monument) at the position of an original monument as determined from proper measurement from its original accessories. New accessories may be added if required. See REHABILITATION and PERPETUATION OF CORNERS.

**REMONUMENTATION PROGRAM** – A cooperative effort to remonument survey corners which are in danger of becoming lost. This program is restricted to National Forest Lands and certain, designated, BLM Districts. Many State and local agencies have similar programs in their areas of authority.

**REMOTE UPLAND OWNER** – One whose land is immediately upland from that owned by a riparian owner. See RIPARIAN OWNER.

**REPRESENTATIVE FRACTION** – A fraction expressing scale in which the numerator is unity and the denominator is the number that the unit distance must be multiplied by in order to obtain its distance on the ground in the same units. For example, 1/12,000. Also seen as 1:12,000 and 1-12,000.

**RESERVATION** – A withdrawal, usually of a permanent nature; also, any Federal lands which have been dedicated to a specified public purpose. See MINERAL RESERVATION.

**RESERVED LAND** – Federal lands which are dedicated or set aside for a specific public purpose or program, and which are, therefore, generally not subject to disposition under the operation of all of the public land laws.

**RESERVOIR-SITE RESERVE** – A reservation of public lands which have potential value as a site for a water storage reservoir.

**RESIDUAL ERROR** – 1) The total error of closure of a traverse. 2) In mathematics, the difference between as observed value of a series and its corresponding adjusted value. 3) Any remaining error after all adjustments are made.

**RES JUDICATA** – A matter settled by judgment. The rule of “*res judicata*” is that a matter once judicially decided is finally decided. The plea of “*res judicata*” is an “*estoppel*” against the losing party from again litigating matters involved in previous action, but does not have that effect in matters which occurred later and which were not at issue in the prior action. See ESTOPPEL and STARE DECISIS.

**RESOURCE AREA (BLM)** – The primary subdivision of a BLM District. It is composed of at least two (typically five to eight) planning units and intermingled and adjoining lands such as National Parks, National Forests, Indian Reservations, Military Reservations and private lands. It is under the administration of an Area Manager.

**RESPONDENT** – See APPELLEE.

**RESTORATION** – 1) The purpose of a resurvey; the recovery of one or more lines or corner positions, or both, of a prior approved survey; or the replacement of one or more lost corners or obliterated monuments by approved methods, including the substantial renewal of one or more monuments, as required for the purpose of a survey. 2) A revocation of a withdrawal which also effects the opening of the public lands in the withdrawal. Also, an action which returns ceded Indian lands to tribal ownership. See RESURVEY, DEPENDENT RESURVEY and INDEPENDENT RESURVEY.

**RESTORATION OF MEANDERS** – The reestablishment of original meanders. See REMANDER.

**RESTRICTED DEED, ALASKA** – A deed which is issued to an Alaska Indian or Eskimo for land claimed by him in an Alaskan trustee town site and which contains a proviso that the land is inalienable except with the approval of the Secretary of the Interior.

**RESURVEY** – A term applied to the reestablishment or restoration of land boundaries and subdivisions by the rerunning and remaking of the lines that were represented in the field note record and on the plat of the previous official survey. This includes, as in the original survey, a field note record of the retracement data, observations, measurements and monuments descriptive of the work performed, and a plat that represents such resurvey, all subject to the approval of the directing authority. The above definition is intended or implied unless modified as in an Independent Resurvey or in some other appropriate manner. The adjective “*dependent*” applied to the term “*resurvey*” is for emphasis, and specifically to suggest the recovery and restoration of the prior official survey. See DEPENDENT RESURVEY, INDEPENDENT RESURVEY, RETRACEMENT, RESTORATION REMEASUREMENT and RESURVEY\*.

**RETRACEMENT** – A survey made to ascertain the direction and length of lines and to identify monuments and marks of an established prior survey. Recovered corners are rehabilitated, but lost corners are not restored and lines through timber are not reblazed. See RESURVEY and REMEASUREMENT.

**RETURNED** – Areas and/or boundaries of the public lands which are described in the approved field notes and appear on the accepted plat of an official survey are said to be “*returned*.”

**RETURNS** – Official reports. In cadastral survey parlance, the “*returns*” are the field notes, report and approved plat of a survey. See FIELD RETURNS and FINAL RETURNS.

**REVERSION CLAUSE** – A clause in an order of withdrawal providing that the lands shall revert to their former status after they have served the purpose for which they are withdrawn; also, a clause in a patent providing that title to the lands shall revert to the United States upon failure of the patentee to use the lands for the purposes stated in the patent.

**REVESTED LANDS** – Lands once granted and later forfeited and returned to Federal ownership by Congressional revestment of title. See O & C LANDS.

**REVISED STATUTES** – A body of statutes which have been reviewed, re-examined, rearranged or otherwise improved, and have been collected, arranged in order and re-enacted as a whole. In 1873, all of the general and permanent laws of the United States then in force were arranged by subject under 74 headings and enacted into law by Congress. This compilation was corrected and superseded by another codification of the laws in 1878. The 1878

codification is known as the *Revised Statutes*. The sections of the Revised Statutes are numbered consecutively. When cited, the section number should follow the abbreviation *R.S.* Thus, *R.S. 2478* is a citation to section 2478 of the Revised Statutes. A citation to the Revised Statutes is always understood to refer to the codification of 1878, See UNITED STATES STATUTES AT LARGE, UNITED STATES CODE and CODE OF FEDERAL REGULATIONS.

**REVOCATION** – Generally, an action which cancels a previous official act; specifically, an action which cancels a withdrawal.

**RHUMB LINE\***

**RIDGE TOP** – The highest part of a range of hills or mountains; an elongated crest or a linear series of peaks or crests. The highest elevations of a divide or the top of a ridge are often used for boundaries. See DIVIDE, HYDROGRAPHIC DIVIDE and CONTINENTAL DIVIDE.

**RIGHT BANK (River)** – The bank on the right-hand side of a stream or river as one faces downstream.

**RIGHT LINE** – An obsolete term for “*True Line*” or for a straight line between corners. The term is found in Manuals of Surveying Instruction as recently as 1894.

**RIGHT OF WAY** – The legal right to cross the lands of another. Also used to indicate the strip of land for a road, railroad or power line. In BLM, a permit or an easement which authorizes the use of public lands for certain specified purposes, commonly for pipe lines, roads, telephone lines or power lines. Also, the lands covered by such an easement or permit.

**RIPARIAN** – From the Latin “*ripa*” meaning river bank.

**RIPARIAN BOUNDARIES** – Water boundaries, or boundaries formed by a river, lake or the sea. The general rule is that riparian boundaries shift with changes due to accretion or erosion but retain their original location if brought about by avulsion or by artificial causes. See ACCRETION, AVULSION, RELICTION, EROSION, RIVER BED and LITTORAL.

**RIPARIAN LANDS** – In strict interpretation, lands bordering on a river. The term “*riparian*” is also used as relating to the shore of the sea or other tidal water, or of a lake or other considerable body of water not having the character of a watercourse.

**RIPARIAN LAW** – The branch of the law which deals with the rights in land bordering on a river, lake or sea.

**RIPARIAN OWNER** – One who owns land having a boundary defined by a water course. Usage has broadened the term to include land along the sea or other tidal water, or along the shore of a lake or other considerable body of water. Strictly speaking, the correct term for lands bordering the sea, or other tidal water, is “*littoral*.” See LITTORAL.

**RIPARIAN RIGHTS** – The rights of an owner of land bordering on a river, lake, bayou, or sea which relate to the water (its use), ownership of the shore, right of ingress and egress, accretions, etc.

**RIPARIAN RIGHTS ENTRY** – An owner of contiguous land may be permitted to make such an entry of public lands when, due to erroneous meandering of a river, lake, or other body of water, public lands are shown on the original survey plat as water-covered areas.

**ROD** – One rod equals 16.5 feet or 25 links. Also termed “*perch*” or “*pole*” in older surveys.

**ROOD** – A square measure equal to ¼ acre or 40 sq. rods. The term rood was sometimes used also for a linear measure varying locally from 5½ yd. To 8 yd..

**RULE OF APPROXIMATION** – A purely administrative expedient intended to equitably decide whether an entryman could obtain patent to more than the area provided by the Preemption and Homestead laws, still maintaining the contiguity of tract entered. Where the excess is less than the deficiency would be if the smallest legal subdivision is excluded from the entry then it is allowed to stand. (See 8 LD 205). Thus, if an entryman selects surveyed lands in excess of the statutory amount, say 175 acres, the Rule would allow him to pay for and receive the excess fifteen acres under certain conditions. The principle condition is that the excess cannot exceed the deficiency which would occur if the smallest legal subdivision were disallowed. The Rule would not be applied if the entryman had made substantial improvements to the tract disallowed and the differences were small (27 LD 78). The final selection was required to be one continuous tract after application of the Rule.

If, in the sample, the selection included aliquot parts containing 40, 40.50, 65 and 29.50 acre lots totaling 175 acres, the 29.50 acre lot would be disallowed because  $40 + 40.50 + 65 = 145.50$  which is deficient by only 14.5 acres whereas the excess was 15 acres. The Rule does not apply to the mining laws except placer claims filed by legal subdivisions of 10 acres, (34 ID 9). It does not apply to claims in unsurveyed areas, (28 ID 149). See 43 CFR 2731.6-1 concerning acreage limitations and the application of the rule of approximation in the matter of small tracts. See DE MINIMIS NON CURAT LEX.

**RULE OF THALWEG** – In river boundaries, the rule which holds that where a navigable river separates two nations, the middle of the main channel is the boundary between them, as distinguished from the geographic middle of the

river, per Shalowitz. The rule of thalweg has also been applied to other boundaries where the boundary is described as being the “*middle (or center) of the main channel*” of a navigable river. See THALWEG, MEDIUM FILUM ACQUAE, GRADIENT BOUNDARY and MEDIAL LINE.

**RULE OF TIDEMARK** – A baseline for determination of coastal boundaries which follows the sinuosities of the low water mark except where true bays are encountered.

**RULES OF PRACTICE** – Certain orders made by the courts for the purpose of regulating the proceedings before them.

**RUSSIAN MEASURES** –

1 archine = 28 inches = 0.71120 meters = 16 verskops.

1 sagene = 3 archines.

500 sages = 1 verst.

1 dessiatine = 2,400 sq. sages = 2.6997 acres.

## S

**S (Land Status Records)** – South.

**SAH (Land Status Records)** – Soldier’s Additional Homestead.

**SB MER (Land Status Records)** – San Bernardino Meridian.

**SC** – South Carolina.

**SCS (Land Status Records)** – Subsistence Camp Site.

**SCS (Land Status Records)** – United States Soil Conservation Service.

**SD (Land Status Records)** – State Director.

**SD** – South Dakota.

**S. DAK.** – South Dakota.

**SDO (Land Status Records)** – State Director’s Order.

**SDS (Land Status Records)** – Soldier’s declaratory statement.

**SDW (Land Status Records)** – Stock Driveway.

**SDW WDL (Land Status Records)** – Stock driveway withdrawal.

**SE (Land Status Records)** – Southeast.

**SEC (Land Status Records)** – Section.

**SEC OF AGRI (Land Status Records)** – Secretary of Agriculture.

**SEC OF THE INT (Land Status Records)** – Secretary of the Interior.

**SEGR (Land Status Records)** – Segregate or Segregated.

**SEL (Land Status Records)** – Selection or Selected.

**SEW MER (Land Status Records)** – Seward Meridian.

**SG (Land Status Records)** – State Grant.

**SHC (Land Status Records)** – Small Holding Claim.

**SI (Land Status Records)** – Silver.

**SIM (Land Status Records)** – Simultaneous.

**SL MER (Land Status Records)** – Salt lake meridian.

**SLUP (Land Status Records)** – Special Land Use Permit.

**S&M (Land Status Records)** – Soil and moisture.

**SMC** – Special Meander Corner.

**SO** – State Office.

**SO (Land Status Records)** – Secretary’s Order.

**SOD (Land Status Records)** – Sodium.

**SPEC PER (Land Status Records)** – Special permit.

**SR (Land Status Records)** – Serial Register.

**SRHE (Land Status Records)** – Stockraising Homestead Entry.

**SS (Land Status Records)** – State Selection.

**SSE (Land Status Records)** – Subsurface Estate.

**ST (Land Status Records)** – Small Tract.

**STA (Land Status Records)** – Station.

**STAT.** – Statutes. Used in citing a reference to the United States Statutes at large, for example: 85 Stat. 688, which cites the eighty-fifth volume of the United Statutes at large, at page 688.

**ST CL (Land Status Records)** – Small tract classification.

**ST HEL MER (Land Status Records)** – St. Helena Meridian.

**ST LSE (Land Status Records)** – Small tract lease.

**STS (Land Status Records)** – Small tract sale.

**ST. STEP MER (Land Status Records)** – St. Stephens Meridian.

**SUBDIV UND (Land Status Records)** – Subdivisions undefined.

**SUBJ (Land Status Records)** – Subject.

**SUL (Land Status Records)** – Sulphur.

**SUPPL (Land Status Records)** – Supplemental.

**SUR (Land Status Records)** – Survey or Surveyed.

**SUS (Land Status Records)** – Suspended.

**SW (Land Status Records)** – Southwest.

**SX (Land Status Records)** – State Exchange.

**SALT LAKE MERIDIAN** – The principal meridian governing surveys in most of Utah; it was adopted in 1855.

**SALT MARSH** – An area of low lying, wet ground containing a high proportion of salt or alkali; generally in arid regions. See COASTAL SALT MARSH and ALKALI FLAT.

**SCALE FACTOR\***.

**SCHOOL LAND DEFICIENCY OR LOSS** – Land included in a State school-land grant which the State did not receive, because it was fractional, or claimed prior to admission, or reserved for some other purpose, is termed a loss or deficiency from the area granted. Under such circumstances, a State is entitled to a lieu selection. See SCHOOL LAND INDEMNITY SELECTION.

**SCHOOL-LAND INDEMNITY SELECTION** – A lieu selection made by a State to compensate for School Lands which it did not secure.

**SCHOOL LAND PATENT** – A patent which is issued to a State to give it additional evidence of title to a school section since title to school sections ordinarily passes to a State merely upon filing of the accepted survey of the lands. See GRANT IN PLACE and IN PRAESENTI.

**SCHOOL LANDS** – Sometimes referred to as “*school sections*” they are the lands included in a grant in place, or a grant in praesenti, to a State in support of common schools. Under the Ordinance of May 20, 1785, section 16 (called Lot 16 in the Ordinance) in each township was set aside for the maintenance of public schools. In 1850 this was changed to sections 16 and 36. In Arizona, New Mexico and Utah, sections 2, 16, 32 and 36 were granted.

**SCREE SLOPE** – A steep slope formed of rocky material with a marked tendency to creep or slide. See TALUS.

**SCRIBE** – A hand tool used by surveyors to inscribe the prescribed markings on bearing trees. See SCRIBING\*.

**SCRIP** – A certificate which allows the owner to make a selection of a specified number of acres out of available public lands.

**SEAL** – In law, a particular sign, made to attest in the most formal manner, the execution of a document or instrument.

**SECANT** – 1) A line that cuts a geometric curve or surface at two or more points. 2) A trigonometric function of an angle. See SECANT METHOD and SECANT CONE\*.

**SECANT METHOD** – A method for laying off a parallel of latitude in Public Lands surveying.

**SECOND FORM RECLAMATION WITHDRAWAL** – A reclamation withdrawal which embraces public lands that are capable of being irrigated by a reclamation project.

**SECOND PRINCIPAL MERIDIAN** – The principal meridian which governs surveys in most of Indiana and in part of Illinois. Adopted in 1805, it is abbreviated 2<sup>nd</sup> Prin. Mer.

**SECTION** – The unit of subdivision of a township with boundaries conforming to the rectangular system of surveys, nominally one mile square, containing 640 acres. See REGULAR SECTION, FRACTIONAL SECTION and IRREGULAR SECTION.

**SECTIONAL CORRECTION LINE** – A latitudinal section line run to rectify a defective latitudinal governing boundary. It is run on cardinal bearing to intersect the opposite controlling boundary where a closing corner is established. See STANDARD PARALLEL, AUXILIARY STANDARD PARALLEL and GOVERNING SECTION LINE.

**SECTIONAL GUIDE MERIDIAN** – A meridional section line run to rectify a defective meridional governing boundary. It is run on cardinal bearing to intersect the opposite controlling boundary where a closing corner is established. See GUIDE MERIDIAN, AUXILIARY GUIDE MERIDIAN and GOVERNING SECTION LINE.

**SECTION CORNER** – A corner at the extremity of a section boundary.

**SECTION, HALF** – Any two quarter sections within a section which have a common boundary; usually identified as the north half, south half, east half, or west half of a particular section.

**SECTION, QUARTER** – One of the aliquot parts of a section. Normally it is a quadrangle measuring approximately ½ mile on each side and containing approximately 160 acres.

**SECTION, QUARTER-QUARTER** – One of the aliquot parts of a quarter section. Normally it is a quadrangle measuring approximately ¼ mile on each side and containing approximately 40 acres.

**SEGREGATION SURVEY** – Definition by running survey lines on the ground which separate appropriated lands from the public lands. See MINERAL SEGREGATION SURVEY.

**SELECTION** – In general, an application to acquire title to public lands which is submitted by an applicant who acquired the right to apply for such lands by receipt of a grant, by surrender of his own lands in an exchange, by relinquishment of his rights to other lands (lieu selection), by surrender of scrip or by similar means.

**SEMITANGENT** – The distance from the point of curvature or point of tangency to the point of intersection of a highway curve.

**SENIOR CORNER** – A point established and monumented by an approved prior survey.

**SENIOR LINE** – Survey lines created at different times have different standings. The “*senior*” line would be the line which was surveyed and approved first. See SENIOR RIGHTS.

**SENIOR RIGHTS** – The rights which take precedence. The first patent issued usually takes precedence in a situation where a later survey is in conflict with an earlier survey. The first patent issued usually has the superior (senior) right or title regardless of the dates of the surveys.

**SENIOR SURVEY** – The oldest of two or more surveys which fixed the position of the line and is controlling unless officially superseded by a subsequent survey.

**SERIAL REGISTERS** – Serial registers were instituted in 1908 as a digest of land case records. BLM maintains these individual chronological records of each public land transaction. Each transaction (case) appears as a page or pages in a serial register. Each one is identified by the serial number assigned to it. A running record of each case, its inception and any actions on it, is kept in book form in the land office of each public domain land state. Serial register pages are now microfilmed for ease in retrieval of information as well as to conserve space. As cases are closed the files for them are sent to Federal records centers of the General Services Administration. Also See CONTROL DOCUMENT INDEX.

**SETTLEMENT CLAIM** – A claim to a right to make a homestead entry. Such claims are based upon actual settlement of the public lands involved. They can no longer be initiated except in Alaska.

**SEVEN RANGES, THE** – The first cadastral survey of the public lands of the United States began in July 1786, in the area immediately south of the “*Geographer’s Line*,” in southeastern Ohio. It is called “*The Seven Ranges*” because plans called for the inclusion of seven ranges of townships in the first tract of land to be offered for sale. In the survey of the seven ranges, sections are numbered from south to north in each range, with number 1 in the southeast corner of the township and number 36 in the northwest corner. See GEOGRAPHER’S LINE, THE; ORDINANCE OF MAY 20, 1785.

**SEWARD MERIDIAN** – The principal meridian governing surveys in southwestern Alaska; it was adopted in 1911.

**SHAFT** – In mining, an opening made at the surface and extending downward into the earth vertically. See DRIFT, TUNNEL and ADIT.

**SHORE** – The land which is covered and uncovered by the rise and fall of the normal tide. It is the strip of land between the mean high water and mean low water lines. In its strictest use, the term applies only to land along tidal waters. See TIDELANDS.

**SHORELINE, OCEAN (T.R. No. 4)** – The intersection of a specified plane of water with the shore or beach (e.g., the high water shore line would be the intersection of the plane of mean high water with the shore or beach). The line delineating the shore line on U.S. Coast and Geodetic Survey nautical charts and surveys approximates the mean high water line. The terms “*shoreline*” and “*coast line*” are frequently used as being synonymous. When “*shore line*” is used the user should specify what is meant, e.g., mean high water shore line, mean low water shore line, etc. See BEACH, SHORE, COAST LINE, MEAN HIGH WATER, FORESHORE, BACKSHORE, etc.

**SHORE LINE, RIVER** – The shore line is the line which is washed by the water wherever it covers the bed of the river within its banks. It lies along the bank at the mean level attained by the waters of the river when they reach and wash the bank without overflowing it.

**SHORE, OCEAN** – “*This is the most important of the four zones, and extends from the low water mark inshore to the base of the cliff (large or small), which usually marks the landward limit of effective wave action. It is the zone over which the line of contact between land and sea migrates,*” per Shalowitz. This definition of “*shore*” describes the same zone as that given by Johnson, and Technical Report No. 4, for “*Beach*.”

The legal definition of “*shore*” as defined by the U.S. Supreme Court in the case of *Borax Consolidated, Ltd. V. City of Los Angeles*, 296 U.S. 10, 22-23 (1935) is: (quote) By the civil law, the shore extends as far as the highest waves reach in winter. But by common law the shore “*is confined to the flux and reflux of the sea at ordinary*



*tides.*” It is the land “*between ordinary high and low water mark, the land over which the daily tides ebb and flow.*” (end quote)

*By those definitions the civil law (at least in California) describes the “shore” or “beach” as defined by Shalowitz, whereas the common law describes the same zone which is also legally defined as the “tidelands.” See BEACH, FORESHORE, BACKSHORE and TIDELANDS.*

**SHORE SPACE LIMITATION** – The limitation of 160 rods or 80 rods of shore space along navigable waters pertaining to certain land entries in Alaska. For provisions of determining the “*shore space*,” see 43 C.F.R. 2094.1.

**SHORE-SPACE RESERVE, ALASKA** – A reservation of public lands along navigable and certain other waters in Alaska, chiefly for harborage purposes.

**SIC** – Thus. Intentionally so written. Used after a word or passage to indicate that it is meant to be exactly as printed or to indicate that it reproduces an original even if in error as to spelling or usage.

**SIDE LINE** – Applied to a strip of land such as a lot or other tract, it defines the boundaries of that tract. Not applied to the ends of a strip. In mining law, the “*side lines*” of a claim, as platted or laid down on the ground, are those which mark its longer dimension where it follows the course of the vein. If the claim as a whole crosses the vein instead of following its course, the “*side lines*” are still the boundaries of the longer dimension, even though they cross the vein. See END LINE.

**SIGHT TREE** – Same as Line Tree, or on older surveys, Station Tree. See LINE TREE.

**SINGLE PROPORTIONATE MEASUREMENT (also called “two-way” proportion)** – A method of proportioning measurement in the restoration of a lost corner whose position is determined with reference to alinement in one direction. Examples of such corners are – quarter-section corners on the line between two section corners, all corners on standard parallels, and all intermediate positions on any township boundary line. The ordinary field problem consists of distributing the excess or deficiency between two existent corners in such a way that the amount given to each interval shall bear the same proportion to the whole difference as the record length of the interval bears to the whole distance. After having applied the proportionate difference to the record length of each interval, the sum of the several parts will equal the new measurement of the whole distance. See PROPORTIONATE MEASUREMENT and DOUBLE PROPORTIONATE MEASUREMENT.

**SITE** – A parcel of ground set apart for a specific use. The word itself does not necessarily imply definite boundaries.

**SIXTEENTH-SECTION CORNER** – Also termed “*quarter-quarter section corner.*” A corner at an extremity of a boundary of a quarter-quarter section; midpoint between or 20 chains from the controlling corners on the section or township boundaries. Written as 1/16 section corner.

**SIXTH PRINCIPAL MERIDIAN** – The last of the principal meridians to be named an ordinal number, it governs surveys in Kansas, Nebraska, most of Colorado and Wyoming and a small part of South Dakota. Adopted in 1855, it is abbreviated 6th Prin. Mer. See ORDINAL NUMBER.

**SKEW MERCATOR** – See OBLIQUE MERCATOR.

**SLOPE CHAINED** – In some of the older surveys the chaining (measuring) was done on the slope but the distances measured were not always reduced to the horizontal equivalent and the slope distance was entered in the field note record. When this systematic error is detected during a retracement cadastral surveyors refer to the line as having been “*sloped chained.*”

**SLOPE CHAINING** – The process of direct measurement of an inclined distance and vertical angle for reduction to its horizontal equivalent.

**SMALLEST LEGAL SUBDIVISION** – A quarter-quarter section or one lot. See SUBDIVISION, SMALLEST LEGAL and MINOR SUBDIVISIONS.

**SMALL-HOLDING CLAIM ENTRY** – An entry in connection with which the entryman and his predecessors-in-interest maintained continuous, adverse, actual, bona fide possession of public lands in the Southwest for at least 20 years prior to cadastral survey of the lands involved (acts of March 3, 1891, 26 Stat. 861; and June 15, 1922, 42 Stat. 650).

**SMALL TRACT** – A parcel of public lands of 5 acres or less which has been found chiefly valuable for sale or lease as a home, recreation, business, or community site under the act of June 1, 1938 (52 Stat. 609; 43 U.S.C. 682 a-c), as amended.

**SMALL TRACT ACT** – The Act of June 1, 1938 (52 Stat. 609; 43 U.S.C. 682 a-c), as amended, authorizes the Secretary of the Interior, under its terms and requirements, to lease or sell parcels (not to exceed 5 acres) of vacant, unreserved public lands, including such lands in Alaska, and public lands withdrawn under the “*General Orders of Withdrawal*,” and those lands withdrawn or reserved for any purposes by the Secretary, but which may be classified by him as being chiefly valuable for sale or lease as a home, recreation, business, or community site under conditions as set forth in the Act. See WITHDRAWAL and WITHDRAWAL, GENERAL ORDERS OF.

**SMALL-TRACT CLASSIFICATION** – Classification of public lands as being chiefly valuable for sale or lease as small tracts; also, the public lands so classified.

**SNOW BLAZE** – In regions subject to heavy snowfall it is desirable survey practices to make a small additional blaze at a height of 6 or 8 feet above the ground on tree monuments and bearing trees to attract attention to them during the winter.

**SOLAR ATTACHMENT** – An auxiliary device mounted on a surveyor’s instrument which mechanically solves the pole-zenith-sun spherical triangle. When the sun’s declination, the latitude of the station and hour angle of the sun are correctly set off on the solar attachment, the instrument on which it is mounted may readily be oriented to the astronomic meridian.  
The first solar attachment was patented by William Burt and when mounted on a surveyor’s compass it became a “*Burt Solar Compass.*” Modern solar attachments are of the telescopic type.

**SOLAR LINE** – A line run along an astronomic bearing with a solar attachment. See TACK LINE.

**SOLDIERS’ ADDITIONAL HOMESTEAD ENTRY** – A selection based on rights of Civil War veterans who had made a homestead entry for less than 160 acres to select enough public lands to make up the difference between the area of their homestead and 160 acres.

**SPECIAL DEPOSIT SURVEY** – A survey authorized by law, executed by BLM personnel but at no cost to the government, estimated costs to be deposited to BLM prior to survey. (43 U.S.C. 682b, 757-761, 887; 30 U.S.C. secs. 701 through 709; 43 C.F.R. 2215.3; BLM 2233.15A5 and A5b; 2233.15A6a and d; 2215.31c.) One example: Mining Claim Occupancy Surveys.

**SPECIAL INSTRUCTIONS** – The written statement containing the detailed specifications for every cadastral survey assignment.  
The special instructions include the basic information necessary for accomplishing the field work and are an important part of the record relating to the survey. Special instructions are usually prepared by the officer in administrative charge of the work. They are usually written in the third person and, together with the Manual and supportive data, contain the necessary specifications and information for execution of the survey. See ASSIGNMENT INSTRUCTIONS.

**SPECIAL LAND USE PERMIT** – A permit which authorizes the use of public lands for purposes not specifically authorized, or forbidden, by law.

**SPECIAL MEANDER CORNER** – A corner established at: 1) The intersection of a surveyed subdivision-of-section line and a meander line; 2) The intersection of a computed center line of a section and a meander line. In the latter case the center line of the section is calculated and surveyed on a theoretical bearing to an intersection with the meander line of a lake (over 50 acres in area) which is located entirely within a section.

**SPECIAL SURVEY** – A cadastral survey that involves unusual application of, or departure from, the rectangular system. They often carry out the provisions of a special legislative act and include such work as small tract surveys; townsite survey; island and omitted land surveys; homestead, homesite, trade and manufacturing site surveys; also the survey and resurvey of portions of sections.

**SPECIAL SURVEYS, ALASKA** – Metes and bounds surveys of areas settled upon or applied for under certain special land laws applicable to the State of Alaska. See METES-AND-BOUNDS SURVEY.

**SPHERICAL COORDINATES** - Pairs of angular values such as latitude and longitude or right ascension and declination which locates points on a sphere in reference to fixed, or defined, great circles.

**SPHEROID** – In general, any figure differing but little from a sphere. In geodesy, a mathematical figure closely approaching the geoid in form and size. See GEOID, GEODETIC SURVEY and SPHEROID\*.

**SQUATTER’S RIGHTS** – An asserted right to occupy public lands by virtue of occupancy.

**STANDARD** – In cadastral survey slang, an ordinary steel pocket tape marked in chains or feet. In earlier surveyor usage, “*standard*” referred to a standard length against which the old-style survey chain was checked for accuracy.

**STANDARD CORNER** – A senior corner on a standard parallel or base line.

**STANDARD FIELD TABLES AND TRIGONOMETRIC FORMULAS** – A supplement to the Manual of Surveying Instructions first published by the General land office in 1910. The eighth edition was published in 1956. The tables and data are designed for use by cadastral surveyors in the field and office.

**STANDARD PARALLEL** – Also called “*correction line.*” A line extended east or west from the principal meridian, usually at intervals of 24 miles north and south of the base line, along a parallel of latitude. Standard parallels are established to correct for the convergence of range lines and to maintain a workable adherence to the requirement that each township be 36 miles square. They are surveyed in the manner prescribed for the survey of the base line.

**STANDARD PARALLEL, AUXILIARY** – Where standard parallels have been placed at intervals exceeding 24 miles (under practice permissible prior to the issuance of the 1881 Manual of Surveying Instructions which specified 24 mile tracts), and conditions require additional standard lines, an intermediate correction line is established to which

may be given a local name, such as “*Fifth Auxiliary Standard parallel North*,” or “*Cedar Creek Correction Line*.” An auxiliary standard parallel is run, in all respects, like a regular standard parallel.

**STAPLE CROP** – A chief commodity or production of a place. A crop used, needed or enjoyed by many people and therefore produced regularly, or in large quantities, is a “*staple crop*.” Under the meaning of the grants of swamp and overflowed lands to various states, a “*staple crop*” may include tame grass or hay as well as the cereals, cotton or tobacco normally grown in a specific region. See SWAMP AND OVERFLOWED LANDS.

**STARE DECISIS** – To abide by, or adhere to, decided cases. It is under the policy of “*stare decisis*” that courts stand by precedent and do not disturb a settled point. It is the doctrine which states that when the court has once laid down a principle of law as applicable to certain state of facts, it will adhere to that principle and apply it to all future cases where facts are substantially the same. Also See RES JUDICATA and OBITER DICTUM.

**STATE COORDINATE SYSTEMS** – The plane-rectangular coordinate systems established by the United States Coast and Geodetic Survey, one or more for each state in the United states, used for defining positions in terms of plane-rectangular (x and y) coordinates. Also called State Plane Coordinate Systems.

**STATE DIRECTOR (BLM)** – The principal Bureau official at the State level. He is directly accountable to the Director of the Bureau of land management. Formerly called State Supervisor.

**STATE EXCHANGE** – An exchange between the Federal Government and a State. See EXCHANGE, PRIVATE EXCHANGE and TAYLOR ACT EXCHANGE.

**STATE GRANTS** – Grants of public lands were made to States for schools and other public purposes. The most common State grants are: school, swamp, tide land, land under navigable waters, and lands for internal improvements. Generally, title to State grant lands could pass only after survey of the lands. Originally, mineral lands were excluded. Also excluded were lands taken by settlers, withdrawn for public purposes or otherwise disposed of by the Government. These grants by Congress were grants which may pass title to lands without further approval or documentation by a Federal agency. See SCHOOL LAND PATENT, INDEMNITY LANDS and RAILROAD GRANT.

**STATEHOOD** – The Thirteen Original States organized the Federal Union under the name of “*The United States of America*” by ratifying the Articles of Confederation, and later, the Constitution. They are: New Hampshire, New York, Maryland, Georgia, Delaware, Massachusetts, Pennsylvania, Virginia, Connecticut, Rhode Island, New Jersey, North Carolina and South Carolina. The other states were admitted to the Union by acts of Congress (enabling acts), usually upon petition of the citizens residing in the territories in question, as follows:

Alabama – December 14, 1819 (3 Stat. 608)

Alaska – January 3, 1959 (72 Stat. 339)

Arizona – February 14, 1912 (36 Stat. 557; 37 Stat. 1728)

Arkansas – June 15, 1836 (5 Stat. 50)

California – September 9, 1850 (9 Stat. 452)

Colorado – August 1, 1876 (18 Stat. 474; 19 Stat. 665)

Florida – March 3, 1845 (5 Stat. 742)

Hawaii – August 21, 1959 (73 Stat. 4)

Idaho – July 3, 1890 (26 Stat. 215)

Illinois – December 3, 1818 (3 Stat. 536)

Indiana – December 11, 1816 (3 Stat. 399)

Iowa – December 28, 1846 (9 Stat. 117)

Kansas – January 29, 1861 (12 Stat. 126)

Kentucky – June 1, 1792 (1 Stat. 189)

Louisiana – April 30, 1812 (2 Stat. 701)

Maine – March 15, 1820 (3 Stat. L. 544)

Michigan – January 26, 1837 (5 Stat. 144)

Minnesota – May 11, 1858 (11 Stat. 285)

Mississippi – December 10, 1817 (3 Stat. 472)

Missouri – August 10, 1821 (3 stat. 645, 3 stat. Appendix II)

Montana – November 8, 1889 (25 Stat. 676; 26 Stat. 1551)

Nebraska – March 1, 1867 (14 Stat. 391, 820)

Nevada – October 13, 1864 (13 Stat. 30, 749)

New Mexico – January 6, 1912 (36 Stat. 557; 37 Stat. 1723)

North Dakota – November 2, 1889 (25 Stat. 676; 26 Stat. 1548)

Oklahoma – November 16, 1907 (34 Stat. 267; 35 Stat. 2160)

Ohio – Feb. 19, 1903 (2 Stat. 201)

Oregon – February 14, 1859 (11 Stat. 383)  
South Dakota – November 2, 1889 (25 Stat. 676; 26 Stat. 1549)  
Tennessee – June 1, 1796 (1 Stat. L. 491)  
Texas – December 25, 1845 (9 Stat. L. 108)  
Utah – January 4, 1896 (28 Stat. 107; 29 Stat. 876)  
Vermont – March 4, 1791 (1 Stat. L. 191)  
Washington – November 11, 1889 (25 Stat. 676; 26 Stat. 1552)  
West Virginia – June 19, 1863 (13 Stat. L. 731)  
Wisconsin – May 29, 1848 (9 Stat. 233)  
Wyoming – July 10, 1890 (26 Stat. 222).

**STATE PLANE COORDINATE SYSTEMS** – The plane-rectangular coordinate systems established by the U.S. Coast and Geodetic Survey, one for each State in the Union, certain territories and the Commonwealth of Puerto Rico, used for defining positions of geodetic stations in terms of plane-rectangular (x and y) coordinates. The two principal systems in use in the United States are the Lambert Conformal Conic map projection and the Transverse Mercator map projection. See **OBLIQUE MERCATOR PROJECTION**.

**STATE SELECTION** – An application to acquire title submitted by a state. See **STATE SELECTION SURVEY**.

**STATE SELECTION LANDS, ALASKA** – The enabling act admitting Alaska as a State provides that, within 25 years after statehood, Alaska is granted and entitled to select 103,350,000 acres (161,484 square miles) of vacant and unappropriated public land.

**STATE SELECTION SURVEY** – The survey providing limited monumentation of the township boundaries of lands selected by the State of Alaska.

**STATES EXEMPT FROM FEDERAL MINING LAW** – States whose land never belonged to the United States, and states specifically exempted from the Federal mining laws, are not open to location under Federal laws. These states are Virginia, North Carolina, South Carolina, Pennsylvania, Rhode Island, New York, New Hampshire, New Jersey, Massachusetts, Maryland, Georgia, Delaware, Connecticut, Maine, Vermont, Kentucky, Alabama, Kansas, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, Oklahoma, Wisconsin, Texas and Hawaii. See **LANDS OPEN TO MINERAL LOCATION**.

**STATE SUPERVISOR** – Former title of the officer in charge of a State Office of the Bureau of Land Management. Now called “*State Director*.”

**STATUS DIAGRAM** – A diagram prepared from a Master Title Plat and Historical Index. A status diagram showing the public domain lands usually accompanies the special instructions for each survey.

**STATUS OF PUBLIC LANDS** – The information with respect to any particular parcel or tract of public land; its legal description; whether surveyed or unsurveyed; the non-federal rights or privileges, if any; which attach to it or its resources; whether classified as mineral lands; withdrawals or special laws, if any, which apply to it; and any other pertinent information which may influence the operation of the public-land laws so far as its use or disposal is concerned.

**STATUTES AT LARGE** – See **UNITED STATES STATUTES AT LARGE**.

**ST. HELENA MERIDIAN** – The principal meridian governing surveys in the southeastern part of Louisiana; it was adopted in 1819.

**STICK** – A measurement term used in some field notes and deeds in the early 1800’s, a stick is ½ chain or 2 poles (rods). It is the point where, in the use under Tiffin’s 1815 instructions of “*a two poles chain of 50 links*,” a chain man called out “*stick*” to be replied with “*stuck*.” See **OUT**, **POLE**, **PERCH**, **ROOD** and **TALLY**.

**STOCKRAISING HOMESTEAD ENTRY** – An entry of public lands, classified as being chiefly valuable for grazing and the growing of forage crops, under the provisions of the Stockraising Homestead Act of December 29, 1916. The provisions for such homesteads were, by implication, repealed by the Taylor Grazing Act.

**STONE BOUND** – A substantial stone post set into the ground with its top end approximately flush with the ground surface. Used to mark accurately and permanently the important corners of a land survey.

**STOPE** – An underground excavation in which ore is mined, usually by working from below.

**STRADDLE STAKES** – In determining the point of intersection of two lines, stakes are usually lined in on both sides of the point of intersection. Since they straddle the point, surveyors call them “*straddle stakes*.”

**STRAIGHT BASE LINE** – A system for placement of the line that divides the inland waters from the marginal sea in which straight lines connect salient points on outermost limits and fringe islands. See **BASELINE**.

**STREET** – Any public thoroughfare (street, avenue, boulevard, or park) or space more than 20 ft wide which has been dedicated or deeded to the public for public use.

**STREET LINE** – A lot line dividing a lot or other area from a street; or more specifically, the side or end boundary of a street, defined by the instrument creating that street as having a stated width.

**STRIKE** – In geology and mining, the direction of a line formed by the intersection of a stratum with a horizontal plane.

**STRONG BEARING** – A survey slang term for a bearing which departs markedly from cardinal. A bearing of 2 or more degrees from cardinal may be considered a “*strong*” bearing. “*Heavy bearing*” is used synonymously.

**ST. STEPHENS MERIDIAN** – The principal meridian governing surveys in southern Alabama and south eastern Mississippi; it was adopted in 1805.

**SUBDIVISION** – (verb) 1) Subdivision of a township into sections. 2) Subdivision of a section into half-sections, quarter-sections, sixteenth-sections or sixty-fourth-sections, or into lots, according to the Manual of Surveying Instructions. 3) The process of surveying such subdivisions. 4) In the private practice of land survey, subdivision is the division of an area into lots, streets, rights-of-way, easements and accessories, usually according to State law and local regulations – (noun) A particular aliquot part, lot, or parcel of land described according to the official plat of its cadastral survey. See SUBDIVISION, SMALLEST LEGAL, URBAN SUBDIVISION and MINOR SUBDIVISION.

**SUBDIVISION-OF-SECTION SURVEY** – A survey which subdivides a previously surveyed section into the required aliquot parts or lots, using methods which are legally prescribed. See REGULAR SECTION SUBDIVISION.

**SUBDIVISION, SMALLEST LEGAL** – For general purposes under the public-land laws, a quarter-quarter section or one lot. Under certain of these laws and under special conditions, applicants, claimants, etc., can select subdivisions smaller than a quarter-quarter section or lot. See MINOR SUBDIVISIONS and ALIQUOT PARTS.

**SUBJECT TO SURVEY** – Open to public land survey. See LANDS SUBJECT TO SURVEY.

**SUBMERGED LANDS ACT** – Also called Public Law 31. The act passed during the 1st session of the 83rd Congress and signed into law may 22, 1953. Confirms and establishes the titles of the states to lands beneath navigable water within their boundaries and to the natural resources within such lands and water. The act also establishes jurisdiction and control of the United States over the natural resources of the seabed on the continental shelf seaward of state boundaries. See CONTINENTAL SHELF, OUTER CONTINENTAL SHELF, and OUTER CONTINENTAL SHELF LANDS ACT.

**SUPPLEMENTAL MASTER TITLE PLAT** – An extension of the Master Title Plat, it depicts a congested section, or sections, within a township, drawn to a scale larger than the master title plat in order to adequately show land status in the area. See MASTER TITLE PLAT and USE PLAT.

**SUPPLEMENTAL PATENT** – A patent issued to modify one previously issued, such as a patent issued without a mineral reservation clause, covering coal, to supersede in whole or in part a patent which had been issued with coal reserved to the United States. In the above described case, the patent would be referred to as a “*supplemental non-coal patent.*”

**SUPPLEMENTAL PLAT** – A plat prepared entirely from office records designed to show a revised subdivision of one or more sections without change in the section boundaries and without other modification of the record. Supplemental plats are required where the plat fails to provide units suitable for administration or disposal, or where a modification of its showing is necessary. They are also required to show the segregation of alienated lands from public lands, where the former are included in irregular surveys of patented mineral or other private claims made subsequent to the plat of the subsisting survey, or where the segregation of the claims was overlooked at the time of its approval. In the past, Supplemental Plats were called “*diagrams*” or “*MAPS.*” See PLAT, MASTER TITLE PLAT, USE PLAT and STATUS DIAGRAM.

**SUPRA** – Above. When used in text it refers to matter in a previous part of the publication. See INFRA and OP. CIT. SUPRA.

**SUPREME COURT OF THE UNITED STATES** – The highest court in the land. The court of last resort in the federal and state judiciaries. Its jurisdiction is essentially appellate, but it has irrevocable original jurisdiction in cases affecting ambassadors, public ministers and consuls or in cases in which a state is a party. The court is composed of a Chief Justice and eight Associate Justices. See UNITED STATES DISTRICT COURTS and UNITED STATES COURTS OF APPEALS.

**SURFACE RIGHTS** – All rights in the land excepting the oil, gas and mineral rights to underground deposits.

**SURVEY** – 1) The plat and the field-note record of the observations, measurements, and monuments descriptive of the work performed. Occasionally used as implying that the official plat is “*The Survey.*” Commonly, any survey but, specifically, an original survey. 2) The process of recording observations, making measurements, and marking the boundaries of tracts of lands. See RESURVEY and SURVEY\*.

**SURVEYING INSTRUCTIONS** – Various regions of the United States have been surveyed under amended or differing instructions from the passage of the first Land Ordinance to the present. The Ordinance of May 20, 1785, gave explicit cadastral survey instructions which were to be carried out under the personal supervision of the

Geographer of the United States, Thomas Hutchins. His successor, Rufus Putnam, was given the title “*Surveyor General of the Northwest Territory*” under the terms of the Act of May 18, 1796. He wrote letters of instruction to deputy surveyors as did his successors, Jared Mansfield and Josiah Meigs. In 1815, Edward Tiffin, who succeeded Meigs as Surveyor General of Territories east of the Mississippi, issued the first signed and dated general instructions for the guidance of deputy surveyors, though they were partially based on an unsigned, undated manuscript prepared earlier by Mansfield. Other printed circulars followed.

In 1851, a Manual of Instructions was issued to the Surveyor General of Oregon. After that came the Manual of 1855, the Manual of 1871 (a copy of the 1855 manual), the Manual of 1881, the Manual of 1890, the Manual of 1894 and the Manual of 1902. In 1919, a part of the Manual of 1930 was published, then the Manual of 1930 and the Manual of 1947. The Manual of Surveying Instructions for the Survey of the Public Lands of the United States, 1973, is the current manual of surveying instructions.

**SURVEYING, LAND** – The determination of boundaries and areas of tracts of land. Land boundaries are usually defined by ownership, commencing with the earliest owners through successive ownerships and partitions. Land surveying includes the re-establishment of original boundaries and the establishment of such new boundaries as may be required in the partition of the land. See CADASTRAL SURVEY.

**SURVEYOR GENERAL** – Prior to 1925, an officer in charge of the survey of the public lands. The Act of May 18, 1796, abolished the office of the Geographer of the United States and provided for the appointment of a Surveyor General. President George Washington appointed Rufus Putnam Surveyor General of the Northwest Territory under the terms of this act. See ACT OF MAY 18, 1796, GEOGRAPHER OF THE UNITED STATES, UNITED STATES SUPERVISOR OF SURVEYS and CHIEF, DIVISION OF CADASTRAL SURVEYS.

**SURVEY, ORIGINAL** – See ORIGINAL SURVEY.

**SUSPENDED APPLICATION OR ENTRY** – An application or entry upon which adverse action by the Bureau of Land Management has been deferred.

**SUSPENDED SURVEY** – Also called suspended plat. When question or doubt arises concerning an accepted survey, all actions related to the area covered may be held in abeyance until the matter is resolved. The survey may be corrected, reinstated or cancelled, either in whole or in part, but no action based on the plat may be initiated or completed while the survey is suspended. See CANCELLATION.

**SWAMP** – 1) Low lying land saturated with moisture and overgrown with vegetation but not covered with water. 2) Land at elevations below the upland such as would be wet and unfit for agriculture without construction of artificial drainage. See MARSH, SALT MARSH and SWAMP AND OVERFLOWED LANDS.

**SWAMP AND OVERFLOWED LANDS** – Any quarter-quarter section or lot the greater part of which was so swampy or subject to overflow during the planting, growing or harvesting season, in the majority of years at or near the date of the grant of such lands, as to be unfit for cultivation in any staple crop of the region in which it is located without the provisions of some artificial means of reclamation. In common usage “*swamp*” and “*overflowed*” lands are regarded as synonymous. See SWAMP-LAND GRANT, LOUISIANA SWAMP LAND ACT OF 1849, SWAMP LANDS ACT OF 1850, SWAMP LANDS ACT OF 1860, STAPLE CROP, TIDELANDS, MARSH and SALT MARSH.

**SWAMP-LAND GRANT** – A State grant consisting of public lands deemed swampy and unfit for cultivation. The lands were granted to enable the various states receiving them to aid in their reclamation. See SWAMP AND OVERFLOWED LANDS, LOUISIANA SWAMP LAND ACT OF 1849, SWAMP LANDS ACT OF 1850, SWAMP LANDS ACT OF 1860 and IN PRAESENTI.

**SWAMP LANDS ACT OF 1850** – The Act of September 28, 1850 (9 Stat. 519), extended the Louisiana Swamp Land Act to the other public-land States then in the Union. See LOUISIANA SWAMP LAND ACT and SWAMP LANDS ACT OF 1860.

**SWAMP LANDS ACT OF 1860** – This March 12, 1860 Act (12 Stat. 3) extended the Swamp Lands Act to the States of Minnesota and Oregon. The various swamp-land grants were carried over into R.S. sec. 2479 (43 U.S.C.A. sec. 982). For a notable exception to the swamp-land laws, see ARKANSAS COMPROMISE ACT. See LOUISIANA SWAMP LAND ACT OF 1849 and SWAMP LANDS ACT OF 1850.

## T

**T (Land Status Records)** – Township.

**TA (Land Status Records)** – Tentative Approval.

**TALL MER (Land Status Records)** – Tallahasee Meridian.

**TC (Land Status Records)** – Timber culture.

**TCP (Land Status Records)** – Timber Cutting Permit.

**TEL (Land Status Records)** – Telephone.

**TELEG (Land Status Records)** – Telegraph.

**TEMP (Land Status Records)** – Temporary.

**TERM (Land Status Records)** – Terminate, Termination.

**T&M (Land Status Records)** – Trade and Manufacturing.

**TMB (Land Status Records)** – Timber.

**T & M SITE** – Trade and Manufacturing Site.

**TN** – Tennessee.

**TNS (Land Status Records)** – Townsite.

**TP (Land Status Records)** – Township.

**TR (Land Status Records)** – TRACT.

**TRANS (Land Status Records)** – Transmission.

**TRF (Land Status Records)** – Transfer.

**TRFD (Land Status Records)** – Transferred.

**TRF JURIS (Land Status Records)** – Transfer of Jurisdiction.

**TRI STA (Land Status Records)** – Triangulation Station.

**TRSP (Land Status Records)** – Trespass.

**T/S (Land Status Records)** – Timber and Stone.

**TS** – Town site. The permanent monuments placed at each turning point of town-site boundary lines are marked not only with the usual subdivisional information, but also with the capital-letter initials of the town-site name followed by TS.

**TX** – Texas.

**TACK LINE** – A straight line projected from point (tack) to point as opposed to a solar line run along an astronomic bearing with a solar attachment.

**TALLAHASSEE MERIDIAN** – The principal meridian governing surveys in Florida and in a small part of Alabama; it was adopted in 1824.

**TALLY** – 1) Five chains as measured with a two pole chain. 2) A method of keeping track of count.

**TALLY PIN** – A chaining pin.

**TALUS** – A slope. Especially a steep slope formed by an accumulation of rock debris. See CONTINENTAL TALUS, SCREE SLOPE.

**TALWEG** – See THALWEG and RULE OF THALWEG.

**TANGENT** – 1) A straight line that touches a given curve at only one point and does not intersect it. 2) In the public lands surveys, a straight line, tangent to a parallel of latitude, usually at a township corner. 3) That part of a traverse of alinement included between the point of tangency (P.T.) of one curve and the point of curvature (P.C.) of the next curve. 4) A trigonometric function of an angle. See TANGENT SCREW\*.

**TAYLOR ACT EXCHANGE** – An exchange consummated under the provisions of section 8 of the Taylor Grazing Act. See EXCHANGE, PRIVATE EXCHANGE and STATE EXCHANGE.

**TAYLOR GRAZING ACT** – Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. sec. 315), as amended. See GRAZING SERVICE.

**TENEMENT** – In its original, proper and legal sense, “*tenement*” signifies everything that may be held, if it is a permanent nature, whether it is corporeal or incorporeal. Though often applied to houses and other buildings or to lands, it is also applicable to offices, rents, franchises and so forth. See CORPOREAL, INCORPOREAL and HEREDITAMENT.

**TERRITORY (methods of acquisition)** – The United States has acquired territory principally by the following three methods:

1. by treaty
2. by joint resolution of the two houses of Congress
3. by statute.

**TERRITORY** – In American law, a portion of the United States, not within the limits of any state, which has not yet been admitted as a state of the Union, but is organized with a separate legislature, and with executive and judicial officers appointed by the president.

**TERRITORY NORTHWEST OF THE OHIO RIVER** – The Territory bounded on the west by the Mississippi River and a line running north from its source to the international boundary, on the north by the boundary line between the United States and the British possessions, on the east by the Pennsylvania and New York State lines, and on the south by the Ohio River. It was made up of claims of Virginia, Connecticut and Massachusetts, and comprised an area of approximately 278,000 square miles. From this territory the states of Ohio, Indiana, Illinois, Michigan and

Wisconsin were formed. It also included that part of Minnesota which lies east of the Mississippi River and the northwest corner of Pennsylvania.

**TESTIMONY** – Evidence given by a competent witness, under oath or affirmation; as distinguished from evidence derived from writings and other sources. The words “*testimony*” and “*evidence*” are not synonymous. See EVIDENCE and WITNESS, EXPERT.

**TEXAS ACCESSION** – The Republic of Texas was admitted as a State in 1845, but retained title to all unoccupied lands. Thus, Texas was not a public-land State. Part of this territory was, however, purchased by the United States in 1850, and is now included in the States of Kansas, Colorado, New Mexico, Oklahoma and Wyoming. This purchase added approximately 75 million acres of public lands to the United States.

**THALWEG** - The “*downway*,” meaning the course taken by boats going downstream in a river. The line following the lowest part of a valley, whether under water or not. The intricacy of detail in ordinary relief often makes difficult a practical location of a thalweg; in a survey of a political boundary line this difficulty may assume considerable weight. A thalweg may also be defined as the line down the center of the main channel of a stream or as the line of greatest slope, cutting all contours at right angles. See THREAD OF THE STREAM and RULE OF THALWEG.

**THENCE** – In surveying and in metes and bounds descriptions, the term designates that the course and distance given thereafter is a continuation from the course and distance given before.

**THENCE DOWN THE RIVER** – This phrase, as used in a surveyor’s field notes, is construed to mean “*with the meanders of the river.*”

**THEODOLITE** – A precision surveying instrument for measuring horizontal and vertical angles. The graduated circles are usually read by means of optical microscopes and are more precisely graduated than are the circles on a transit. See TRANSIT.

**THEORETICAL CORNER\***.

**THIRD PRINCIPAL MERIDIAN** – The principal meridian, adopted in 1805, which governs surveys in a large part of Illinois. It is abbreviated 3rd Prin. Mer.

**THIRTEEN ORIGINAL COLONIES** – See THIRTEEN ORIGINAL STATES.

**THIRTEEN ORIGINAL STATES** – The Thirteen Original Colonies, upon revolt from the British Crown, became sovereign, independent states. They are: New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina and Georgia.

**THREAD OF THE STREAM** – Though the courts do not always agree on definitions, the great weight of authority is to the effect that the thread of the stream is the center of the main channel thereof. If there are two prominent channels, the thread of the stream is the center of the channel used for navigation. See THALWEG and MEDIUM FILUM ACQUAE.

**THROW** – In mining, the vertical distance between the parts of a vein which have been separated by a fault, measured at right angles to the strike of the fault. A horizontal fault can have no *throw*, and a vertical fault can have no *heave*. See HEAVE.

**TIDAL CURRENT** – A horizontal movement of the water caused by gravitational interactions between the sun, moon and earth. See TIDE.

**TIDAL DATUM** – A reference for leveling defined by tidal phase observation and measurements. Mean sea level is usually used as the datum for elevations. Mean high water, mean low water and similar terms are tidal datums.

**TIDE** – The periodic rising and falling of the water that results from the gravitational attraction of the moon and sun acting upon the rotating earth. See TIDAL CURRENT.

**TIDE, EBB** – The movement of the tidal current away from the shore or down a tidal stream. The correct technical term is “*Ebb Current.*”

**TIDE, FLOOD** – The movement of a tidal current toward the shore or up a tidal stream. The correct technical term is “*Flood Current.*”

**TIDELANDS** – Coastal areas situated above mean low tide and below mean high tide, particularly the areas alternately covered and uncovered by the daily tides. As part of the bed of navigable waters, such lands belong to the states by right of sovereignty. Tidelands, including coastal “*salt marshes*” are not subject to survey. In contrast, coastal marshes not covered by daily tides are “*swamp and overflowed lands*” within the meaning of the various “*Swamp Lands Acts,*” and are subject to survey. See NAVIGABLE WATERS, LOUISIANA SWAMP LANDS ACT OF 1849, SWAMP LANDS ACT OF 1850, SWAMP LANDS ACT OF 1860 and SWAMP AND OVERFLOWED LANDS.

**TIDE, NEAP** – See NEAP TIDES.

**TIE** – A survey connection to an existing station or corner of the Public Lands from a point whose position is desired to be referenced.



**TIE IN** – 1) To make a connection to a previously determined point. 2) To connect corner accessories, topographic and cultural features to the survey.

**TIE POINT** – The point to which a survey connection is made.

**TIER (United States public land surveys)** – Any series of contiguous townships situated east and west of each other; also, sections similarly situated within a township.

**TIMBER AND STONE ACT** – An 1878 act which authorized the negotiated sale of public lands especially valuable for either timber or stone, and otherwise unfit for cultivation. The Timber and Stone Act was repealed in 1955.

**TIMBER AND STONE ENTRY** – An entry of public lands valuable for timber and stone made under laws now repealed. See **TIMBER AND STONE ACT**.

**TIMBER CULTURE ACT** – In 1873 Congress passed an act to encourage the growth of timber on the western prairies. It provided for the entry of public lands if the entryman planted and cultivated trees on a specified part of the land. The law was repealed in 1891.

**TITLE** – In real property law, title is a means whereby the owner of lands has the just possession of his property.

**TITLE 43** – Refers to Title 43 (Public lands) of the United States Code (U.S.C.), or to Title 43 (Public Lands: Interior) of the Code of Federal Regulations (C.F.R.).

**TOPOGRAPHY** – Collective or individual features both natural and cultural, improvements, significant changes in character of land and relief which are tied to a point on the survey line or are intersected by it. See **TOPOGRAPHY\***.

**TORRENS REGISTRATION SYSTEM** – The basic principle of the system is the registration of the title to the land, instead of recording the evidence of such title.

**TOWN LOT** – A subdivision of a townsite or of an urban subdivision.

**TOWN LOT ENTRY** – A cash entry of a town lot within a townsite. See **TOWNSITE**.

**TOWNSHIP** – The unit of survey of the public lands; normally a quadrangle approximately 6 miles on a side with boundaries conforming to meridians and parallels within established limits, containing thirty-six sections, some of which are designed to correct for the convergence of meridians or range lines. See **FRACTIONAL TOWNSHIP**.

**TOWNSHIP CORNER** – A corner of a township. See **CLOSING TOWNSHIP CORNER**.

**TOWNSHIP LINES** – The township boundaries that run north and south are termed “*range lines*,” with few exceptions the range lines are run on cardinal and have been intended to be on cardinal. The boundaries running east and west are termed “*township lines*.” By law, they were intended to be on true parallels of latitude.

**TOWNSHIP PLAT** – See **PLAT**.

**TOWNSITE** – An area of public lands which has been segregated for disposal as an urban development, often subdivided into blocks, which are further subdivided into town lots.

**TOWNSITE ENTRY** – A cash entry of a townsite.

**TOWNSITE RESERVE** – A reservation of public lands which have potential value as a townsite. See **MUNICIPAL RESERVES**.

**TOWNSITE SURVEY** – A survey of street and lot boundaries executed to segregate from the public lands an area qualifying under the townsite laws.

**TRACT** – Generally, a metes and bounds survey of an area at large within a township. In modern public land surveys the term is used specifically to mean a parcel of land that lies in more than one section or that cannot be identified completely as a part of a particular section. Tract numbers begin with the next higher number of the numerical designation within a township, for example: if there is an old numbers are sequential and no number is repeated within a township, for example; if there is an old Mineral Lot No. 37, the tract would be Tract No. 38. If a tract falls across a township line it is given a separate number in each township. See **LOT**.

**TRACT BOOK** – Starting about 1800, tract books designed primarily for the maintenance of permanent records of all transactions involving public domain lands were created and maintained in local land offices. Tract books were the companion records to the land office “*status plat*.” Prior to the beginning of the records improvement program in 1955, these records constituted the records required in accordance with 43 C.F.R. 1813.1-1. Over the years, many of the tract books became worn and mutilated making status difficult to determine. To protect these books from further damage and to preserve the information they contain, these records are now microfilmed. As this is done, the tract books are transferred to the appropriate Federal records center as part of the National Archives. See **LAND OFFICE STATUS PLAT**, **HISTORIC INDEX**, **MASTER TITLE PLAT** and **USE PLAT**.

**TRADE AND MANUFACTURING SITE (Alaska)** – Section 10 of the Act of May 14, 1898, as amended August 23, 1958, authorizes, under its terms and provisions, the sale of not more than 80 acres of land in Alaska possessed and occupied in good faith as a trade and manufacturing site.

**TRADE-AND-MANUFACTURING-SITE ENTRY** – A cash entry of 80 acres or less in Alaska which are used as a trade or manufacturing site.

**TRANSIT** – A repeating surveying instrument for measuring horizontal and vertical angles. The graduated circles are usually not graduated as precisely as are those on a theodolite. See THEODOLITE.

**TRANSPORTATION ACT OF 1940** – Act of September 18, 1940 (54 Stat. 954). See RELEASED RAILROAD CLAIMS.

**TRANSVERSE MERCATOR MAP PROJECTION** – A conformal map plotting system in which points on the ellipsoid are mathematically projected onto a cylinder whose axis is oriented 90° (transverse) to the axis of the ellipsoid. The cylinder surface may meet the ellipsoid at the map center or it may cut below the surface (secant) creating two parallels where the scale is exact. The secant form of this projection is the basis of State Plane Coordinate Systems where the zone extends north-south more than east-west.

**TRAVERSE** – In surveying, a sequence of lengths and directions of lines between points on the earth, obtained by field measurements and used to determine the positions of the points through use of trigonometric computations.

**TREATY OF GHENT, 1814** – By the treaty of peace concluded at Ghent (Belgium) on December 24, 1814, it was agreed to provide for a final adjustment of the boundaries described in the Treaty of 1783 that had not yet been ascertained and determined, embracing certain islands in the Bay of Fundy and the whole of the boundary line from the source of the River St. Croix to the most northwestern point of the Lake of the Woods.

**TREATY OF GUADALUPE HILDAGO** – The peace treaty signed Feb. 2, 1848, at the close of the Mexican War, and proclaimed July 4, 1848. See MEXICAN CESSION.

**TREATY WITH GREAT BRITAIN, 1782** – The original limits of the United States were first definitely described in the provisional treaty concluded with Great Britain on November 30, 1782.

**TREATY WITH GREAT BRITAIN, 1783** – The definite treaty of peace with Great Britain concluded on September 3, 1783, defines the boundaries of the United States in terms similar to those of the provisional treaty. The northern boundary became at once a fruitful source of dissension between the two countries. From the time of the conclusion of peace almost to the present day (1954) the definite location of this line has been subject to a series of treaties, commissions, and surveys.

**TREATY WITH SPAIN, 1795** – The southern boundary of the United States was described in definite terms by the treaties with Great Britain of 1782 and 1783, but its location was not accepted by Spain and was disputed by that country until settled by the treaty concluded on October 27, 1795.

**TREATY WITH SPAIN, 1819** – The treaty of February 22, 1819, settled conflicting claims between the United States and Spain concerning East and West Florida. The third article of the treaty defines the boundary between the United States and the Spanish possessions in the Southwest. The western boundary of the United States south of the 42nd parallel, as fixed by this treaty, was confirmed by treaty with Mexico on January 12, 1828, since by that time Mexico had gained independence from Spain.

**TRESPASS** – An unlawful act causing injury to rights or property of another. As used in BLM, an unauthorized use of federal lands or resources.

**TRIANGULATION STATION** – A marked and/or described point whose position has been determined by triangulation. The usage has broadened to include any precise control station.

**TRUE** – 1) The correct value, as distinguished from an assumed value or approximate value. 2) An adjective applied to bearings indicating astronomic or geodetic values. See TRUE LINE.

**TRUE LINE** – A line of constant bearing (Rhumb Line) between two corners of a survey.

**TRUSTEE DEED** – A deed which is issued by the trustee in connection with the sale in Alaska of a town lot in a trustee town site.

**TRUSTEE TOWN SITE, Alaska** – An area of public land in Alaska which has been segregated for disposal as an urban development, the town lots which are sold by a trustee appointed by the Secretary of Interior.

**TRUST PATENT** – See PATENT, TRUST.

**TRUST TERRITORY OF THE PACIFIC ISLANDS** – Islands in the western Pacific; the Caroline, Marshall and Mariana (except Guam) Groups. Formerly under Japanese mandate, they were placed under the administration of the United States Department of the Interior through an agreement with the United Nations following World War II.

**T-SHEET** – A topographic map or chart prepared by the former Coast and Geodetic Survey, and now by the National Ocean Survey, including the manuscript copy. The topographic map is identified with a number, prefixed with the letter T, such as T-5542. As now prepared they are prefixed “TP” (topographic-photogrammetric). The term “T-Sheet” is an inhouse expression to denote such maps and charts.

**TUNNEL** – In mining, a lateral or horizontal passage underground intended to reach the vein or mineral deposit, where a drift may begin. See DRIFT, SHAFT and ADIT.

**TUNNEL LOCATIONS** – Tunnel sites are acquired in accordance with local rules and customs, but may not exceed 3000 feet as imposed by Federal law. When a lode is discovered within a tunnel, the owner is called upon to make a

surface location of the vein or lode as required by law. Discontinuing operations for 6 months constitutes abandonment of all right to the veins along the line of the tunnel.

**TURNING POINT** – In meandering, or in any irregular survey, “*turning point*” is synonymous with “*angle point*.” In leveling, however, “*turning point*” refers to an intermediate point of known elevation in a level circuit.

**TWENTY-FOUR-MILE TRACTS** – The largest unit in the rectangular system of surveys. Each area controlled by a principal meridian and a base line is divided into tracts by means of standard parallels or correction lines (true parallels of latitude) located at intervals of 24 miles to the north and south of the base line and by means of guide meridians (true meridians) spaced at intervals of 24 miles east and west of the principal meridian. Because of the convergence of the meridians, the distance between the guide meridians is 24 miles only at the starting points; at all other points, the distance is less by the amount of the convergence. Twenty-four-mile tracts were first specified in the 1881 Manual of Surveying Instructions.

## U

**UA (Land Status Records)** – Unit Agreement.

**UINTAH SPEC MER (Land Status Records)** – Uintah Special Meridian.

**UNAPPROP (Land Status Records)** – Unappropriated.

**UNDET (Land Status Records)** – Undermined.

**UNGD (Land Status Records)** – Underground.

**UNSUR (Land Status Records)** – Unsurveyed.

**UR (Land Status Records)** – Uranium.

**USAF (Land Status Records)** – United States Air Force.

**USC (Land Status Records)** – United States Code.

**U.S.C.A.** – United States Code Annotated.

**USC & GS** – United States Coast and Geodetic Survey.

**USC SUPP** – Supplement to U.S. Code.

**USDA** – United States Department of Agriculture.

**USFS** – United States Forest Service.

**USGS (Land Status Records)** – United States Geological Survey.

**USLM** – United States Location Monument.

**USMM** – United States Mineral Monument. The term was formerly used when a monument was established in connection with a mineral survey; it is seen in older field notes and on monuments established prior to its discontinuation, though the preferred term is now Location Monument. See LOCATION MONUMENT, USLM.

**USMS** – United States Mineral Survey.

**USS (Land Status Records)** – United States Survey.

**U.S.ST. at L.** – United States Statutes at Large. Also sometimes U.S. Stats.

**UT** – Utah.

**UTE MER (Land Status Records)** – Ute Meridian.

**UTM** – Universal Transverse Mercator.

**UNAPPROPRIATED PUBLIC LANDS** – See VACANT AND UNAPPROPRIATED PUBLIC DOMAIN LANDS.

**UNAPPROVED SURVEY** – A cadastral survey which has not, for whatever reason, reached the status of an accepted survey. See ACCEPTED SURVEY.

**UINTAH SPECIAL MERIDIAN** – The Uintah Meridian governs surveys in a small part of Utah. It was adopted in 1875.

**UMIAT MERIDIAN** – The principal meridian governing surveys in the northern part of Alaska. It was adopted in 1956.

**UNITED STATES CODE** – A compilation, under 50 subjects, or titles, of the general and permanent laws of the United States in force as of an indicated date. Most of the statutes governing the operations of the Bureau of Land Management appear in Title 43, “*Public Lands*,” and title 30, “*Mineral Lands and Mining*.” Many laws relating to Alaska are found in Title 48, “*Territories and Insular Possessions*.”

**UNITED STATES COURTS OF APPEALS** – Sometimes U.S. Circuit Courts of Appeals. The middle level of the federal judicial hierarchy. There is one such court in each of the 11 judicial circuits into which the United States is divided. As the name indicates, the jurisdiction is exclusively appellate; they have no original jurisdiction. In cases where a court of appeals has held a State statute invalid because of repugnancy to the Constitution or a law or treaty of the United States, an appeal may be taken to the Supreme Court. In all other cases its decisions are final except as

they may be reviewed by the Supreme Court at the latter's discretion. See UNITED STATES DISTRICT COURTS and SUPREME COURT OF THE UNITED STATES.

**UNITED STATES DISTRICT COURTS** – The lowest level of the federal judicial hierarchy, whose jurisdiction may include a whole state or only part of it. No “*district*” crosses state boundaries. These are the only Federal courts where juries are used. They have no appellate jurisdiction; District courts have original jurisdiction of civil cases at common law, in equity, in admiralty, in the enforcement of Acts of Congress and of all prosecutions for crime recognized under the authority of the United States. See UNITED STATES COURTS OF APPEALS and SUPREME COURT OF THE UNITED STATES.

**UNITED STATES LOCATION MONUMENT** – When a U.S. Survey or a Mineral Survey is situated in an area where there are no corners of the public land surveys and no other monuments within two miles, a “*location monument*” is established for permanent reference of the surveys in that vicinity. Similar monuments were formerly designated United States Mineral Monuments.

**UNITED STATES MINERAL MONUMENT** – A term formerly used. See UNITED STATES LOCATION MONUMENT.

**UNITED STATES STATUTES AT LARGE** – Laws passed during each session of Congress are, at the end of the session, printed in a bound volume entitled *United States Statutes at Large*. The public laws and private laws are printed in separate sections. Within each section the laws are arranged chronologically by the date of their approval. When cited, the volume number should precede the abbreviation, *Stat.*, and the page of the volume on which the statute appears should follow it. For example, 17 Stat. 91 is a citation to a statute which may be found on page 91 of Volume 17 of the Statutes at Large.

**UNITED STATES SUPERVISOR OF SURVEYS** – An officer in charge of the survey of the public lands from 1910 until 1946. See SURVEYOR GENERAL, CADASTRAL ENGINEERING STAFF OFFICER and CHIEF, DIVISION OF CADASTRAL SURVEYS.

**UNIVERSAL TRANSVERSE MERCATOR PROJECTION** – A special case of the transverse Mercator projection. Abbreviated as the UTM grid, it consists of 60 north-south zones, each 6° wide in longitude.

**UNORGANIZED MINING DISTRICT** – Where land office forms, or other forms, have a space to indicate “*Mining District*” and there is, in fact, no organized mining district, the form is completed by writing the words, “*unorganized mining district.*” See ORGANIZED MINING DISTRICT and MINERAL DISTRICT.

**UNPERFECTED ENTRY** – See ENTRY UNPERFECTED.

**UNRECORDED DEED** – A conveyance of title not registered or recorded according to state statutes.

**UNRESERVED PUBLIC LANDS** – Public lands which have not been withdrawn or reserved for general purposes. The public lands which are not affected by a general order of withdrawal, by a mineral withdrawal for classification, or by inclusion within a grazing district under the Taylor Grazing Act, are considered unreserved public lands since they are subject to classification and disposal.

**UNSURVEYED LANDS** – Lands not yet surveyed. Fractional section surveys, for example, leave unsurveyed land within a section. The land is known to exist, but the survey has either not yet been authorized or has not yet, for whatever reason, been completed. See COMPLETION SURVEY.

**UPLANDS** – 1) Land situated above ordinary high water. 2) Land situated above riparian land or land adjacent to riparian areas but remote from the body of water and having no riparian rights. See ORDINARY HIGH WATER.

**URBAN DISTRICTS** – Thickly settled areas (whether in cities or suburbs) or areas where congested traffic often occurs. A highway, even though in the country, on which the traffic is often very heavy, is considered to be urban.

**URBAN SUBDIVISION** – A division of property into two or more parcels, usually with street dedications, performed and recorded by a surveyor according to state law and local regulations.

**USE PLAT** – A copy of the master title plat and any supplemental master title plats of a township. Use plats show, in addition to the status shown on the master title plat, information concerning use of the lands, such as applications, leases and permits. See MASTER TITLE PLAT and SUPPLEMENTAL MASTER TITLE PLAT.

**U.S. SURVEY** – A metes and bounds survey executed to comply with one of various regulations for entry of Public Lands.

**USQUE AD FILUM AQUAE (OR VIAE)** – Up to the middle of the stream (or road).

**UTE MERIDIAN** – The principal meridian governing surveys in a small area in Colorado; it was adopted in 1880.

## V

**V (Land Status Records)** – Village.

**VA** – Virginia.

**VAR INT (Land Status Records)** – Variable Interest.

**VAR.** – Variation.

**VIZ** – A contraction for *videlicet*, to-wit, namely, that is to say.

**vs.** – Versus. Also, occasionally, abbreviated v.

**VT** – Vermont.

**VACANT AND UNAPPROPRIATED PUBLIC DOMAIN LANDS** – Public domain lands which have never left Federal ownership and have not been reserved, withdrawn, dedicated or set aside for a specific purpose. These lands, some 450 million acres, are mostly in the 11 Western States and Alaska. The vacant and unappropriated public domain is administered by the Bureau of Land Management.

**VALUABLE MINERAL** – See MINERAL, VALUABLE.

**VARA** – A Spanish unit of measurement of various lengths.

**VARIATION** – See MAGNETIC VARIATION.

**VEIN** – In mining law, a continuous body of mineral or mineralized rock, filling a seam or fissure in the earth's crust, within defined boundaries in the general mass of the mountain (boundaries which clearly separate it from the neighboring rock), and having a general character of continuity in the direction of its length. A requirement that a miner shall locate his claim "*along the vein*" means along the out-crop or course of the apex and not along the strike. "*Lode*," "*ledge*" and "*vein*" are synonymous in mining law as well as in common usage.

**VEIN, DISCOVERY** – In mining law, that vein which served as a basis of the discovery and location of a mining claim.

**VERSUS** – A Latin word meaning *against*. In the title of a cause of action, the name of the plaintiff is put first, followed by the word "*versus*," then the defendant's name. The word is commonly abbreviated "*vs.*" or "*v.*"

**VIS FLUMINIS** – In the civil law, the force of a river; the force exerted by a stream or current; water power.

## W

**W (Land Status Records)** – West.

**WA** – Washington.

**WAA (Land Status Records)** – War Assets Administration.

**WAR DEPT (Land Status Records)** – War Department.

**WASH.** – Washington.

**WASH MER (Land Status Records)** – Washington Meridian.

**WC** – Witness Corner.

**W/CHG (Land Status Records)** – With Change(s).

**WCMC** – Witness Corner Meander Corner. WC is the abbreviation for Witness Corner when used alone or, as in this case, with another abbreviation; however, in the field notes or in simply talking about it, a surveyor would say, "*Witness Meander Corner*," not "*Witness Corner Meander Corner*."

**WD (Land Status Records)** – Warranty deed.

**WDL (Land Status Records)** – Withdrawal.

**WDN (Land Status Records)** – Withdrawn.

**WFO** – Western Field Office. Established in Portland, Oregon in 1973. See SPECIAL OFFICES (BLM).

**WI** – Wisconsin.

**WILL MER (Land Status Records)** – Willamette Meridian.

**WIS.** – Wisconsin.

**W/O (Land Status Records)** – Without.

**WO** – Washington Office.

**WP (Land Status Records)** – Water Power.

**W P** – Witness Point.

**W.P.C.** – Witness private claim. Used in the specimen field notes in the General Instructions of 1855.

**WP DES (Land Status Records)** – Water Power Designation.

**WR (Land Status Records)** – Water rights.

**WR MER (Land Status Records)** – Wind River Meridian.

**WS (Land Status Records)** – Watershed.

**WT (Land Status Records)** – Warrant.

**WV** – West Virginia.

**WY** – Wyoming.

**WYO** – Wyoming.

**WAGON ROAD GRANT** – A grant of public lands made to a State to aid in the construction of military wagon roads.

**WARRANTY** – A promise that a statement is true. In conveyancing, a warranty deed conveys fee title (to the land described) to the grantee and in addition guarantees the grantor will make good the title if it is found wanting. See DEED, BARGAIN AND SALE and PATENT.

**WASHINGTON MERIDIAN** – 1) The Act of September 28, 1850 (9 Stat. 515), provided for the adoption of the meridian of the observatory at Washington, which passes through the old Naval Observatory at 24th Street and Constitution Avenue, N.W., Washington, D.C., as the American Meridian for all astronomic purposes. The meridian of Greenwich was, under this act, adopted for all nautical purposes. The act was repealed August 22, 1912 (37 Stat. 342). During the nearly 62 years the act was in force, the meridional boundaries of the Territories and States of Arizona, Colorado, Dakota, Idaho, Montana, Nevada and Wyoming and the States of Kansas, Nebraska, New Mexico and Utah were referred to the Washington Meridian, which is 77° 03'02" .3 west of Greenwich, according to Geological Survey Bulletin 1212. Aaron L. Shalowitz, LL.M., Coast and Geodetic Survey, says it is 77°03'06" .276. 2) The principal meridian, adopted in 1803, which governs surveys in the southwestern part of Mississippi is also named the Washington Meridian.

**WATERS OF THE UNITED STATES** – All waters within the United States which are navigable for the purpose of commerce, or whose navigation successfully aids commerce.

**WAY** – A road, street or other passage. Technically, a right of passage over land.

**WAYLEAVE** – A right of way over or through land for the carriage of minerals from a mine or quarry. It is an easement of the class called "*rights of way*," and is generally created by express grant or reservation.

**WEEKS LAW LANDS** – Federal acquired lands within National Forest boundaries acquired under 36 Stat. 961, the weeks law.

**WHARFING OUT, RIGHT OF** – A right to the exclusive use of submerged lands as by the affixing thereto or the establishment thereon of a permanent structure to some point within a navigable body of water. It presupposes exclusive use and to that extent it may interfere with fishing or navigation.

**WHARF PERMIT** – A permit which authorizes the use of a shore-space reserve for wharfage purposes.

**WILDLIFE REFUGE** – A reservation for the protection of wildlife.

**WILDLIFE REFUGE EXCHANGE** – An exchange whereby the Federal Government receives title to lands within a wildlife refuge.

**WILLIAMETTE MERIDIAN** – The principal meridian governing surveys in Oregon and Washington; it was adopted in 1851.

**WIND RIVER MERIDIAN** – The principal meridian governing surveys in a small area in Wyoming; it was adopted in 1875.

**WINZE** – In mining, a vertical or steeply inclined passageway driven to connect a mine working with another.

**WITHDRAWAL** – An action which restricts the disposition of public lands and which holds them for specific public purposes; also, public lands which have been dedicated to public purposes. See WITHDRAWAL, GENERAL ORDERS OF; RESERVATION.

**WITHDRAWAL, GENERAL ORDERS OF** – Under Executive orders Numbers 6910 (Nov. 26, 1934), and 6964 (Feb. 5, 1935), known as the "*General Orders of Withdrawal*," all vacant public lands in Alabama, Arizona, Arkansas, California, Colorado, Florida, Idaho, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, Wisconsin, and Wyoming were withdrawn for classification.

**WITHIN LIMITS** – At less than allowable linear and angular errors of closure as set forth in the Manual of Surveying Instructions. Also within rectangular limits.

**WITNESS** – A person who testifies as to what he has observed. See EXPERT WITNESS.

**WITNESS CORNER** – A monumented survey point usually on the line of survey near a corner established as a reference when the corner is so situated as to render its monumentation or ready use impracticable.

**WITNESS POINT** – A monumented station on a line of the survey, employed to perpetuate an important location without special relation to any regular corner, except that the bearing or distance may be known.

**WITNESS TREE** – According to the General Instructions of 1846, and other instructions prior to that year, "*Witness trees are signalized and marked as (bearing trees), but the course and distance to them, as well as the small chop, are omitted.*" Later, all trees used as corner accessories were marked as bearing trees, and the distance and bearing from the corner was recorded. The term "*Witness tree*" became obsolete. See BEARING TREE.

**WRIT OF ERROR** – A process of common law origin, it is a precept issued in writing by an appellate court to a lower court for supposed error in law apparent on record. A writ of error removes nothing to the higher court for re-examination except the law. See APPEAL.

## **X**

**X (Land Status Records)** – Exchange(d).

**X** – The departure or distance along the east-west axis in a coordinate system.

## **Y**

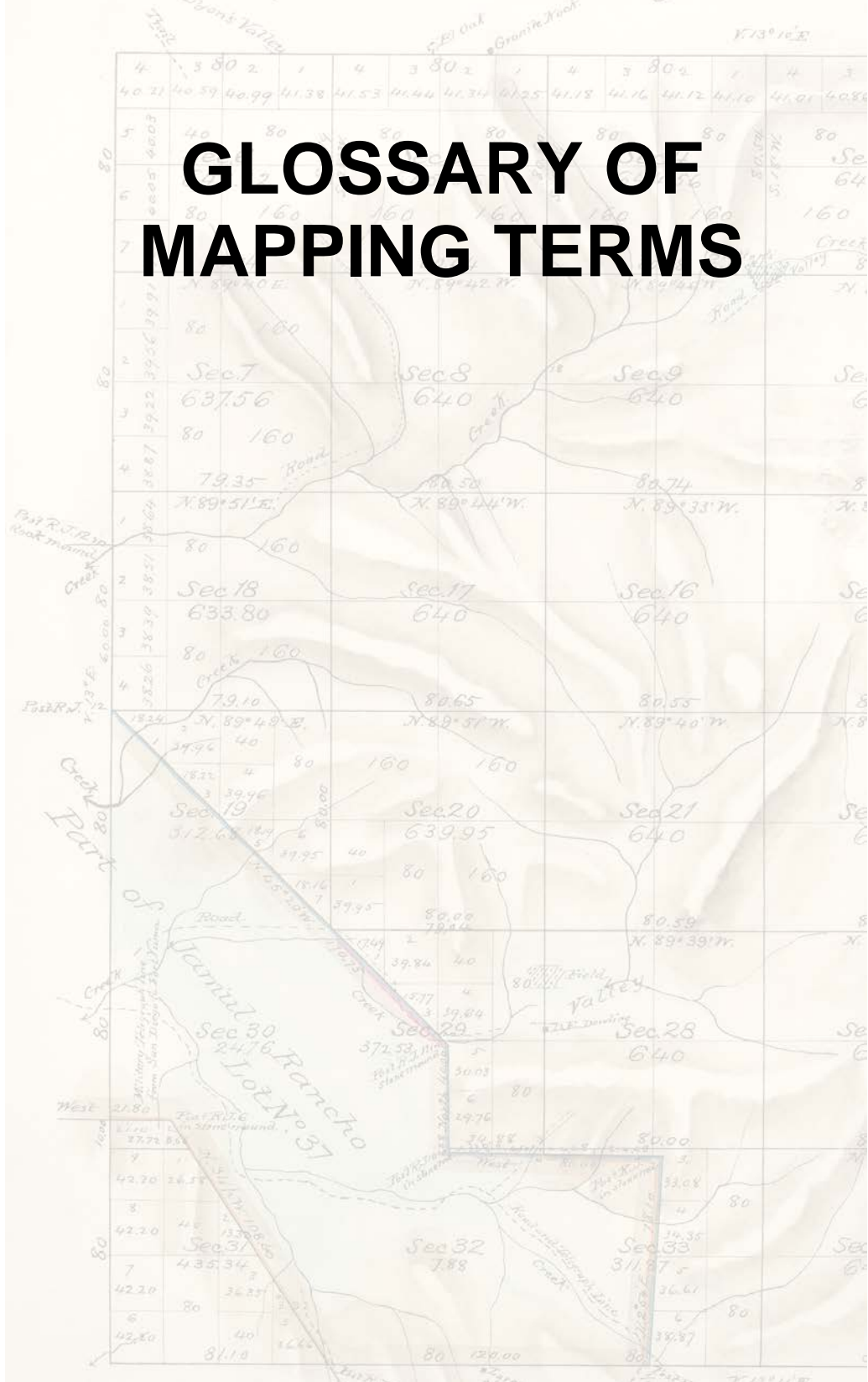
**Y** – The latitude or distance along the north-south axis in a coordinate system.

## **Z**

**ZONE** – The unit of division in State Plane Coordinate Systems created where state boundaries extend beyond limits imposed in the design of the projection system. Where the scale error between a geodetic distance and its grid representation exceeds 1 in 10,000 a state was usually divided into two or more zones. A new origin is used for each zone. See DANGER ZONE.

Township N<sup>o</sup> 17 South Range N<sup>o</sup> 2 East

# GLOSSARY OF MAPPING TERMS





## A

**1927 NAD** - The North American Datum, 1927.

**ABC** - Airborne Control.

**ACIC** - Aeronautical Chart and Information Center.

**ADP** - Automatic Data Processing.

**AEI** - Aerial Exposure Index.

**AMS** - Above Mean Sea Level.

**AMT** - Above Mean Terrain.

**A.S.A.** - American Standards Association. See U.S.A.S.I.

**ABRASION** - Mechanical scratching, scraping, removal of emulsion or film base moving through cameras or processing equipment.

**ABSOLUTE ORIENTATION** - The scaling, leveling and attitude correction of photographs in a photogrammetric instrument to fit ground control or the mathematically equivalent process in analytical photogrammetry. See RELATIVE ORIENTATION.

**ABSOLUTE STEREOGRAPHIC PARALLAX** - With a pair of truly vertical photographs of equal principal distances taken from equal flight heights, or a pair of rectified photographs, the absolute stereoscopic parallax of a point is the algebraic difference, parallel to the air base, of the distances of the two images from their respective principal points. The term "*parallax*" is generally used to denote absolute stereographic parallax and also to denote similar measurements when the previous theoretical conditions are not strictly attained, as, for example, in measuring parallaxes on unrectified serial photographs. Linear parallax, x parallax, and horizontal parallax are synonymous with the preferred term, absolute stereoscopic parallax.

**ACCIDENTAL ERROR** - Random errors that occur without regard to any known physical law or pattern. Their occurrence is assumed to fall within a distribution pattern in accord with the theory of probability. See RANDOM ERROR.

**ACCRETION** - The act of growing to a thing; usually applied to the gradual and imperceptible accumulation of land by natural causes, as out of the sea or a river. Accretion of land is of two kinds: By alluvion, i.e., by the washing up of sand or soil, so as to form firm ground; or by reliction, as when the sea shrinks below the usual water-mark. The term "*alluvion*" is applied to deposit itself, while "*accretion*" denotes the act. However, the terms are frequently used synonymously. Land uncovered by gradual subsidence of water is not an "*accretion*" but a "*reliction*." See ACCRETION\* and AVULSION\*.

**ACCURACY (USC & GS SP, PUBL. 242)** - Degree of conformity with a standard or accepted value. Accuracy relates to the quality of a result, and is distinguished from precision which relates to the quality of the operation by which the result is obtained.

**ACCURACY CHECKING (USGS)** - The procurement of presumptive evidence of a map's compliance with specified vertical accuracy standards.

**ACCURACY TESTING (USGS)** - The procurement of evidence, on a sampling basis, of a map's compliance with specified *horizontal* accuracy standards. Accuracy testing is designed to determine the absolute accuracy of map features.

**ACHROMATIC** - Devoid of hue, or transmitting light without showing its constituent colors.

**ACHROMATIC LENS** - A lens that has been partly corrected for chromatic aberration, usually for two wavelengths of light. Such a lens is customarily made to bring green and red light rays to approximately the same point focus. Also called achromat. Achromatic lenses are not sufficiently corrected for color photography or color separation.

**ACRE** - A measure of land, 43,560 square feet, in whatever shape. See ACRE\*.

**ACTINIC** - Pertaining to electromagnetic radiation capable of initiating photochemical reactions, as in photography or the fading of pigments.

**ACTIVE** - Denotes a source of radiation external to the surface or object. See PASSIVE SYSTEM.

**ACTIVE SYSTEMS** - 1) A system having its own source of electromagnetic radiation. 2) A system that measures electromagnetic radiation that is reflected from a surface or object, and not produced (emitted) by the surface or object.

**ACUTANCE (USGS)** - An objective measure of the ability of a photographic system to show a sharp edge between contiguous areas of low and high illuminance.

**ADDITIVE COLOR THEORY** - Theory of production of color images by addition of colored light rather than by subtraction of unwanted colors from white light. Additive color methods are used to create composite color

images from photographs taken in different parts of the spectrum. Three primary colors can be projected to produce every hue in varying degrees of saturation.

**ADD TAPE** - A survey tape on which minor graduations are placed ahead of the zero point. See CUT TAPE.

**ADJUSTED TO DATUM** - The value of a position or elevation after proper adjustment between previously adjusted stations or bench marks.

**ADJUSTMENT** - 1) A process designed to remove inconsistencies in measured or computed quantities by applying derived corrections to compensate for random, or accidental errors, such errors not being subject to systematic corrections. 2) Bringing the movable parts of an instrument or device more nearly into proper relation and fit. 3) Positioning the public-land lines on the topographic map to indicate their true, theoretical, or approximate location relative to the adjacent terrain, and culture, by reconciling the information shown on BLM plats and field records with the ground evidence of the location of the lines. See ADJUSTMENT\*.

**ADMINISTRATIVE INDEX MAP (USGS)** - A special State map printed for administrative use. Quadrangle locations (by latitude and longitude), names, dates of survey, and authorship are shown by black print. Provisional quadrangle names and areas of 7½- and 15-minute quadrangles are also shown by overprint. Areas of quadrangles (in square miles) are shown in the left and right margins. Areas of partial quadrangles or portions of quadrangles falling within a particular State are shown within the individual quadrangle outlines.

**ADMINISTRATIVE MAP** - A planimetric map of a BLM administrative unit.

**ADVANCE COMPLETION** - See preferred ADVANCED FIELD COMPLETION.

**ADVANCE EDITION** - See preferred PRELIMINARY EDITION.

**ADVANCE FIELD COMPLETION** - (USGS) Field completion carried out prior to stereocompilation. It includes complete photoidentification and field interpretation; road, drainage, and woodland classifications; obtaining name and boundary information; obtaining data for accuracy checks; and assembling all data needed to compile and publish a map without additional fieldwork.

**ADVANCE INTERPRETATION** - See preferred FIELD PHOTOINTERPRETATION and ADVANCE FIELD COMPLETION.

**ADVANCE MATERIAL INDEX MAP (USGS)** - A letter size State map showing by symbols the advance information available for quadrangles work.

**AERIAL** - Relating to the air or atmosphere, being applicable in a descriptive sense to anything in space above the ground and within the atmosphere.

**AERIAL EXPOSURE INDEX** - The reciprocal of twice the exposure, expressed in meter candle seconds, at the point on the toe of the characteristic curve where the slope equals 0.6 gamma when recommended processing conditions are used.

**AERIAL PHOTOGRAPH** - A photograph of a part of the earth's surface taken by an aircraft supported camera.

**AERIAL RECONNAISSANCE** - The securing of information by aerial photography or by visual observation from the air.

**AERONAUTICAL CHART** - A map of the earth's surface designed for aviation use.

**AEROTRIANGULATION** - The process for extension of survey control whereby overlapping aerial photographs are related using perspective principles.

**AFFINE** - A geometrical condition in which the scale along one axis or reference plane is different from the scale along the other axis or plane.

**AFFINE TRANSFORMATION** - 1) A multiple-stage rectification technique made by photographic alternations of map dimensions which include differential magnification (transformation of one rectangle into another of different proportions) and shear (transformation of a rectangle into a parallelogram). 2) A transformation in which straight lines remain straight and parallel lines remain parallel. Angles, however, may undergo changes and differential scale changes may be introduced.

**AGONIC LINE** - The locus of all points on the earth's surface at which the magnetic north coincides with astronomic north. Also denotes its representation on a map.

**AIR BASE** - The line joining two exposure stations, or the length of this line; also, the distance (at the scale of the stereoscopic model) between adjacent perspective centers as reconstructed in the plotting instrument.

**AIRBORNE CONTROL SURVEY SYSTEM (ABC)** - A system for establishing a supplemental, vertical, and horizontal control for mapping and cadastral surveying where access is difficult. Horizontal and vertical angles as well as EDM distances are measured from known ground stations to a helicopter equipped with a Hoversight. See AIRBORNE CONTROL SURVEY\*.

**AIRBORNE MAGNETOMETER** - An instrument used to measure variations in the magnetic field of the earth while being transported by an aircraft.

**AIRPORT** - Any body of land or water which is used, or intended for use, for the landing and take-off of aircraft, and any appurtenant areas which are used, or intended for use, for airport buildings or other airport facilities or rights-of-way, together with all airport buildings and facilities located thereon.

**AIR SPEED** - The velocity of an aircraft relative to the surrounding atmosphere.

**AIR STATION** - The point in space occupied by the camera lens at time of exposure. See EXPOSURE STATION.

**ALBERS CONICAL EQUAL-AREA PROJECTION** - An equal-area projection of the conical type, on which the meridians are straight lines that meet in a common point beyond the limits of the map and the parallels are concentric circles whose center is at the point of intersection of the meridians. Meridians and parallels intersect at right angles, and the arcs of longitude along any given parallel are of equal length. The parallels are spaced to retain the condition of equal area. On two selected parallels, the arcs of longitude are represented in their true length. Between the selected parallels the scale along the meridians is a trifle too large, and beyond them, too small.

**ALIDADE** - The part of a surveying instrument which consists of a sighting device, with index, and reading or recording accessories. The alidade of a theodolite or surveyor's transit is the upper part of the instrument: the telescope, micrometer microscopes, or verniers, and accessories, mounted on what is termed "*upper motion*" of the instrument, and used in observing a direction or angle on the graduated circle, which is mounted on the "*lower motion*." The alidade used in topographic surveying consists of a straightedge ruler carrying a telescope, or other sighting device, and used in the recording a direction on the plane-table sheet.

**ALINEMENT (ALIGNMENT)** - 1) Formation or position in line, or, more properly, in a common vertical plane. 2) In railway or highway surveying: The ground plan, showing the alinement or direction, and components of the center line, as distinguished from a profile, which shows the vertical element.

**ALKALI FLAT** - A level lakelike plain formed in low depressions where accumulated water evaporates depositing fine sediment and dissolved minerals which form a hard surface if mechanical sediments prevail or a crumbly powdered surface if efflorescent salts are abundant.

**ALLUVIAL FAN or ALLUVIAL CONE** - The deposit of sediment laid down by a swift-flowing stream as it enters a plain or an open valley, so called on account of its shape.

**ALLUVIUM** - Gravel, sand, silt, and clay sediments deposited by streams as a result of markedly decreased current velocity, e.g., on the stream bottoms, along the banks, or where streams enter a body of standing water.

**ALTIMETER** - An instrument that indicates directly the height above a reference surface. See RADAR ALTIMETER, BAROMETER, and BAROMETRIC LEVELING.

**ALTIMETRY** - The science of determining the difference of elevation by use of altimeters.

**ALTITUDE** - The vertical angle between the plane of the horizon and the line to the object which is observed or defined. In astronomy and surveying, the altitude is positive if the object is above the horizon, and negative if below it. In surveying, a positive altitude is also termed an angle of elevation; a negative altitude, an angle of depression. In photogrammetric surveying and airport zoning, altitude applies to the elevation above a datum of points in space (as opposed to points on the ground surface) above a datum, usually mean sea level.

**ANAGLYPH** - A stereogram in which the two views are printed or projected superimposed in complementary colors, red and blue or red and green. By viewing through spectacles of corresponding complementary colors, a stereoscopic image is formed.

**ANALYTICAL AEROTRIANGULATION** - A process of interior and absolute orientation of aerial photographs obtained by computational methods from plate coordinates and mathematical analysis of the photogrammetric system. See AEROTRIANGULATION and ANALYTICAL PHOTOTRIANGULATION\*.

**ANASTIGMATIC LENS** - A lens that has been corrected for astigmatism and curvature of field.

**ANGLE, DIP** - 1) The vertical angle of the observation point between the plane of the true horizon and a sight line to the apparent horizon. 2) The vertical angle, at the air station, between the true and the apparent horizon, which is due to flight height, earth curvature, and refraction.

**ANGLE OF CONVERGENCE** - See ANGULAR PARALLAX.

**ANGLE OF COVERAGE** - The apex angle of the cone of rays passing through the front nodal point of a lens.

**ANGLE OF FIELD** - See ANGLE OF COVERAGE.

**ANGLE POINT** - A point in a survey where the alinement deflects from a straight line.

**ANGSTROM** - Unit of wavelength, used chiefly in expressing short wavelengths; mathematically, it equals  $10^{-10}$  meters or  $10^{-8}$  centimeters.

**ANGULAR DISTORTION** - Distortion in shape of a map area caused by non-conformality of the map projection. See CONFORMALITY.

**ANGULAR ERROR OF CLOSURE** - The discrepancy between the summation of a series of field angles and the theoretical sum.

**ANGULAR PARALLAX** - The angle subtended by the eye base of the observer at the object viewed.

**ANNOTATED PHOTOGRAPH** - A photograph on which planimetric, hypsographic, geologic, cultural, hydrographic, or vegetation information has been added to identify, classify, outline, clarify, or describe features that would not otherwise be apparent in examination of an unmarked photograph.

**ANTIHALATION** - 1) The reduction of blurring or fogging that takes place around the image of a brightly lighted antihalation coating. 2) A light-absorbing coating applied to the back side of the support of a film or plate (or between the emulsion and the support) to suppress halation.

**ANTIVIGNETTING FILTER** - See VIGNETTING.

**APERTURE STOP** - The physical element (such as a stop, diaphragm, or lens periphery) of an optical system which limits the size of any pencil of rays traversing the system. The adjustment of the size of the aperture stop of a given system regulates the brightness of the image and depth of field without having any effect upon the size of the area covered.

**APOCHROMATIC LENS** - A lens which is corrected for chromatic aberration for three wavelengths of light rather than two as in the achromatic lens.

**APPARENT HORIZON** - The visible junction of earth and sky viewed from a specific point.

**APPROXIMATE CONTOUR (USGS)** - A contour line of doubtful accuracy used in stereocompilation to indicate uncertainty of location.

**ARCTIC CIRCLE** - The geographic parallel having a north latitude of 90° minus the sun's declination at summer solstice. Although the value changes slightly every year it is shown on most maps as 66° 33'.

**ARC TRIANGULATION** - A system of triangulation of limited width designed to connect widely separated control or for nationwide geodetic surveying.

**ARC (USGS)** - 1) A part of a mathematically defined curve. 2) A triangulation arc is a system of triangulation of limited width designed to progress in a single general direction to connect other arcs or to extend control from an established datum.

**AREA COVERAGE** - Complete photographic coverage of an area by conventional photography having parallel flight lines and stereoscopic overlap between exposures in the line of flight.

**AREA TRIANGULATION** - Surveys to provide horizontal control over an area such as a county or for filling in between arcs of triangulation.

**ARM OF THE SEA** - A comparatively narrow extension of a larger body of water.

**ARTIFICIAL HORIZON** - A device consisting of a plane reflecting surface which can be adjusted to coincide with the plane of the horizon.

**ASPHERICAL LENS** - A lens in which one or more surfaces depart from a true spherical shape.

**ASSUMED ELEVATION** - An arbitrary value assigned to a bench mark to which other work is referenced. Usually an even value such as 1000.00 feet, is chosen in absence of a connection to sea level datum.

**ASSUMED GROUND ELEVATION (USGS)** - The elevation assumed to prevail in a local area covered by a particular photograph or group of photographs. Used especially to denote the elevation assumed to prevail in the vicinity of a critical point, such as a peak or other feature having abrupt local relief.

**ASTRONOMIC** - Of or pertaining to astronomy. In surveying, azimuths or geographic positions determined by direct observation on the sun or a star (or stars) are designated astronomic azimuths or astronomic positions.

**ASTRONOMIC AZIMUTH** - The direction of a line relative to the meridian, as determined from astronomic observations. Usually measured clockwise from the south.

**ASTRONOMIC LATITUDE** - The angle between the plane of the earth's equator and a normal to the geoid as determined by celestial observations.

**ASTRONOMIC LONGITUDE** - The dihedral angle between the Greenwich Meridian and the observer's meridian as determined by astronomic observations and time signals.

**ASTRONOMIC NORTH** - The local direction of the earth's axis of rotation as determined from celestial observations.

**ASTRONOMIC POSITION** - See GEOGRAPHIC POSITION, ASTRONOMIC LATITUDE and ASTRONOMIC LONGITUDE.

**ATMOSPHERIC REFRACTION** - The bending of the path of light rays as they pass through air of varying density.

**ATTENUATION** - Reduction in intensity of radiation with distance from its source due only to absorption and/or scattering.

**ATTITUDE** - 1) The angular orientation of a camera, or of the photograph taken with that camera, with respect to some external reference system. Usually expressed as tilt, swing, and azimuth; or roll, pitch, and yaw. 2) The angular orientation of an aerial or space vehicle with respect to a reference system.

**AUTOMATIC LEVEL** - A leveling instrument in which the line of sight is automatically maintained horizontal by means of a built-in compensator acting through the force of gravity.

**AUTOPOSITIVE** - A term applied to a type of photographic film or paper which yields positive copies from positive originals or negative copies from negative originals without an intermediate copy.

**AUTO SURVEYOR** - A trade name for an inertial positioning system.

**AVERAGE ERROR** - The mean of all errors taken without regard to sign. It is the quotient of the sum of the absolute magnitudes of the errors divided by the number of errors included. See **ERROR OF THE MEAN**.

**AVULSION** - (USGS) The sudden removal of land from one segment and joining it to another as a result of erosion caused by inundation or current. Also, a sudden change in the course of a river, by which a portion of land is cut off, as where a river changes course to form an oxbow. See **AVULSION\***.

**AVULSIVE CUTOFF** - (ASCE) A river's action when avulsion takes place; also, describes the area of land enclosed by the old and the new channels.

**AXES** - The plural of axis.

**AXIS OF HOMOLOGY** - 1) The intersection of two projectively related planes. 2) The intersection of the plane of the photograph with the horizontal plane of the map or the plane of reference of the ground. Corresponding lines in the photograph and map planes intersect on the axis of homology.

**AXIS OF TILT** - A line through the perspective center of a photograph, perpendicular to the principal plane. Also, the line of zero tilt displacement on a tilted photograph. This line lies at right angles to the principal plane and passes through the isocenter.

**AXIS, X AXIS** - The line in the photograph plane through the perspective center and parallel to the line joining fiducial marks which are in the general direction of the flight line. In an aerial coordinate system the X axis is along the forward air base.

**AXIS, Y AXIS** - The line in the photograph plane through the perspective center and perpendicular to the X axis. In an aerial coordinate system, the Y axis is horizontal and is perpendicular to the forward air base. The origin is at the rear exposure station.

**AXIS, Z AXIS** - The line through the perspective center and perpendicular to the plane of the photograph. The positive direction is upward. In an aerial coordinate system, the Z axis is in a vertical plane and perpendicular to the forward air base.

**AZIMUTH** - The angle measured on the horizon between the meridian and the plane of the vertical circle through a celestial body or other object. Most government agencies reckon with azimuth clockwise from south, 0° to 360°.

**AZIMUTH LINE** - (USGS) A radial line from the principal point, isocenter, or nadir point of a photograph, representing the direction to a corresponding point on an adjacent photograph in the same line of flight.

**AZIMUTH MARK** - A mark set at a significant distance from a triangulation or traverse station to mark the end of a line for which the azimuth has been determined and to serve as a starting or reference azimuth for later use. Azimuth marks are set to be visible from the station without a tower.

## B

**B/H** - Base to height ratio.

**BM** - Bench mark.

**bx** - The component of the airbase which lies along the line of flight.

**by** - The transverse component of the air base.

**bz** - The vertical component of the air base. See **BZ CURVE**.

**BZ CURVE** - A graphic representation of the vertical errors along a line parallel to the flight line of a stereotriangulated strip.

**BACK AZIMUTH** - The azimuth of a geodetic line at the end opposite the reference end. It differs from the forward azimuth (at the reference end) by 180° plus the amount of the convergence of meridians between the two points. See **AZIMUTH** and **GEODETIC AZIMUTH\***.

**BACK FOCAL LENGTH** - The distance measured along the lens axis from the rear vertex of the lens to the plane of best average definition. Also called back focal distance.

**BACKGROUND** - Any effect in a sensor or other apparatus or system above which the phenomenon of interest must manifest itself before it can be observed. See **NOISE**.

**BACKSHORE** - That part of a beach which is usually dry, being reached only by the highest tides, and, by extension, a narrow strip of relatively flat coast bordering the sea. See **BEACH\*** and **BACKSHORE\***.

**BACKSIGHT** - 1) A sight on a previously established survey point, other than a closing or check point. 2) In leveling, a reading on a rod held on a point with a previously determined elevation to determine the height of the instrument (HI).

**BALANCING A SURVEY** - Distributing corrections through a traverse to eliminate the errors of closure according to some approved method so that the resulting survey figure will be geometrically and mathematically consistent. The removal of errors by the method of least squares is termed an adjustment.

**BALDWIN SOLAR CHART** - A chart designed by D. H. Baldwin, of the Geological Survey, for orienting a planetable by means of the sun's shadow.

**BAND** - 1) A selection of wavelengths. 2) Frequency band. 3) Absorption band. 4) A group of tracks on a magnetic drum. 5) A range of radar frequencies.

**BANK OF STREAM** - The continuous margin along a river or stream where all upland vegetation ceases. The right bank of a stream is the bank on the right-hand side, and the left bank, the one on the left-hand side, as one proceeds downstream.

**BAR** - 1) A mass of sand, gravel, or alluvium deposited on the bed of a stream, sea, or lake, or at the mouth of a stream forming an obstruction to water navigation. 2) A term used in a generic sense to include various types of submerged or emergent embankments of sand and gravel built on the sea floor by waves and currents. 3) An offshore ridge or mound of sand, gravel, or other unconsolidated material submerged at least at high tide, especially at the mouth of a river or estuary, or lying a short distance from and usually parallel to the beach.

**BAROMETER** - An instrument for measuring atmospheric pressure.

**BAROMETRIC LEVELING** - Determining elevations by use of altimeters or barometers.

**BARREL DISTORTION** - A type of geometric distortion found in scanning imagery in which elements crossing the flight direction are distorted by a combination of scanner-mirror rotation and forward motion of the aircraft. Straight lines (roads, etc.) cut obliquely appear as sigmoid curve in the resultant imagery. Some photographic lenses also produce barrel distortion.

**BARRIER BEACH** - Offshore bar. This term refers to a single elongate sand ridge rising slightly above the high-tide level and extending generally parallel with the coast, but separated from it by a lagoon. The term should apply to islands and spits.

**BARRIER FLAT** - The relatively flat area, often occupied by pools of water, separating the exposed or seaward edge of a barrier and the lagoon behind the barrier.

**BAR SCALE** - A line on a map subdivided and marked with a distance which each of its parts represents on the earth.

**BASAL ORIENTATION** - The establishment of the position of both ends of an air base with respect to a ground system of coordinates. In all, six elements are required. These are essentially the three-dimensional coordinates of each end of the base. In practice, however, it is also convenient to express these elements in one of two alternative ways: 1) the ground rectangular coordinates of one end of the base and the difference between these and the ground rectangular coordinates of the other end of the base; 2) the ground rectangular coordinates of one end of the base, the length of the base, and the two elements of direction (such as base direction and base tilt).

**BASE-HEIGHT RATIO (B/H)** - In aerial photography, the ratio of the air base to the flight height. See X FACTOR.

**BASE IN** - In normal position of viewing the stereo model where the Zeiss Parallelogram is employed. See BASE OUT.

**BASE IN-BASE OUT MACHINE** - A colloquial term for a universal plotter having the Zeiss Parallelogram feature.

**BASE LINE** - A monumented line of precisely measured length tied to a triangulation system by a base net to control scale errors. See BASE LINE\*.

**BASE LINE PHOTOGRAPHY** - Aerial photographs flown for the particular purpose of provision of an initial physical status for later comparison.

**BASE MAP** - A map which contains the fundamental framework necessary for adequate geographic reference and positioning of information that may be drawn or overprinted on it. It contains only the common essentials that are generally found on a wide variety of maps of comparable scales.

**BASE OUT** - The position of the Zeiss Parallelogram where viewing the stereo model but leaving one photograph oriented in its previous position and orienting the third photograph to the second. See BASE IN.

**BASE SHEET** - A sheet of paper or other material containing (or keyed to) a map projection as well as basic data in varying stages of completeness for map compilation or revision. See CONTROL BASE.

**BASE-WIDTH RATIO** - Ratio of airbase to width of flight coverage.

**BASE CONTROL** - Coordinated and correlated position data, horizontal or vertical, forming a framework of marked or monumented points for the support and control of subsequent surveys.

**BATHYMETRY** - The art or science of determining ocean depths.

**BAYOU** - A minor, sluggish waterway or estuarial creek, generally tidal or with slow or imperceptible current, and with its course generally through lowlands or swamps, tributary to or connecting with other bodies of water. Various specific meanings have been implied in different parts of the southern United States. Sometimes called slough.

**BEACH** - The belt or zone along the shore usually with a gentle slope toward the water, occupied by unconsolidated material, moving sand, or shore drift. The zone from the waterline to the place where there is a marked change in material or physiographic form, or to the line of permanent vegetation (usually the effective limit of normal storm waves). See SHORE and BEACH\*.

**BEAMAN ARC** - A specially graduated arc attached to the vertical circle of an alidade or transit to simplify computing elevation difference for inclined stadia sights. It was designed by W. M. Beaman, of the Geological Survey.

**BEAM COMPASS** - Drafting instrument for drawing circles with a long radius. The point and the pen, or pencil tip, are separate units, mounted to slide and clamp on a long bar or “*beam*” so that the distance between them is equal to the desired radius.

**BEARING** - The direction of a line expressed as an angle less than 90°, east or west of the reference meridian, generally in the form S.50°W. It may be grid, magnetic, or true bearing, according to the nature of the reference meridian.

**BED OF STREAM** - The area within the high-water lines of a stream or river. It is the area which is kept practically bare of vegetation by the wash of the waters of the stream from year to year. See BEDS OF NAVIGABLE LAKES AND STREAMS\*.

**BENCH** - 1) A strip of relatively level earth or rock, raised and narrow. A small terrace or comparatively level platform breaking the continuity of a declivity. 2) A level or gently sloping erosion plane inclined seaward.

**BENCH MARK** - A relatively permanent material object, natural or artificial, bearing a marked point of known elevation above or below an adopted datum.

**BENCH MARK, MONUMENTED** - (USGS) A described point, whose elevation has been determined by surveys of third-order accuracy or better, marked by a metal tablet bearing identifying and other appropriate information.

**BENCH MARK, NONMONUMENTED** - (USGS) A described point, whose elevation has been determined by surveys of third-order accuracy or better, which is recoverable but not marked with a tablet. It may be marked with a chiseled square or cross, a nail and washer in the root of a tree, etc.

**BEND** - A curve in a river channel whose lateral changes involve a decrease in radius. Bends generally grow into meanders.

**BIOME** - A classification of terrain according to its associated plants and animals. Standard biomes for BLM are Tundra, Boreal Forest, Coniferous Forest, Woodland-Brush Land, Grassland, and Desert.

**BLOCK ADJUSTMENT** - The adjustment by combining of strips, sections, models, or photographs into blocks, or of small blocks into larger blocks. The adjustments may be horizontal or vertical or both; it may be done by instrumental, analog, or mathematical processes, or combinations of these. See STRIP ADJUSTMENT.

**BLUE-LINE BOARD** - (USGS) A blue-line guide on a rigid or semirigid material.

**BLUE-LINE GUIDE** - A drafting surface on which a nonphotographic blue-line image has been processed. See BLUE LINE BOARD.

**BLUE-LINE PRINT** - A positive copy of a map or other data printed in blue.

**BLUFF** - 1) Any high headland, or bank presenting a precipitous front. 2) The high vertical banks of certain rivers. 3) A high steep bank or cliff.

**BLUNDER** - A mistake. A blunder is not an error, though a small blunder may remain undetected in a series of observations and have the effect of an error in determining a result. Examples of blunders are reading a horizontal circle incorrectly by an even degree, neglecting to record a tape length in a measured transverse, and reversing numerals in recording an observation.

**BOARD ON GEOGRAPHIC NAMES** - An agency within the U. S. Department of the Interior established by Public Law 242, 80th Congress, approved July 25, 1947. This Board has jurisdiction for the review of names of places, mountains, streams, lakes, and other natural features which may be confused by the use of local names, historical names, or writings relating to an area. The Board has authority to announce an accepted term or name for use on maps, plats, charts, reports, and historical statements prepared by or in behalf of the Federal Government.

**BOAT CHART** - A large scale working chart on which hydrographic data (soundings, bottom characteristics, etc.) are plotted by survey parties.

**BRAIDED STREAM** - A watercourse not filled by the normal stream flow, which subdivides into an interlaced pattern of channels.

**BRANCH OF THE SEA** - Same as arm of the sea.

**BRIDGE** - A structure over a traffic carrying way or water course having a span of more than 10 feet.

**BRIDGING** - The extension and adjustment of photogrammetric surveys between bands of ground control. See STEREOTRIANGULATION.

**BUILDING GRAVER** - An instrument for scribing solid rectangular map features.

**BULKHEAD LINE** - A line in a harbor or navigable waters defining the channelward limit of solid fills or bulkheads. Such lines are usually established by the Secretary of the Defense Department; however, state or municipal authorities under their police powers may establish bulkhead lines shoreward of those established by the Secretary of Defense.

**BULL'S EYE LEVEL** - See CIRCULAR LEVEL

**BUNDLE SOLUTION** - A computation method in analytical aerotriangulation where all the parameters are considered in a large simultaneous solution.

**BUTTE** - A flat-topped hill, produced when hard strata of rock overlie weaker layers, and protect them from being worn down. The butte is similar to but smaller than a *Mesa*, and is often produced from a mesa when the latter is reduced in size.

## C

**CRT** - Cathode ray tube.

**CALIBRATED FOCAL LENGTH (CFL)** - An adjusted value of the equivalent focal length so computed as to distribute the effect of lens distortion in a desired manner over the entire field used in a camera.

**CALIBRATION** - The act or process of determining certain specific measurements in a camera or other instrument or device for comparison with a standard or for purpose of record.

**CALIBRATION, CAMERA** - The determination of 1) the calibrated focal length; 2) the location of the principal point with respect to the fiducial marks; 3) the point of symmetry; 4) the resolution of the lens; 5) the degree of the flatness of the focal plane; and 6) the effective lens distortion in the focal plane of the camera which is referred to the particular calibrated focal length. In a multiple-lens camera, the calibration also includes the determination of the angles between the component perspective units.

**CALIBRATION CONSTANTS** - The results obtained by calibration which give the relationship of the principal point to the fiducial marks of a camera and the calibrated focal length of the lens-camera unit.

**CAMERA, AERIAL** - A camera specifically designed for use in aircraft. The prefix *aerial* is not essential where the context clearly indicates an aerial camera rather than a ground camera.

**CAMERA AXIS** - A line perpendicular to the focal plane of the camera and passing through the interior perspective center or emergent nodal point of the lens system.

**CAMERA STATION** - The point in space occupied by the camera lens at exposure.

**CANAL** - 1) An artificial watercourse cut through a land area for navigation, irrigation. 2) A long narrow arm of the sea extending far inland.

**CANTILEVER EXTENSION** - (USGS) Phototriangulation from a controlled area to an area of no control. The procedure may be progressive, starting from the control, or it may be a simultaneous mathematical procedure.

**CANYON or CAÑON** - A gorge, relatively narrow but of considerable size, bounded by steep slopes. It has been formed by a river cutting through the soft rocks of an arid region.

**CAPE** - 1) A point of land extending into the sea or a lake; a headland. 2) A relatively extensive land area jutting seaward from a continent or large island which prominently marks a change in, or interrupts notably, the coastal trend.

**CARRYING CONTOUR** - (USGS) A single contour line representing two or more contours; used to show vertical or near vertical topographic features, such as cliffs, cuts and fills.

**CARTOGRAPHIC LICENSE** - (USGS) The freedom to modify manuscript information in order to improve the clarity of the map.

**CARTOGRAPHY** - The art, science and technology of expressing graphically, by maps, charts, three-dimensional models and globes, the known physical features of the earth or any heavenly body, at any scale. In particular, cartography is concerned with all phases of map finishing, including the designing of format and symbolization; drafting, editing, and proofing of map content; and specifying requirements for reproduction.



**CASED ROAD** - A double line symbol for a road on a map-usually major highways.

**CATHODE-RAY TUBE** - A vacuum tube that generates a focused beam of electrons which can be deflected by electric and/or magnetic fields. The assembly contains an electron gun arranged to direct a beam upon a fluorescent screen. Scanning by the beam can produce light at all points.

**CENTERING DEVICE, DIAPOSITIVE** - See DIAPOSITIVE CENTERING DEVICE.

**CENTER OF RADIATION** - The selected point on a photograph from which radials are drawn or measured.

**CENTER, PHOTOGRAPH** - The center of a photograph as indicated by the images of the fiducial marks of a camera. In a perfectly adjusted camera the photograph center and the principal point are identical.

**CENTRAL MERIDIAN** - The meridian, usually passing near the center of the area, used as the Y or N axis in a plane-coordinate or grid system. To avoid negative coordinates in the system, this meridian is usually assigned a large X or E value.

**CENTRAL PERSPECTIVE RAY** - The ray from the external perspective center to the object point whose image is located at the principal point.

**C FACTOR** - An empirical value which expresses the contour plotting capability of a given stereoscopic system, generally defined as the ratio of flight height to the smallest contour interval accurately plottable. Not a constant but dependent on conditions present, it is used in determination of flying height or as a rough comparison of photogrammetric systems.

**CHART** - (USGS) A special-purpose map generally designed for navigation. The term “*chart*” is applied chiefly to maps made primarily for nautical and aeronautical navigation and to maps of the heavens, though the term is sometimes used to describe other special-purpose maps.

**CHECKED ELEVATION** - An elevation determined by two or more independent sets of measurements, or by a closed loop, in which the results agree within a specified limit. Results are printed in black on USGS maps.

**CHECK PROFILE** - A profile plotted by use of field survey measurements to check a profile plotted using measurements of position and elevation from a topographic map.

**CHICAGO ROD** - A two piece leveling rod with a telescopic joint.

**CIRCUIT** - A series of connected survey lines that form a closed loop; also, a line or series of lines connecting two fixed points.

**CIRCUIT CLOSURE** - The discrepancy between the algebraic sum of the differences in elevation between junction points in a leveling circuit and the theoretical value of zero.

**CIRCULAR LEVEL** - A spirit level with the inside surface of its upper part ground spherical to form a circular bubble, and with graduations consisting of concentric circles, for application where high precision is not required.

**CLASSICAL POINTS** - Six symmetrically selected image points located within the neat model at which Y parallax is removed during relative orientation of the photographs. Four of the points are near the model corners; the other two are near the X-X axis near the model boundary. See PASS POINTS.

**CLOSED TRAVERSE** - A traverse which starts and ends upon the same station or upon stations of known position.

**CLOSING THE HORIZON** - Measuring the last angle of a series of angles around a station.

**CLOSURE** - 1) The process of measurement in a closed figure for a check on horizontal or vertical precision. 2) (USGS) A misclosure. See JUNCTION CLOSURE, HORIZON CLOSURE and TRIANGLE CLOSURE.

**COASTAL PLAIN** - A plain which borders the sea coast, and extends from the sea to the nearest elevated land. It is sometimes formed through denudation by the sea, the beach being later raised by earth movement to form a plain, frequently known as a Raised Beach, or by deposition of solid matter at their mouths by rivers.

**COASTLINE** - The line that separates the land surface and the water surface of the sea or ocean. See BEACH and BEACH\*.

**COATED LENS** - A lens coated to reduce light reflection from its surface and for selectively absorbing light of a particular wavelength (color) so as to prevent it from passing through the lens.

**COINCIDENCE** - 1) The alinement if diametrically opposed index marks to form a continuous line under the reading microscope of a theodolite. 2) The alinement of the images of opposite ends of a level bubble.

**COLLIMATE** - 1) To render parallel to a certain line or direction, to render parallel, as rays of light; to adjust the line of sight or lens axis of an optical instrument so that it is in its proper position relative to other parts of the instrument. 2) To adjust the fiducial marks of a photogrammetric camera so that they define the principal point. Also called adjustment for collimation.

**COLLIMATION** - The act of making a collimation adjustment.

**COLLIMATION ADJUSTMENT** - The process of bringing the line of collimation of a telescope into close agreement with the collimation axis. Also termed adjustment for collimation.

**COLLIMATION AXIS** - The line through the second nodal point of the objective (object glass) perpendicular to the horizontal axis of a transit or perpendicular to the vertical axis of a level.

**COLLIMATION, ERROR OF** - The angle between the line of collimation (line of sight) of a telescope and its collimation axis.

**COLLIMATION, LINE OF** - The line through the second nodal point of the objective (object glass) of a telescope and the center of the reticle.

**COLLIMATION PLANE** - The plane described by the collimation axis of a telescope of a transit when rotated around its horizontal axis.

**COLLIMATOR** - A fixed telescope with crosshairs in its focus, used to adjust a second telescope by looking through it in a reverse direction with the latter so that images of the crosshairs are formed in the focus of the second telescope, as if they originated in a distant point.

**COLOR COMPOSITE IMAGE** - In landsat imagery, a color negative, transparency, or print produced from bulk or precision black-and-white triplet sets.

**COLOR ENHANCEMENT** - Utilization of contrasting colors (rather than differences in grey values) to indicate subtle changes in film density. Can be applied in single or multi-emulsion situations.

**COLOR PROOF** - A multicolor print made by whirling or rubbing color proof sensitizer on a proof sheet and making consecutive exposures through the scribed features. Each color requires separate sensitization which is applied over the previous color print to form the composite multicolor proof.

**COLOR SEPARATION** - The preparation of separate drawings for each type of map data to be reproduced in a separate color.

**COLOR SEPARATION DRAWING** - Separate manuscripts prepared for each color of the completed map.

**COLOR-SEPARATION GUIDE** - A print of a manuscript that provides copy for final drafting, scribing, or stickup of selected data.

**COMBINATION GRAVER** - A swivel graver which may be converted to a rigid graver for scribing.

**COMPARATOR** - 1) An instrument or apparatus for measuring a dimension in terms of a standard. 2) An instrument for comparing standards of length; for subdividing such standards; or for determining a standard length of a measuring device. 3) An optical instrument, usually precise, for measuring rectangular or polar coordinates of points on any plane surface, such as a photographic plate.

**COMPASS SURVEY** - A transverse survey which relies on the magnetic needle for orienting the sequence as a whole or for determining the bearings of lines individually.

**COMPENSATING ERROR** - An error that tends to offset a companion error and thus obscure or reduce the effect of each.

**COMPENSATION PLATE** - See CORRECTION PLATE.

**COMPILATION** - 1) The production of a new or improved map (or portion of a map) from existing maps, aerial photographs, surveys, new data, and other sources. 2) The production of a map (or portion of a map) from aerial photographs and geodetic control data, by means of photogrammetric instruments.

**COMPILED MAP** - A map incorporating information collected from various sources, not developed by surveys made for the map in question. Most small-scale maps of large areas are compiled maps.

**COMPLETION** - Obtaining field information needed to edit and publish a map from a compiled manuscript. See FIELD COMPLETION and COMPLETION SURVEY\*.

**COMPOSITE** - A print containing the reproducible information from two or more color separation drawings surprinted in register.

**COMPUTER MAPPING** - See DIGITAL MAPPING.

**CONCLUDED ANGLE** - An interior angle between adjacent sides of a polygon which is obtained by subtracting the sum of all the other interior angles of the figure from the theoretical value of the sum of all interior angles.

**CONFLUENCE** - A junction or flowing together of streams; the place where streams meet.

**CONFORMAL** - Having the map scale at any one point the same in both directions. See CONFORMALITY.

**CONFORMALITY** - The unique property of conformal map projections, in which all small or elementary figures on the surface of a sphere retain their original shapes on the map. See ANGULAR DISTORTION.

**CONFORMAL MAP PROJECTION** - See CONFORMALITY.

**CONGRUENCING** - Process by which two images or two digital images of a multi-image set are transformed so that the size and shape of any object on one photograph is the same as the size and shape of that object on the other photograph.

**CONJUGATE IMAGE POINTS** - Unique, selected objects appearing in each of two or more photographs. See the preferred term CORRESPONDING IMAGE POINTS.

**CONSTANT ERROR** - A systemic error which is the same in both magnitude and sign throughout a given series of observations, such as an index error of an instrument.

**CONSTRUCTION SURVEY** - The survey measurements made for design information, stakeout for construction or for surveys during progress of construction as well as following completion of the work for quantity determination.

**CONTACT PRINT** - A photographic print produced by the exposure of a sensitized emulsion in contact with the emulsion of a negative or positive transparency.

**CONTACT PRINTER (USGS)** - 1) Any machine which reproduces a photographic image using emulsion contact. 2) A diapositive printer in which the sensitized surface of the diapositive plate is placed in direct contact with that of the aerial negative to produce an exact positive copy of the negative.

**CONTINENT** - Large land mass rising more or less abruptly above the deep ocean floor; includes marginal areas that are shallowly submerged.

**CONTINENTAL APRON** - The gentle incline at the base of the continental slope leading to the deep oceanic basins.

**CONTINENTAL MARGIN** - The zone separating the emergent continents from the deep sea bottom; generally consists of continental shelf, continental slope and continental rise.

**CONTINENTAL SHELF** - The submerged portion of a continent which slopes gently seaward from the low-water line to a point where a substantial break in grade occurs, at which point the bottom slopes seaward at a considerable increase in slope until the great ocean depths are reached. The point of break defines the “*edge*” of the shelf, and the steeper sloping bottom the “*continental slope*.” Conventionally, the edge is taken at 100 fathoms (or 200 meters) but instances are known where the increase in slope occurs at more than 200 or less than 65 fathoms. See OUTER CONTINENTAL SHELF.

**CONTINENTAL SLOPE** - Continuously sloping portion of the continental margin with gradient of more than 1 to 40, beginning at the outer edge of the continental shelf and bounded on the outside by a rather abrupt decrease in slope where the continental rise begins at depths ranging from about 4,500 to 10,000 feet; formerly considered to extend to abyssal plains.

**CONTINENTAL TALUS** - The steep slope from the lower edge of the continental shelf into the ocean depths. It is characterized by a marked change in gradient and usually begins at a depth of approximately 100 fathoms.

**CONTINUOUS-STRIP PHOTOGRAPHY** - Photography of a strip of terrain in which the image remains unbroken throughout its length along the line of flight. See SONNE CAMERA.

**CONTOUR** - An imaginary line on the ground all points of which are at the same elevation above or below a specified datum surface. See APPROXIMATE CONTOUR, CARRYING CONTOUR, DEPRESSION CONTOUR, INDEX CONTOUR, INTERMEDIATE CONTOUR, SUPPLEMENTAL CONTOUR and UNDERWATER CONTOUR.

**CONTOUR INTERVAL** - The difference in elevation between adjacent contours.

**CONTOUR MAP** - See TOPOGRAPHIC MAP.

**CONTRAST** - Difference between tones on a photograph; the variation in brightness of different parts of a negative or positive.

**CONTRAST IMPROVEMENT** - Image alternation which increases the grey-tone intensity differences.

**CONTROL INDEX MAP (USGS)** - A map of an area showing by suitable symbols the location of all control lines or stations of a designated category, and indicating the file location of the related control data. See GEODETIC CONTROL DIAGRAMS.

**CONTROLLED MOSAIC** - A mosaic oriented and scaled to horizontal control; usually assembled from rectified photographs.

**CONTROL BASE (USGS)** - A surface upon which the map projection and ground control are plotted and upon which pass points resulting from aerotriangulation have been plotted or marked. See BASE SHEET.

**CONTROL, PHOTO** - Any station in a horizontal and vertical control system that is identified on a photograph and used for correlating the data shown on that photograph; also termed photocontrol point, picture control point, and ground control point.

**CONTROL POINTS** - Any station (in a horizontal and/or vertical-control system) that is identified on a photograph and used to aid in fixing the attitude and/or position of a photograph or group of photographs.

**CONTROL STRIP** - 1) A strip of aerial photographs taken to aid planning and accomplishing later aerial photography, or to serve as control in assembling other strips. 2) A strip of film used for control of exposure, development, or both.

**CONTROL SURVEY** - A survey which provides horizontal or vertical position data for subordinate surveys or mapping.

**CONTROL SURVEY CLASSIFICATION** - A series of designations to classify control surveys according to their precision and accuracy. The highest prescribed order of control surveys is designated first order; the next lower prescribed classification, second order; the lowest, third order. Specifications issued by the Bureau of the Budget in 1958 establish three main orders of geodetic control, with additional sub-divisions of classes in some of them. Surveys which fail to meet one of the three preceding specifications are called fourth order although they meet no prescribed standards.

**CONVERGENCE OF EVIDENCE** - Bringing together several kinds of evidence so that a conclusion may be drawn from all available data.

**CONVERGENCE OF MERIDIANS** - The drawing together of the geographic meridians in passing from the Equator to the Pole.

**CONVERGENT PHOTOGRAPHY** - Aerial photography with the camera (or cameras) intentionally tilted so that the central perspective ray of one exposure is inclined to that of an adjacent station.

**COORDINATES** - A set of numbers used in specifying the location of a point.

**COORDINATE SYSTEM** - A mathematically defined method for specifying the locations of points. Distances or angles from suitable references located the points within the system. See GEODETIC COORDINATES, GEOGRAPHIC COORDINATES, PLANE COORDINATES, SPHERICAL COORDINATES, STATE COORDINATE SYSTEMS, STATE PLANE COORDINATES and UNIVERSAL TRANSVERSAL MERCATOR.

**COORDINATE TRANSFORMATION** - Mathematical conversion of coordinate values from one system to another.

**COORDINATOGRAPH** - An instrument by which the X and Y coordinates of points and/or lines are plotted on a plane, such as in compiling maps or in plotting control points.

**COPLANER** - Lying in the same plane.

**COPYING CAMERA** - A precision camera used in the laboratory for reproduction purposes. Also called process camera.

**CORNER, FOUND** - A term adopted by the U. S. Geologic Survey to designate an existent corner of the public-land surveys which has been recovered by field investigation. See CORNER\*.

**CORRECTION** - A quantity which is applied to an observation or function thereof to diminish or eliminate the effects of errors and obtain an improved value of the observation or function. It is also applied to reduce an observation to some arbitrary standard.

**CORRECTION PLATE** - A glass plate having a surface ground to a predetermined shape for insertion into an optical system to compensate for known systemic errors in the photogrammetric system.

**CORRESPONDENCE** - The condition that exists when corresponding images on a pair of photographs lie in the same epipolar plane; the absence of y parallax. See Y PARALLAX.

**CORRESPONDING IMAGE POINTS** - Unique objects appearing in each of two or more photographs selected to correlate the photograph.

**COULEE** - 1) A short, blocky, steep-sided lava flow, generally of glassy rhyolite or obsidian, issuing from the flank of a volcanic dome or from the summit crater of a volcano. 2) The term coulee is generally applied throughout the northern tier of states to any steep-sided gulch or water channel and at times even to a stream valley of considerable length.

**COURSE** - 1) The bearing or, azimuth and length of a line, considered together. 2) The azimuth or bearing of a line along which a ship or aircraft is to travel or does travel, without change of direction; the line drawn on a chart or map as the intended track. The direction of a course is always measured in degrees from the true meridian, and the true course is always meant unless it is otherwise qualified; e.g., as a magnetic or compass course. 3) A route on the earth along which a river flows; the river itself.

**COVE** - A small bay or open harbor.

**COVERAGE** - 1) Inclusion of an area within overlapping aerial photos. 2) A measure of the amount of area covered in an aerial photograph, usually expressed as square miles per frame.

**CRAB** - A photographic condition caused by failure to orient the camera to the flight line resulting in photo edges not parallel to the air base.

**CREEK** - 1) A stream of less volume than a river. 2) A small stream of intermittent flow.

**CRESCENT BEACHES** - Crescent-shaped beaches concave toward the sea which form at the heads of bays and at the mouths of streams entering these bays along hilly and mountainous coasts.

**CREST** - The summit land of any eminence; the highest natural projection which crowns a hill or mountain, from which the surface dips downward in opposite directions.

**CRITICAL POINT** - A peak or high ground with abrupt local relief requiring investigation in planning aerial photography to avoid “*hidden ground.*”

**CRITICAL SURFACE** - A valley terrain of cylindrical form with the air base lying on or near the surface of the cylinder as extended into the air. Orientation becomes indeterminate.

**CROSS SECTIONING, DIGITAL** - The determination of a vertical section of terrain in which the measurements are stored as numerical values. See DIGITIZING.

**CUESTA** - A ridge, or belt of hilly land, formed on gently dipping rock strata (e.g. on a coastal plain) from the more durable layers, which resist denudation better than the weaker layers, and are thus left behind as uplands; it has a gentle dip slope on one side, and a relatively steep scarp slope on the other.

**CULTURE** - Those features of the terrain that have been constructed by man, such as roads, trails, buildings and boundary lines.

**CULVERT** - A structure carrying traffic over a watercourse having a 10 feet or less clear span. Usually a pipe section.

**CURVES** - Curved rulers, termed irregular curves, or French curves, used for drawing curved lines. The patterns for these curves are laid out in parts of ellipses and spirals or other mathematical curves in various combinations. Curves for drawing circular curves are highway curves.

**CUT** - 1) Depth to which material is to be excavated (*cut*) to bring the surface to a predetermined grade. Therefore, the cut is the difference in elevation of a surface point and a point on the proposed subgrade vertically below it. 2) The name applied to the excavated area itself. 3) A graphic ray from a known plane table position to an unknown position. See CUT\*.

**CUT TAPE** - A survey tape on which the minor graduation are placed only between zero and one unit. See ADD TAPE.

## D

**DEP.** - Departure (of a traverse)

**DI-10** - A brand name of electronic distance measurement equipment.

**DATUM** - A position or element in relation to which others are determined; a reference system. In surveying, two principal types of datums are used - horizontal and vertical. See SEA LEVEL DATUM, NORTH AMERICAN DATUM OF 1927, 1927 NAD, HORIZONTAL GEODETIC DATUM and VERTICAL GEODETIC DATUM.

**DATUM PLANE** - A surface used as a reference from which to reckon heights or depths. The datum in most general use is based upon mean sea level and this is used as the reference for the first-order level net extending over the whole country.

**DATUM SHIFT** - A graphical correction required where source map data is on a different datum than the map under revision.

**DEFLECTION ANGLE (USGS)** - The angle, measured in the vertical plane containing the flight direction, between the datum of a model in a stereotriangulated strip and the datum of the preceding model. See DEFLECTION ANGLE\*.

**DELINEATION** - The visual selection and distinguishing of mapworthy features on the surface of various possible source materials by outlining the features on the source material, or on a map manuscript (as when operating a stereoscopic plotting instrument); also, a preliminary step in compilation. See COMPILATION and PHOTO DELINEATION.

**DELTA** - The fan-shaped alluvial tract formed at the mouth of a river, when it deposits more solid material there than can be removed by tidal or other currents.

**DENSITOMETER** - Device used to measure the average grey-tone density of images on a piece of film. The measurement may be a meter reading or an electronic signal. When the observed area is smaller than a few hundred microns, the instrument is called a microdensitometer.

**DENSITY** - 1) The comparative amount of silver (or dye) in a given area of a photograph resulting from exposure to light and development. 2) Descriptive of the number of survey control points in an area.

**DEPARTURE** - The east-west component of a traverse course.

**DEPRESSION ANGLE** - The vertical angle measured at the perspective center between the true horizon and the photograph perpendicular. The complement of an angle of tilt.

**DEPRESSION CONTOUR** - A contour forming a closed loop around lower ground.

**DEPTH CURVE** - A line connecting points of equal depth, referenced to a water surface. Intervals between depth curves may be variable.

**DEPTH OF FIELD** - The range of object distance (lens to object) within which images formed by a lens, on a given surface, have acceptable sharpness.

**DEPTH OF FOCUS** - The range of image distances (lens to object) within which the images formed by a lens, on a given surface, have acceptable sharpness. In photogrammetry it defines the range through which the projection distance of a photogrammetric projector can be varied while preserving satisfactory image detail in the stereoscopic model.

**DESCRIPTION** - The formal published data describing each triangulation, trilateration, traverse station, bench mark or other mark preserving horizontal position and/or elevation. The description contains information regarding location, type of mark and augmenting data which will help find the mark and identify it.

**DESERT** - An almost barren tract of land in which the precipitation is so scanty or so sporadic that it will not adequately support vegetation.

**DETAILS** - The small items or particulars of information shown on a map by lines, symbols, and letting. The greater the omission of details the more generalized the map.

**DIAPHRAGM** - The device for controlling the size of the opening of a lens. The size of the lens opening governs the amount of light reaching the film.

**DIAPOSITIVE** - A positive photographic print on a transparent medium, generally glass, for use in a plotting instrument.

**DIAPOSITIVE CENTERING DEVICE** - (USGS) A special device used to position the principal point of a diapositive with respect to the plateholder.

**DIAPOSITIVE** - A device for making positive copies of negatives in proper format for photogrammetry.

**DICHROMATE PROCESS** - A photographic rub-on color process used to transfer from one drawing to another.

**DIFFERENTIAL LEVELING** - The process of measuring distances in elevation by spirit leveling.

**DIFFERENTIAL SHRINKAGE** - The difference in unit contraction along the grain structure of material as compared to the unit contraction across the grain structure; frequently applied to photographic film and papers and to mapping papers in general.

**DIGITAL IMAGE (OR DIGITIZED IMAGE)** - An image composed of small, uniformly shaped regions each of which have assigned coordinates and a grey tone. See RESOLUTION CELL.

**DIGITAL MAPPING** - The process of generating a map using computer-processed data in numerical form.

**DIGITIZING** - The conversion of a space relationship or measurement to numerical values in which mapping or cross-section data is converted to punch card form by a transducer and digitizer coupled to a recording system.

**DIP ANGLE** - The vertical angle of the observation point between the plane of the true horizon and a sight line to the apparent horizon. In photogrammetry, this angle is measured in the principal plane of the photograph at the exposure station.

**DIRECT ANGLE** - An angle measured directly between two lines, as distinguished in transit traverse from a deflection angle.

**DIRECT COPY** - See AUTOPOSITIVE.

**DIRECT MEASUREMENT** - Determination of a distance by physical comparison or accumulation of distance using a device calibrated in some unit of measure. See INDIRECT MEASUREMENT.

**DIRECTION** - The angle between a line and an arbitrarily chosen reference line. When the reference line is north or south and the angle is measured east or west, the direction is called a bearing. When the reference line is south and the angle is clockwise, the direction is called an azimuth.

**DIRECTION THEODOLITE** - An instrument which has a horizontal circle which remains in one position during one set of observations.

**DIRECT POSITIVE** - A film. See AUTOPOSITIVE.

**DIRECT RADIAL PLOT** - See RADIAL TRIANGULATION.

**DIRECT RADIAL TRIANGULATION** - See RADIAL TRIANGULATION.

**DIRECT TIE** - See DIRECT TIE\*.

**DISCREPANCY** - The difference between two results of measurement or computation.

**DISPLACEMENT** - 1) Any shift in image position which does not affect the perspective characteristics of the photograph. 2) Horizontal shift of plotted position of a topographic feature caused by adherence to prescribed line weights and symbol sizes. See TILT DISPLACEMENT and RELIEF DISPLACEMENT.

**DISSECTED PLATEAU** - A Plateau into which a number of valleys have been carved by erosion; its origin as a plateau is patent, however, when the tops of the mountains and ridges are seen to be level against the skyline, it shows that they once formed part of a continuous surface.

**DISTANCE ANGLE** - The angle in a triangle under a law-of-sines computation which is opposite the known distance.

**DISTORTION** - Any shift in the position of an image on a photograph which alters the perspective characteristics of the photograph. Causes of image distortion include lens aberration, differential shrinkage of film or paper, and motion of the film or camera. See **FILM DISTORTION** and **LENS DISTORTION**.

**DISTORTION CURVE** - A curve representing the distortion characteristics of a lens; it is plotted with image radial distances from the lens axis as abscissas and image radial displacements as ordinates. Image displacements away from the lens axis are considered as positive.

**DIURAL** - Having a period of, or occurring in, or related to, a day.

**DIVIDE** - A ridge or area of elevated land between two basins or valleys.

**DIVIDED HIGHWAY** - A highway with separated roadways for traffic in opposite directions.

**DODGING** - The process of holding back light from certain areas of sensitized material to avoid overexposure of these areas.

**DOMESTIC MAP** - A mapped area of the U.S.A.

**DOPPLER EFFECT (Also DOPPLER SHIFT)** - Apparent change in frequency of radiant energy (sound waves, or electrical waves) when the distance between the source and the observer or receiver is constantly changing.

**DOT GRAVER** - A device for drilling a small circular hole for scribing maps.

**DOT GRID** - Film positive with regularly spaced dots used as an overlay over a photo or map in determining areas.

**DOUBLE CENTERING** - A method of prolonging a line from a fixed point whereby the backsight is taken with the telescope in the direct position. The telescope is placed in the indirect position and the foresight is made. The point at which the vertical cross-hair intersects the hub is then marked. The transit is then rotated 180° to take a backsight with the telescope in the indirect position, and a second projected point with the telescope in the direct position is marked on the hub. A point midway between the two marked points is the true point on the prolonged line.

**DOUBLE-RODDED LINE** - A line of leveling wherein two sets of turning points are used to give independent sets of measurements from the same instrument setups.

**DRAFTING GUIDE** - See **COLOR-SEPARATION GUIDE**.

**DRAINAGE** - All map features associated with water runoff.

**DRAINAGE AREA** - The area of a drainage basin.

**DRIFT** - 1) The horizontal displacement of an aircraft, caused by the force of wind, from the track it would have followed in still air. 2) A special condition of crab wherein the photographer has continued to make exposures oriented to the predetermined line of flight while the airplane has drifted from that line.

**DUMPY LEVEL** - A leveling instrument with its telescope permanently attached to the vertical spindle or leveling base as a single unit.

**DUNE** - A hill or ridge of sand formed by transportation by the wind.

**DUPLICATING FILM** - Sensitized emulsion on transparent base manufactured for the special purpose of duplicating photographs, particularly color photographs.

## E

**EC STATION** - 1) Extended control station. 2) Electronic control station.

**ER-55** - See later in this section.

**ESNA** - Electrical Survey Net Adjuster.

**ECCENTRICITY** - 1) The amount of deviation from a center. 2) Lack of coincidence of the several centers of rotation, circles, and indexes of an instrument. 3) Horizontal displacement of the instrument or signal from the station mark at the time an observation is made. 4) A measure of the relative shape of an ellipse or an ellipsoid.

**ECCENTRICITY CORRECTION** - The correction that must be applied to an observation made from an eccentric setup (reduction to center) or to an eccentric signal to compensate for eccentricity. See **REDUCTION TO CENTER** and **SWING**.

**ECCENTRIC SIGNAL** - A signal (target) which is not in the same vertical line with the station which it represents.

**EDGE ENHANCEMENT** - Image alternation which intensifies the changes between adjacent areas.

**EDITING** - Checking a map in its stages of preparation to insure correct interpretation of the sources used and precise reproduction.

**EFFECTIVE FOCAL LENGTH (USGS)** - The adjusted value of the focal length of a lens which best fulfills the geometric conditions of a given photogrammetric operation. In making diapositive plates, the settings of the printer are based on the effective focal length derived from the calibrated focal length and further adjusted to allow for film distortion. In photoalidade operation, the effective focal length is the setting of the focal-length scale which best brings a specific photograph into proper geometric perspective. The preferred expression for this value is "*principal distance*."

**ELECTRICAL SURVEY-NET ADJUSTER** - A panel containing a number of adjustable resistances and d-c power sources for adjustment of survey data.

**ELECTROMAGNETIC RADIATION** - Energy propagated through space or through a material medium as waves or variations of electric and magnetic fields; known as radio waves, heat waves, light waves, etc., depending upon frequency. Also called electromagnetic energy.

**ELECTROMAGNETIC SPECTRUM** - Ordered array of known electromagnetic radiations, extended from the shortest cosmic rays, through gamma rays, X-rays, ultraviolet radiation, visible radiation, infrared radiation, and including microwave and all other wavelengths of radio energy.

**ELECTRONIC COLOR COMBINER** - An instrument which produces false color image by linearly combining a few black-and-white films of the same scenes. The films are usually obtained from multiband and time-sequential photography. The films are put in synchronized flying spot scanners, the resulting video signals are linearly combined through a matrix multiplier circuit, and the three linearly combined signals then drive the color gun of a color TV tube. An electronic color combiner usually has greater versatility for congruencing or registering.

**ELECTRONIC DISTANCE MEASUREMENT (EDM)** - Measurement made with devices that compare the phase difference between transmitted and returned (i.e., reflected or retransmitted) electromagnetic waves, of known frequency and speed, or the round-trip transit time of a pulsed signal, from which distance is computed.

**ELECTRONIC TRAVERSE** - A traverse in which the angles are measured with a direction theodolite and distances with an electronic distance-measuring instrument.

**ELEVATION** - The vertical distance from a datum, generally mean sea level, to a point or object on the earth's surface. The terms "*elevation*" and "*altitude*" have sometimes been used synonymously, but in modern surveying practice the term "*elevation*" is preferred to indicate heights on the earth's surface whereas "*altitude*" is used to indicate the heights of points in space above the earth's surface. See FIELD ELEVATION, SPOT ELEVATION and CHECKED ELEVATION.

**ELEVATION METER** - A mechanical or electromechanical device on wheels that measures slope and distance and automatically and continuously integrates their product into difference elevation.

**ELEVATION TINT** - The layer of color between selected contours, according to altitude. This is a method of obtaining a mental picture of the terrain more readily.

**ELEVATION TONES** - A method of accentuating the elevation expressed by contours through the use of colors or different tones of the same color.

**ELLIPSOID** - The surface generated by rotation of an ellipse about one of its axes.

**ELLIPSOIDAL REFLECTOR** - A mirror surface which conforms to a portion of an ellipsoid of revolution. See ER-55 PLOTTER.

**EMISSION** - With respect to electromagnetic radiation, the process by which a body emits electromagnetic radiation as a consequence of its temperature only.

**EMULSION** - A suspension of a light-sensitive material in gelatin, used for coating photographic film, plates, or papers.

**ENCODER** - A mechanism usually attached to the output of a measuring device (or photogrammetric instrument) which converts movements into digital information. See DIGITIZING.

**ENDLAP** - Progressive forward overlap of aerial photos along the line of flight.

**ENGINEERING MAP** - A map showing information that is essential for planning an engineering project or development. An engineering map is generally a large-scale map of a comparatively small area or of a route. It may be entirely the product of an engineering survey, or reliable information may be collected from various sources and delineated on a base map.

**ENGINEERING SURVEY** - The process of collecting and recording information for planning an engineering project.

**ENGINEER'S LEVEL** - A precision leveling instrument for establishing horizontal line of sight, used to determine differences of elevation.

**ENHANCEMENT** - Various processes and techniques designed to render optical densities of imagery more susceptible to interpretation.



**EPHEMERIS (PLURAL EPHEMERIDES)** - A tabulation of positions and related data for a celestial body for given dates at uniform time intervals. Also, a publication containing such data for a number of celestial bodies. See EMPHEMERIS\*.

**EPOLAR PLANE** - Any plane containing the air base.

**EQUALITY** - Equality or equation in station numbers arises when a single point on a route alignment has two values. Thus station  $123 + 45.6$  ahead =  $123 + 54.3$  back.

**EQUATION** - 1) A statement of equality of the same point on a route survey which has two values. 2) One of a set of simultaneously solved equality statements which adjust for fixed conditions of length, angles, azimuth or position in least squares adjustment. See EQUALITY.

**EQUIVALENT FOCAL LENGTH** - The distance measured along the lens axis from the rear nodal point to the plane of best average definition over the entire field used in the aerial camera.

**ER-55 PLOTTER** - A stereoscopic plotting instrument of the direct-viewing, double projection type, characterized by the use of reduced size diapositives and an ellipsoidal-reflector illumination system in which the light source is at one focus of the ellipsoidal surface and the projector lens is at the other, producing optimum illumination of the entire image area of the diapositive. The principal distance of the projectors is 55 mm. The commercially manufactured version of this plotter is the Balplex.

**ERROR** - A class of small inaccuracies due to imperfections in equipment or techniques, surrounding conditions, or human limitations; not to be confused with blunders or mistakes. See ACCIDENTAL ERROR, AVERAGE ERROR, CONSTANT ERROR, COMPENSATING ERROR, INDEX ERROR, INSTRUMENTAL ERROR, PERSONAL ERROR, PROBABLE ERROR, MEAN ERROR, RANDOM ERROR, ROOT MEAN SQUARE ERROR, STANDARD ERROR, and SYSTEMIC ERROR.

**ERROR OF CLOSURE** - The amount by which a value of quantity obtained by surveying operations fails to agree with a fixed or theoretical value of the same quantity.

**ERROR OF THE MEAN** - The resultant error of the mean or average of a number of quantities. It is the quotient of the algebraic sum of the errors divided by the number of errors included.

**ESTUARINE** - Of, or pertaining to, or formed in a estuary.

**ESTUARY** - Drainage channel adjacent to the sea in which the tide ebbs and flows. Some estuaries are the lower courses of rivers or smaller streams, others are no more than drainage ways that lead seawater into and out of coastal swamps.

**ETCHED DRAWING** - A color-separation negative produced by a photomechanical process. See PHOTOMECHANICAL ETCHING.

**ETCHING** - See PHOTOMECHANICAL ETCHING.

**EXPOSURE** - 1) A photograph. 2) The control of light in making a photograph. Exposure-data refers to camera shutter and aperture settings, together with light intensity measurements, filter factors, and all such controls of light reaching the film.

**EXPOSURE INTERVAL** - The time interval between taking successive photographs.

**EXPOSURE STATION** - The point in space occupied by the camera lens at the time of taking the picture.

**EXTENDED CONTROL STATION** - A described and monumented point established as a basis of subsidiary surveys, usually for Airborne Control System use. Triangle figures or electronic traverses are used to establish position based on higher order surveys in nearby areas.

**EXTENSION OF CONTROL** - Surveys executed to establish additional control from existing control.

**EXTERIOR NODE** - See NODAL POINTS.

**EXTERIOR PERSPECTIVE CENTER** - See NODAL POINTS.

**EXTRAPOLATE** - To calculate the value of a function lying beyond an interval from values of the function within that interval. In topographic surveys extrapolation is used in estimating the elevation of a point so situated that the elevation cannot be interpolated between two contour lines..

**EYE BASE** - The distance between the pupils of the eyes of an individual; also called interpupillary distance or interocular distance.

**EYEPIECE** - The lens or combination of lenses at the observing end of one optical distance.

**EYOTT** - A small island arising in a river.

## F

**f STOP** - A point on the scale of graduations of lens aperture size. The function of focal length divided by aperture of a lens.

**FALSE COLOR** - Reproduction that shows objects in colors other than their true color. Usually refers to color infrared.

**FALSE ORIGIN** - An arbitrary zero point to the south and west of a grid zone which is assigned to avoid negative coordinate values.

**FATHOM** - 1) A unit of distance equivalent to 6 feet, used primarily in marine depth measurements. 2) To find the depth of something; to sound.

**FEATHERING** - 1) The technique of progressively dropping contours, to avoid congestion on steep slopes. 2) The thinning of overlapping edges of photographs before assembly into a mosaic in order to make match lines less noticeable.

**FERTSCH EFFECT** - A phenomenon of physiological optics that occurs with rapid scanning of a stereomodel in a direction parallel to the eye base and that appears as a vertical displacement of the floating mark which reverses with the direction of scanning. The effect is directly related to the relative brightness of the two exposures in the immediate vicinity of observation, and to the fact that the human eye tends to detect the movement of the floating mark more quickly in a bright background than in a dark one.

**FIDUCIAL AXES** - The imaginary lines defined by opposite fiducial marks on a photograph. The x axis is considered to be the axis nearly parallel with the flight lines.

**FIDUCIAL MARKS** - Those marks, which define the axes whose intersection fixes the principal point of the photograph. See FIDUCIAL AXES.

**FIELD BOARD** - Slang for planetable sheet. See preferred FIELD SHEET.

**FIELD CHECK (USGS)** - An on-the-site comparison of the features shown on a map compilation with the ground features.

**FIELD COMPLETION (USGS)** - Obtaining in the field additional information needed to edit and publish a topographic quadrangle map from a compiled manuscript. It includes a comprehensive examination of the compilation for completeness, quality, and topographic expression; the addition, deletion, or correction of map features; the classification of buildings, roads, drainage, and woodland; the mapping of public-land subdivision lines and civil boundaries; obtaining name information; and checking the map for compliance with vertical-accuracy standards.

**FIELD CONTOURING** - Placing contours on a topographic map by planetable surveys on a prepared base.

**FIELD COPY** - See preferred FIELD SHEET.

**FIELD EDIT** - See preferred FIELD COMPLETION.

**FIELD ELEVATION** - Any elevation determined by field methods.

**FIELD INSPECTION** - The process of comparing aerial photographs with conditions as they exist on the ground and of obtaining information to supplement or clarify that which is not readily discernible on the photographs themselves.

**FIELD PHOTOINTERPRETATION** - The operation of annotating aerial photographs in the field to clarify uncertain photoimages, to add details not discernible on the photographs, and to delete features appearing on photographs not mapworthy or no longer present on the ground. See ADVANCE FIELD COMPLETION.

**FIELD POSITION (USGS)** - 1) A position determined by field work. 2) A position computed while field work is in progress.

**FIELD SHEET (USGS)** - A sheet of stable material generally used on a planetable board, either blank or with compiled data, on which fieldwork is plotted. Also called a planetable sheet. In field completion surveys, it contains the compilation to be completed.

**FIELD SKETCHING (USGS)** - The art of drawing or filling in map detail based on selected positions and elevations plotted on a planetable sheet.

**FILL** - Use of material to equalize or to raise topography to a certain grade; to build up with fill; to fill low ground with sand, gravel or earth; the material used to artificially raise topography.

**FILM BASE** - A thin flexible transparent sheet of material used as a support for photographic emulsion.

**FILM DISTORTION** - The nonuniform dimensional changes which occur in photographic film with changes in humidity or temperature, or from aging, handling, or other causes. (Note: The failure of film to be flat in the camera at the instant of exposure is sometimes referred to, incorrectly, as film distortion. Although lack of flatness may result in errors on the photograph similar to those caused by film distortion, the cause of these errors is incomplete functioning of the pressure or vacuum system of the camera rather than dimensional instability of the film.)

**FILM MOSAIC (USGS)** - An assembly of film negatives or positives of a map manuscript adjusted and fitted to a map projection constructed on a transparent base.

**FILTER** - 1) An electronic device for eliminating or reducing certain waves or frequencies while leaving others relatively unchanged. 2) Any material which modifies radiation transmitted through an optical system by absorption, reflectance, polarizing or scattering.

**FIORD** - A long, narrow inlet into the sea-coast, with more or less steep sides.

**FIRST ORDER** - The designation given survey work or equipment which conforms to the highest standards of precision and accuracy. See CONTROL SURVEY CLASSIFICATION.

**FIRST ORDER MAGNITUDE RELIEF FEATURE** - A continent or an ocean basin.

**FIRST ORDER PLOTTER** - An obsolescent term originally designating a stereo instrument capable of performing aerotriangulation.

**FIXED** - A descriptive term used with a bench mark, point, position, station, etc., to designate a point for which geodetic coordinates (latitude and longitude, or elevation) have been established by a previous adjustment or by a more precise survey and are to be held without disturbance in a newer survey or adjustment. See FIXED BOUNDARY\*.

**FIXING** - The process of rendering a developed photographic image permanent by chemically removing the unaffected light-sensitive material.

**FLAT** - 1) A level surface, without elevation, relief, or prominences; a plain; a level tract along the banks of a river. 2) A level tract lying at little depth below the surface of the water, or alternately covered and left bare by the tide. See OPTICAL FLAT.

**FLATNESS OF FIELD** - The quality of a lens which affords sharpness of image both in the center and at the edges of a negative.

**FLICKER METHOD** - The alternative projection of corresponding photographic images onto a tracing-table platen or projection screen, or into the optical train of a photogrammetric instrument. See STEREO IMAGE ALTERNATOR.

**FLIGHT ALTITUDE** - The vertical distance above sea level of an aircraft in flight. In aerial navigation practice the altitude of an aircraft is always stated in relation to sea level. See FLIGHT HEIGHT.

**FLIGHT HEIGHT (OR FLYING HEIGHT)** - The vertical distance between an aircraft in flight and the mean ground level of the area being photographed.

**FLIGHT HEIGHT TO CONTOUR INTERVAL RATIO** - See C FACTOR.

**FLIGHT LINE** - A line drawn on a map or chart to represent the planned or actual track of an aircraft.

**FLIGHT MAP** - A map on which are indicated the desired flight lines and (or) the positions of exposure stations before aerial photographs are taken, or a map on which are plotted, after photography, selected air stations and the tracks between them.

**FLIGHT SPACING** - The distance between adjacent tracks in a series of parallel aircraft flights.

**FLIGHT STRIP** - A succession of overlapping aerial photographs taken along a single course.

**FLOATING MARK** - A mark seen as occupying a position in the three-dimensional space formed by the stereoscopic fusion of a pair of photographs and used as a reference mark in examining or measuring the stereoscopic model. The mark may be formed (1) by a real mark lying in the projected object space, (2) by two real marks lying in the projected or virtually projected object spaces of the two photographs, (3) by two real marks lying in the planes of the photographs themselves, and (4) by two virtual marks lying in the image planes of the binocular viewing apparatus.

**FLOOD-PLAIN** - A plain, bordering a river, which has been formed from deposits of sediment carried down by the river. When a river rises and overflows its banks, the water spreads over the flood-plain; a layer of sediment is deposited at each flood, so that the flood-plain gradually rises.

**FLY LEVELING** - Spirit leveling in which some of the restrictions of precise leveling, such as limiting lengths of sights and balancing backsight and foresight distances, are relaxed to obtain elevations of moderate accuracy more rapidly.

**FOCAL LENGTH** - A general term for the distance between the center, vertex, or rear node of a lens (or the vertex of a mirror) and the point at which the image of an infinitely distant object comes into critical focus. The term must be preceded by an adjective such as "*equivalent*" or "*calibrated*" to have a precise meaning. See BACK FOCAL LENGTH, CALIBRATED FOCAL LENGTH, EFFECTIVE FOCAL LENGTH, EQUIVALENT FOCAL LENGTH and NORMAL FOCAL LENGTH.

**FOCAL PLANE** - The plane perpendicular to the optical axis of the lens in which images of points in the object field are focused.

**FOCUS** - The point toward which rays of light converge to form an image after passing through a lens or reflecting from a mirror. Also defined as the condition of sharpest imagery. See DEPTH OF FOCUS.

**FOOT-METER ROD (USGS)** - A stadia rod graduated in feet on one side and in meters on the other.

**FOOT PLATE** - A metal plate with a knob used as turning point in leveling across sand.

**FORESIGHT** - 1) A sight on a new survey point in connection with a survey, or on a previously established point to close a circuit. 2) In leveling, a reading on a rod held on a point to determine its elevation. See SIDE SHOT and FORESIGHT\*.

**FORMAT** - 1) The dimensions of the negative area within the focal-plane frame of the camera. 2) The dimensions of a map.

**FORMAT CENTER** - The point near the center of a photograph at the intersection of the lines between fiducial marks.

**FORM LINES** - Lines resembling contour lines, drawn to represent the shape of the terrain but without regard to true vertical datum or regular spacing.

**FOUND CORNER** - A term adopted by the U.S. Geologic Survey for an existent corner of the Public Lands Surveys which has been recovered by field investigation. See CORNER\*.

**FRACTIONAL SCALE** - A map scale expressed as a fraction, as 1/24,000. See REPRESENTATIVE FRACTION.

**FREQUENCY** - Number of repetitions of a periodic process per unit time.

**FUSION** - That metal process which combines the two perspective images on the retinas of eyes in such a manner as to give a mental impression of three dimensional model.

## G

**GAT** - Greenwich Apparent Time.

**GCT** - Greenwich Civil Time.

**GHA** - Greenwich Hour Angle.

**GMT** - Greenwich Mean Time.

**GAP** - Any space where aerial photographs fail to meet minimum coverage requirements.

**GENERALIZATION** - Modification of contours on a source map preparatory to reduction and conversion to larger contour interval to show terrain without clutter.

**GENERAL PURPOSE MAP (USGS)** - A map designed to provide a large amount of general information for widespread public use.

**GEODESIC** - The shortest line connecting two given points on the surface of an ellipsoid.

**GEODESY** - The science which treats mathematically the shape and size of the earth; also, the branch of surveying in which measurements are made for determining the shape of the earth including precise horizontal and vertical positions on its surface. One branch of geodesy includes gravity forces.

**GEODETTIC** - Referred to or based on considerations of geodesy.

**GEODETTIC AZIMUTH** - The horizontal angle at station A measured from a north-south plane (perpendicular to the reference ellipsoid) clockwise to an ellipsoidal normal section passing through station B. Geodetic azimuth is determined by applying a correction to astronomic azimuth or by computations on the referenced ellipsoid. The azimuth from A toward B is the forward azimuth while the azimuth from B toward A is the back azimuth of station B. See GEODETTIC.

**GEODETTIC CONTROL** - A system of horizontal or vertical survey stations that have been established and adjusted by geodetic methods.

**GEODETTIC CONTROL DIAGRAMS** - A series of index maps which show the location of precise surveys of U.S.C. & G.S., U.S.G.S. and other agencies.

**GEODETTIC COORDINATES** - Quantities which define a horizontal position on an ellipsoid of reference with respect to a geodetic datum. See GEOGRAPHIC COORDINATES.

**GEODETTIC LATITUDE** - 1) the angle between the plane of the equator of the referenced ellipsoid and the normal to the ellipsoid surface. 2) The latitude of a point determined by geodetic methods.

**GEODETTIC LEVELING** - Spirit leveling of a high order of accuracy, generally extended over large areas, with application of orthometric corrections, to furnish accurate vertical control for surveying and mapping operations.

**GEODETTIC LINE** - See GEODETTIC.

**GEODETTIC LONGITUDE** - 1) The dihedral angle between an arbitrary meridian and the meridian of an ellipsoidal normal. 2) A longitude determined by geodetic methods.

**GEODETIC NORTH** - The direction of the pole of the earth ellipsoid of reference.

**GEODETIC POSITION** - Geographic coordinates of a point determined by geodetic methods.

**GEODETIC SATELLITE** - An earth orbiting satellite equipped to make it useful for geodetic observations.

**GEODETIC SURVEY** - A precise survey of considerable extent which takes into account the shape of the earth.

**GEODIMETER** - Trade name for an electronic distance measuring system.

**GEOGRAPHIC** - Signifying basic relationship to the earth considered as a globe-shaped body. The term "*geographic*" is applied alike to data based on the ellipsoid (geodetically determined) and on the geoid (astronomically determined).

**GEOGRAPHIC COORDINATES** - (U.S.C. & G.S. Sp. Pub 242) An inclusive term, used to designate both geodetic coordinates and astronomic coordinates.

**GEOGRAPHIC POSITION** - Coordinates usually expressed as latitude and longitude of a point which are usually determined by geodetic methods but occasionally by astronomic observations.

**GEOID** - The figure of the earth considered as a sea level surface extended continuously through the continents. It is a theoretically continuous surface that is perpendicular at every point to the direction of gravity (the plumbline). It is the surface of reference for astronomic observations and for geodetic leveling.

**GEOLOGIC SURVEY** - A survey or investigation of the character and structure of the earth.

**GEOLOGY MAP** - A map showing contours and various strata of soils and underlying rocks composing the surface of the mapped area.

**GORE (USGS)** - 1) An irregularly shaped tract of land, generally triangular, left between two adjoining surveyed tracts, because of inaccuracies in the boundary surveys or as a remnant of a systematic survey. 2) A lune shaped map used in making a globe. 3) A fillet of paved surface between two merging highway lanes. See HIATUS.

**GORGE** - A valley which is more than usually deep and narrow, with steep walls; there is no sharp distinction between a gorge and a canyon, though the latter is generally of much greater size. The sides of a small gorge are sometimes nearly vertical.

**GRAD** - A European angular unit of measure equal to 1/400th of a full circle. Also spelled GRADE

**GRAIN** - 1) One of the discrete silver particles resulting from the development of an exposed light-sensitive material. 2) The fibers of a paper, such as that used for photographic prints. 3) The predominant direction in which fibers run.

**GRAPHIC RECTIFICATION** - A technique for determination of photograph rectification by graphical means.

**GRAPHIC SCALE** - See BAR SCALE.

**GRATICULE** - 1) A network of lines. 2) The network of parallels of latitude and meridians of longitude plotted on a map, or chart according to a projection.

**GRAVER** - A scribing instrument for cutting through the plastic coating without disturbing the base material. See BUILDING GRAVER, COMBINATION GRAVER, DOT GRAVER, PEN-TYPE GRAVER, RIGID GRAVER, and SWIVEL GRAVER.

**GREAT CIRCLE** - The line of intersection of the surface of a sphere with any plane which passes through the center of the sphere.

**GREENWICH MERIDIAN** - The meridian passing through the original site of the Royal Observatory, Greenwich, England; uses as zero degrees longitude.

**GRID** - A network composed of two sets of lines, each set drawn according to a definite pattern and intersecting the other in a specific geometric arrangement. The most common form of grid consists of uniformly spaced parallel lines intersecting at right angles. The term is frequently used to designate a plane-rectangular coordinate system superimposed on a map projection, in which case it generally carries the name of the projection; that is, Lambert grid, transverse Mercator grid, Universal transverse Mercator grid.

**GRID AZIMUTH** - Azimuth referred to the Y (or N) axis of a grid system.

**GRID DISTANCE** - See GRID LENGTH.

**GRID LENGTH** - The distance between two points obtained by inverse computation from grid coordinates of the points. It differs from the geodetic length by the amount of small correction based on the scale factor for the line.

**GRID METHOD** - A method of plotting detail from oblique photographs by superimposing a perspective of a grid on a photograph, thereby facilitating the transfer of detail from the photograph to a base.

**GRID NORTH** - The direction of the earth's polar axis as plotted ( or computed) on a map projection.

**GRID PLATE** - A glass plate on which a grid is accurately ruled, used principally for the calibration of photogrammetric instruments. See RESEAU.

**GRID TICK** - A small mark placed at the edge of a map or drawing to indicate a measurement.

**GROUND CONTROL POINT** - Any point that has a known location on the earth's surface which can be identified in ERTS imagery. See CONTROL, PHOTO.

**GROUND DISTANCE** - A measured distance not yet reduced to sea level (geodetic) distance.

**GROUND RESOLUTION** - The minimum distance between two objects on the ground (or size of object on the ground) that can be detected.

**GROUND SPEED** - The velocity of an aircraft along a track with relation to the ground; the resultant of the heading and airspeed of an aircraft and the direction and velocity of the wind.

**GROUND SURVEY** - A survey made by measurement on the surface of the earth as distinguished from aerial survey.

**GROUND SWING** - An error condition in microwave distance measurement caused by reflected waves from water, pavement or other smooth surface. The reflected wave combines with the direct wave causing error which can be eliminated by frequency changes.

**GROUND TRUTH** - Term coined for information obtained on surface or subsurface features to aid in interpretation of remotely sensed data. A vague, misleading term suggesting that the truth may be found on the ground. Ground data and ground information are preferred terms.

**GULCH** - A small ravine; a small, shallow canyon with inclined slopes and steep sides.

**GULF** - A portion of the sea partially enclosed by a more or less extensive sweep of the coast. The distinction between gulf and bay is not always clearly marked, but in general a bay is wider in proportion to its amount of recession than a gulf; the latter term is applied to long landlocked portions of sea opening through a strait, which are never called bays.

**GUYOT** - See TABLEMOUNT.

**GYROCOMPASS** - A north seeking device consisting of a gimballed rotating wheel which aligns itself to the earth's rotation. Some aircraft magnetic compasses are gyroscopically stabilized and are also called gyrocompasses.

**GYRO THEODOLITE** - A theodolite with a gyrocompass attached.

## H

**HI** - Height of instrument. See HI\*.

**HACHURES** - A series of lines used on a map to indicate the general direction and steepness of slopes. The lines are short, heavy, and close together for steep slopes; longer, lighter, and more widely spaced for gentle slopes.

**HALATION** - Reflection during exposure from a film base from a bright area to an adjacent area of the emulsion giving the appearance of a halo upon development.

**HANGING VALLEY** - The valley of a tributary which enters a main river valley from a considerable height above the bed of the latter, and so forms rapids or waterfalls down the slope.

**HARBOR** - A stretch of water on the coast which affords shelter to seagoing vessels; it may have been formed naturally, or artificially, or by artificial improvement of a natural feature.

**HAZE** - Interference with visibility or photographic resolution caused by particles in the atmosphere scattering or reflecting light.

**HEAD** - A comparatively high promontory with either a cliff or steep face. It extends into a large body of water, such as a sea or lake. An unnamed head is usually called a headland.

**HEADLAND** - A steep crag or cliff jutting out into the sea.

**HEAVY PLOTTER** - An obsolescent term indicating a precise photogrammetric instrument such as the Stereoplanigraph or Wild A7.

**HEIGHT DISPLACEMENT** - Displacement of images radially inward or outward with respect to the photograph nadir, according as the ground objects are, respectively, below or above the elevation of the ground nadir.

**HEIGHT OF INSTRUMENT (HI)** - 1) The height of the center of the telescope (horizontal axis) above the ground or station mark. 2) The height of the line of sight of the leveling instrument above the adopted datum.

**HERTZ (Hz)** - Unit of frequency, cycles per second, in the International System.

**HIATUS** - A gap in aerial photo coverage. See GAP and HIATUS\*.

**HIDDEN GROUND** - An area which cannot be observed in a photograph because of interference from topographic features.

**HIGHLIGHTS** - 1) Those portions of a subject from which the greatest amounts of light are reflected. 2) The densest parts of a negative and the lightest parts of a print or transparency.

**HIGH-OBLIQUE PHOTOGRAPH** - A photograph taken with the camera axis intentionally tilted so as to include the apparent horizon.

**HIGH WATER** - The maximum elevation reached by rising water. See HIGH WATER MARK\*.

**HIGHWAY** - An undivided road, usually paved, having a built-up driving surface with shoulders. See JEEP TRAIL and ROAD.

**HIGHWAY CURVES** - Templates for drawing circular curves from their tangents.

**HILL** - A small portion of the earth's surface elevated above the surroundings, of lower altitude than a *Mountain*. In general, an eminence is not considered a mountain unless its elevation, from foot to summit, is well over 1,000 ft.

**HINTERLAND** - 1) That zone containing the beach flanks and the area inland from the coast line to a distance of five miles. 2) The region lying behind the coast district.

**HISTORIC COAST LINE\***.

**HOLOGRAPHY** - The process of recording and reproducing an image using two emulsion coated surfaces and a laser beam which scans the object. No lens is used. The viewer "*sees*" the object in three dimensions and the "*object*" can be turned to view it from different angles.

**HOOK** - A *Spit* which is curved at one end; the curvature may be caused by the action of the waves in rolling material to the sheltered side of the spit

**HORIZON** - A plane normal to the plumbline at the observers station. See APPARENT HORIZON and ARTIFICIAL HORIZON.

**HORIZON CAMERA** - A camera used in conjunction with an aerial surveying camera in vertical photography to photograph the horizon simultaneously with the vertical photographs. The horizon photographs indicate the tilts of the vertical photographs.

**HORIZON CLOSURE** - The amount by which the sum of a series of adjacent measured horizontal angles around a point fails to equal exactly  $360^\circ$ , the theoretical sum. See CLOSING THE HORIZON.

**HORIZONTAL** - A plane perpendicular to the plumbline at the point of consideration or origin.

**HORIZONTAL CONTROL** - Survey information which provides position information used for locating subordinate surveys or mapping.

**HORIZONTAL GEODETIC DATUM** - An ellipsoid of reference, defined by two dimensions or constants, an initial point on the reference ellipsoid (defined by latitude and longitude) and an azimuth from the initial point to another point. See NORTH AMERICAN DATUM OF 1927.

**HORIZONTAL PARALLAX** - See ABSOLUTE STEREOSCOPIIC PARALLAX.

**HORIZONTAL REFRACTION** - The lateral effect of terrestrial refraction on an observed direction

**HOVERSIGHT** - A basic component of an Airborne Surveys System developed by the U.S. Geologic Survey. It consists of a silicone-damped pendulum with a self-contained light source for projecting a beam of collimated light through a semitransparent mirror. The helicopter pilot can see the light-source image superimposed upon the image of the ground below.

**HYDRODIST** - A brand of electronic distance measurement device.

**HYDROGRAPHIC CHART** - A chart showing water features such as; depth, channels, islands, and other aids to navigation.

**HYDROGRAPHY** - Topography along shore lines, depths of water and submerged features of bodies of water. Also the science or study of bodies of water and related phenomena.

**HYPERFOCAL DISTANCE** - If an object at a great distance (infinity) be sharply focused, it is found that, without altering the position of the lens, a comparatively near object is still "*in focus*;" that is, it is rendered without perceptible unsharpness. The distance to this near point is the hyperfocal distance.

**HYPERANCHROMATIC** - Films and plates which have a high red sensitivity.

**HYPERSENSITIZING** - Applied to various methods of increasing the sensitivity of an emulsion; for example, fuming of bathing with ammonia, fuming with mercury, etc.

**HYPO** - Slang term for sodium hyposulphite, a common fixing agent in photo developing and printing.

**HYPSOGRAPHY** - See TOPOGRAPHY.

## I

**IMC** - Image Motion Compensation.

**IR** - Infrared.

**ICONOMETRY** - The process of conducting a plan and elevation from the perspective is termed iconometry. It is the reverse of drawing a perspective from plan and elevation. As applied to photographic surveying, iconometry is the process of making a map from photographs.

**IDENTIFICATION POSTS** - Wood or metal upright stake marked or tagged to help in recovery of survey stations.

**IMAGE COMPRESSION** - A remote sensing operation which preserved all or most of the information in the image and which reduces the amount of memory needed to store an image or the time needed to transmit an image.

**IMAGE ENHANCEMENT** - Any one of a group of operations which improve the detectability of the targets of interest. These operations include, but are not limited to, contrast improvement, edge enhancement, spatial filtering and noise suppression, image smoothing and image sharpening.

**IMAGE-MOTION COMPENSATION** - A device installed with certain aerial cameras to compensate for the forward motion of an aircraft while photographing ground objects. True image-motion compensation must be introduced after the camera is oriented to the flight track of the aircraft and the camera is fully stabilized.

**IMAGE POINT** - The image on a photograph corresponding to a specific point on the ground.

**IMAGE RAY** - Straight line from a ground object, through the camera lens, to the image on the photograph.

**IMAGERY** - Representation or reproduction of objects recorded on photographic emulsions; visual representation of energy recorded by remote sensing instruments.

**IN-AND-OUT STATION (USGS)** - A recoverable but unoccupied station incorporated into a traverse by recording a fictitious deflection angle of 180° to reverse the azimuth of the course leading into it, so that the next station coincided with the preceding station and the in-and-out station is used as the backsight for continuing the traverse. In the computations it is treated as an ordinary station in the traverse.

**INDEX CONTOUR** - A contour line shown distinctively for easy identification and generally labeled with the elevation value.

**INDEX CORRECTION** - A correction applied to the reading from any measuring device to compensate for index error. See INDEX CORRECTION\*.

**INDEX ERROR** - A constant instrumental error due to the displacement of the zero or index mark or vernier of an instrument or scale.

**INDEX MAP** - 1) A map showing location of collections of data which may be other maps, photos, statistical tables or descriptions. 2) A small scale map showing locations or other information about a survey or a project. See ADMINISTRATIVE INDEX MAP, CONTROL INDEX MAP, PHOTOCONTROL INDEX MAP, PHOTOGRAPHY INDEX MAP and SALES INDEX MAP.

**INDEX OF REFRACTION** - A ratio between the speed of light waves in a medium as compared to the speed in a vacuum.

**INDICATED CORNER** - A term adopted by the U.S. Geological Survey to designate corner of the public-land surveys whose location cannot be verified by the criteria necessary to class it as a found or existent corner, but which accepted locally as the correct corner and whose location is perpetuated by such marks as fence-line intersections, piles of rock, and stakes or pipe driven into the ground, which have been recovered by field investigation. See OBLITERATED CORNER\*.

**INDIRECT MEASUREMENT** - Any quantitative result determined from its relation to some measurement. A stadia distance, for example, is an indirect measurement.

**INDIRECT PHOTOGRAPHY** - Photography in which the camera records an image display (television, radar, and so forth).

**INERTIAL GUIDANCE** - A system for an indirect method of measurement which converts individual accelerations and elapsed time into velocity thence into distance traveled by the measuring system.

**INFRARED (IR)** - That portion of the electromagnetic spectrum bounded by visible light and by microwave radiation (generally from 0.70 microns to 1000 microns).

**INFRARED FILM** - Photographic film sensitized to record invisible rays beyond the red end of the light spectrum. It is also sensitive to blue and ultraviolet light and must be used with a red filter to screen out the latter.

**INFRARED IMAGERY** - A recording in graphic form of radiated electromagnetic energy in the heat (infrared) range of the spectrum.

**INFRARED PHOTOGRAPHY** - Commonly used term for imagery which is the product of direct-recording camera/infrared film equipment. See FALSE COLOR.

**INFRARED RADIATION** - Electromagnetic radiation lying in the wavelength interval from about .70 microns to an indefinite upper boundary sometimes arbitrarily set at 1000 microns (0.01 centimeter). At the lower limit of this interval, the infrared radiation spectrum is bounded by visible radiation, whereas on its upper limit it is bounded by microwave radiation of the type important in radar technology. See ELECTROMAGNETIC SPECTRUM.



**INFRARED SCANNER** - Instrument for obtaining thermal infrared imagery through line scanning techniques. See INFRARED THERMAL SENSING.

**INFRARED THERMAL SENSING** - Line scanning techniques using infrared scanners with detectors. Usually, the imagery is obtained from selected portions of the 3 to 14 micron region of the spectrum.

**INLET** - A narrow body of water extending into the land from a larger body of water.

**INSTRUMENTAL ERROR** - An error arising from imperfect condition of the instrument used. Such an error is usually systematic, but may be accidental or random.

**INSTRUMENT STATION** - A survey point at which a surveying instrument is set up for making measurements.

**INSULAR SHELF** - The subaqueous part of an island or archipelago extending from the shore outward beneath the shallow seas to a insular talus where the bottom slopes down rapidly to the ocean depths.

**INSULAR TALUS** - The steep slope from the lower edge on an insular shelf into the ocean depths. It is characterized by a marked change in gradient and usually begins at a depth of approximately 100 fathoms.

**INTERFEROMETER** - An apparatus used to produce and measure interference from two or more coherent wave trains from the same source. Interferometers are used to measure wavelengths, to measure angular width of sources, to determine the angular position of sources (as in satellite tracking), and for many other purposes.

**INTERIM REVISION (USGS)** - A type of limited revision which changes to a published map are determined by reference to current aerial photographs. Obsolete data are removed from the original drawings (but contours are not corrected), and all new data are combined on a single plate and overprinted in purple. The revised data is not field checked. See MAP REVISION.

**INTERIOR ANGLE** - An angle between adjacent sides of a closed figure, measured on the inside of the figure.

**INTERIOR NODE** - See NODAL POINTS.

**INTERIOR ORIENTATION** - The adjustment of a photograph to a position within a photogrammetric system so that the reconstructed cone of rays is geometrically identical with the cone of rays that entered the camera at exposure.

**INTERIOR PERSPECTIVE CENTER** - See NODAL POINTS.

**INTERMEDIATE BENCH MARK** - See BENCH MARK, NONMONUMENTED.

**INTERMEDIATE CONTOUR** - A contour line drawn between index contours.

**INTEROCULAR DISTANCE** - See INTERPUPILLARY DISTANCE.

**INTERPOLATION** - Determination of an intermediate value between fixed or tabulated values from some known or assumed rate or system of change.

**INTERPRETATION** - The determination of the nature and significance on a qualitative basis of images on aerial photographs and on photographic recordings of other airborne sensors.

**INTERPRETER** - 1) A person who examines and interprets aerial photographs and other imagery to obtain desired information. 2) A person who deduces the geologic significance of geophysical data.

**INTERPUPILLARY DISTANCE** - The distance between the pupils of the eyes of an individual.

**INTERSECTION** - 1) The procedure of determining the horizontal position of an unoccupied point (intersection station) by direction observations from two or more known positions. 2) The procedure of determining the horizontal position of a point by intersecting lines of direction obtained photogrammetrically. The lines of direction may be obtained directly from vertical photographs or by graphic or mathematical analysis of the photographs. 3) The general area where two or more highways join or cross, within which are included the roadway and roadside facilities for traffic movements in that area. See INTERSECTION\*.

**INTERSECTION STATION** - A survey point whose position is determined by directions observed from two or more known stations. See NO CHECK POSITION.

**INTERVALOMETER** - A timing device for automatically operating the shutter of a camera at specified intervals.

**INVAR** - An alloy of nickel and steel having a very low coefficient of thermal expansion.

**INVERSE COMPUTATION** - The computation of the length and azimuths of a line from the coordinates of its end points.

**INVERT** - The floor, bottom, or lowest part of the internal cross section of a conduit; the flowline.

**INVERTED IMAGE** - An image which is in reverse order, left to right, as well as from top to bottom.

**ISLAND** - A body of land extending above and completely surrounded by water at mean high water.

**ISLAND SHELF** - The zone around an island or island group, extending from the low-water line to the depths at which there is a marked increase of slope to greater depths. Conventionally its edge is taken at 100 fathoms (or 200 meters).

**ISLAND SLOPE** - The steep slope from the outer edge of an island shelf into great depths.

**ISOBAR** - A line, generally shown on a weather map, joining points on the earth's surface having equal barometric pressure (reduced to sea level) at a given time.

**ISOBATH** - Line on a marine map or chart joining points of equal depth usually in fathoms below mean sea level.

**ISOCENTER** - The point on a photograph intersected by the bisector of the angle of tilt which is midway between the plumbline and the photograph perpendicular and through the principal point.

**ISODIFF** - One of a series of lines on a map or chart connecting points of equal correction or difference in datum, especially useful in readjustment of surveys from one datum to another. See ISOLAT and ISOLONG.

**ISOGONIC CHART** - A chart showing isogonic lines properly labeled with their magnetic declinations. Lines of equal annual change in the declinations are also generally shown.

**ISOGONIC LINE** - A line joining points on the earth's surface having equal magnetic declination as of a given date.

**ISOLAT** - An isodiff connecting points of equal latitude correction.

**ISOLINE (USGS)** - A line of common scale at the intersection of the planes of two overlapping aerial photographs having common perspective center and equal principal distances, applied generally in Geological Survey to the line of intersection between two components of a set of convergent photographs or the intersection of either wing component with the nominal vertical of trimetrogon photography. In the latter case the isoline becomes an isometric parallel when the nominal vertical is truly vertical.

**ISOLONG** - An isodiff connecting points of equal longitude correction.

**ISOMETRIC PARALLEL** - The intersecting line between the plane of a tilted photograph and a horizontal plane having an equal perpendicular distance from the same perspective center. A line parallel to the horizon through the isocenter.

**ISTHMUS** - A narrow strip of land, bordered on both sides by water, that connects two larger bodies of land.

## J

**JEEP TRAIL** - A primitive road, usually passable by all-wheel-drive vehicles only.

**JUNCTION** - The immediate locality in which two or more highway routes meet. See INTERSECTION.

**JUNCTION CLOSURE (USGS)** - The amount by which a new survey line into a junction point fails to give the previously determined position or elevation for the junction points.

**JUNCTION POINT** - A survey point common to two or more survey lines.

## K

**K** - Kelvin.

**K FACTOR** The B/H ratio. See BASE-HEIGHT RATIO.

**KELSH PLOTTER** - A brand of stereoscopic plotting instrument of the double-projection type, characterized by the use of contact-size diapositives and a moving illumination system that concentrates light on the portion of the image that is projected to the tracing table.

**KELVIN** - Thermometer scale equal to the Celsius (formerly called "*Centigrade*") degrees plus 273°, thru 0°C = 273°K, 100°C = 373°K.

## L

**LAKE** - An extensive sheet of water enclosed by land, occupying a hollow in the earth's surface. The name is sometimes loosely applied, too, to the widened part of a river, or to a sheet of water lying along a coast, even when it is connected with the sea; there are many gradations, in fact, between bays and lagoons which are almost enclosed and coastal lakes.

**LAMBERT CONFORMAL CONIC MAP PROJECTION** - A map plotting system in which points on the ellipsoid are mathematically projected onto a cone with its axis identical with the polar axis. The cone surface may be tangent to the ellipsoid or it may cut below the surface (secant) creating two parallels where the scale is exact. The secant form of this projection is the basis of State Plane Coordinate Systems where the zone extends more east-west than north-south.

**LAMBERT GRID** - An information designation of a plane coordinate system based on a Lambert conformal map projection.

**LANDFORM** - The shape into which a part of the earth's surface is sculptured by natural forms.

**LAND LINE ADJUSTMENT (USGS)** - Positioning the public land lines on the topographic map to indicate their theoretical, or approximate location relative to the adjacent terrain and culture, by reconciling the information shown on BLM Plats with the ground evidence of the location of the lines.

**LANDMARK** - 1) An object of enough interest or prominence in relation to its surroundings to make it outstanding or to make it useful in determining a location or a direction. 2) Any monument or material mark or fixed object used to designate the location of a land boundary on the ground. See **LANDMARK\***.

**LANDSCAPE MAP** - A topographic map made to a relatively large scale and showing all details. Such maps are required by architects and landscape gardeners for use in planning buildings to fit the natural topographic features and for landscaping parks, playgrounds, and private estates. These are generally maps of small areas, and a scale is used of 1 inch equals 20 feet to 1 foot equals 50 feet, depending on the amount of detail.

**LAND SURVEY** - The process of determining land boundaries and areas. See **CADASTRAL SURVEY\*** and **LAND SURVEY\***.

**LAPLACE AZIMUTH** - A geodetic azimuth derived from an astronomic azimuth by use of the Laplace equation which correlates geodetic and astronomic azimuths using observed longitude and known geodetic position.

**LAPLACE STATION** - One of several stations selected at intervals in a large system of geodetic triangulation or traverse where both astronomic azimuth and longitude observations are made for the purpose of determining the Laplace correction.

**LARGE SCALE MAP** - A detailed map at scales of 1" = 1000 ft., or even 1" = 100 ft. See **SMALL SCALE MAP**.

**LASER** - An acronym for "*light amplification by stimulated emission of radiation.*" A device producing coherent energy beams in the spectrum of light or near-light frequencies.

**LATITUDE** - 1) The angle between the plane of the earth's equator and a normal to surface at the point. 2) The north-south component of a traverse course. See **GEODETTIC LATITUDE** and **ASTRONOMIC LATITUDE**.

**LEAGUE** - See **MARINE LEAGUE**.

**LEAST SQUARES** - A mathematical method for the adjustment of observations, based on the theory of probability. In this method, the sum of the squares of all the computed corrections is made a minimum.

**LEFT-READING** - A descriptive term for a reverted or mirror image.

**LEGEND** - A description, explanation, table of symbols, and other information, which is printed on a map or chart for a better understanding and interpretation of it.

**LEGENDRE'S THEOREM** - The lengths of the sides of a spherical triangle (very short by comparison with the radius of the sphere) are equal to the lengths of the corresponding sides of a plane triangle in which the plane angles are derived by reducing each of the spherical angles by approximately one-third of the spherical excess.

**LENS, COLOR CORRECTED** - A camera lens specially designed for taking color photographs. Chromatic aberration has been corrected to provide substantially optimum resolution for all visible and near infrared wavelengths on the same focal plane.

**LENS DISTORTION** - An aberration affecting the position of images of the optical axis. The radial component is measured from the principal point. The tangential component is measured normal to a radial line from the principal point.

**LENS ELEMENT** - One lens of a complex lens system.

**LEVEL** - 1) Horizontal. 2) A leveling instrument. 3) An attachment (such as a spirit level) to indicate when an instrument or other device is level. See **AUTOMATIC LEVEL**, **CIRCULAR LEVEL**, **DUMPY LEVEL**, **ENGINEER'S LEVEL** and **TILTING LEVEL**.

**LEVEL CIRCUIT** - The measurement of bench mark elevations by spirit leveling in two different directions from one end of the circuit to another. Different turning points are used in each of the two different directions.

**LEVEL DATUM** - A surface used as a reference for elevation or depth measurements. It may consist only of an assumed elevation value for a given benchmark or may be based on mean sea level.

**LEVELING (OR LEVELING)** - 1) The process of measuring the difference of elevation between any two points, usually by spirit leveling. 2) The process of orienting the photogrammetric model to a level surface during absolute orientation. See **FLY LEVELING**, **GEODETTIC LEVELING**, **RECIPROCAL LEVELING**, **SPIRIT LEVELING**, **TRIGONOMETRIC LEVELING** and **WATER LEVELING**.

**LEVEL SURFACE** - A surface which at every point is perpendicular to the plumbline or the direction in which gravity acts.

**LIGHT** - That form of radiation that is capable of detection by the human eye. Visible radiation (about 0.4 to 0.7 micron in length).

**LIGHT SCATTER** - Breaking up of light rays by refraction and reflection from particles of moisture or solid matter suspended in the atmosphere.

**LIGHT, TRANSMITTED** - Light that has traveled through a medium without being absorbed or scattered.

**LIMITED REVISION (USGS)** - The correction of specified map deficiencies only. Usually this will be confined to the updating of certain major features which would be specified for each project, or it might be limited to certain types of features within portions of a total project area. See **MAP REVISION**.

**LINEAR PARALLAX** - See preferred ABSOLUTE STEREOSCOPIIC PARALLAX.

**LIST OF DIRECTIONS** - A tabulation of points or objects observed during triangulation with the horizontal directions referred to an initial.

**LITHOGRAPHY** - A printing process in which the image to be printed is ink-receptive and all other areas are ink-repellent. See OFFSET PRINTING.

**LITTORAL** - Of or pertaining to, a shore, especially a seashore. More specifically applied to the depth zone of the sea floor lying between tide levels.

**LOBE** - The tongue of land within a meander. When the lobe lies between two stream meanders and is connected with the mainland by a narrow passage, the narrow passage is the neck. The cutting action of the river narrows the neck until finally the river breaks through and forms a new channel or a cutoff.

**LOCATION SURVEY** - 1) The establishment on the ground of points and lines which have been previously determined by computation, or by graphical methods, or by description obtained from deeds and maps or other records. 2) In private practice of surveying, survey of a lode mining claim.

**LOGICAL CONTOURING** - Sketching contours on a map using spot elevations taken at breaks in slope.

**LONGITUDE** - The dihedral angle between the observer's meridian and an arbitrary initial meridian (usually Greenwich). See ASTRONOMIC LONGITUDE, GEODETIC LONGITUDE, GREENWICH MERIDIAN and WASHINGTON MERIDIAN\*.

**LOW-OBLIQUE PHOTOGRAPH** - An oblique aerial photograph that does not include the apparent horizon.

**LOXODROME** - See RHUMB LINE.

## M

**m** - Meter.

**MAP/MYP** - Management Action Plan/Multi Year Program (A BLM Planning System-not a mapping term).

**M & P FACTORS** - Tables used for computing arcs on the meridians and parallels. See M & P FACTOR\*.

**MSL** - Mean Sea Level.

**MSS** - Multispectral Scanner Subsystem.

**MAGAZINE** - A container for rolled film or photographic plates attached to the camera body.

**MAGNETIC AZIMUTH (OR BEARING)** - Azimuth (or bearing) referred to magnetic north or south.

**MAGNETIC DECLINATION** - The bearing of magnetic-north at a particular date. See MAGNETIC VARIATION and MAGNETIC DECLINATION\*.

**MAGNETIC NORTH** - The direction indicated by the north end of a magnetized needle under influence of the earth's magnetic field and free of local magnetic disturbance.

**MAGNETIC VARIATION** - Regular or erratic change in magnetic declination. Not interchangeable with magnetic declination. See MAGNETIC VARIATION\*.

**MAIN SCHEME STATION** - 1) (USGS) One of the principal stations of a triangulation arc or net, observed, computed, and adjusted in accordance with the general specifications for the project, and contributing to the overall strength of the system. 2) (NGS) A station through which basic data are carried for the continued extension of a survey system.

**MAKELINE** - A scale line (or one of a corresponding pair of lines) furnished to a process camera operator with instructions for a ratio of enlargement or reduction.

**MANUSCRIPT MAP** - The original drawing of a map as compiled or constructed from various data, such as ground surveys and photographs. Usually place and feature names are not included.

**MAP** - A representation on a plane surface, at an established scale, of the physical features (natural, artificial, or both) of a part or whole of the earth (or any celestial body) by means of symbols and labels and with the means of orientation indicated. A map may emphasize, generalize, or omit the representation of certain features to satisfy specific requirements. The type of information which a map is designed primarily to convey is frequently used, in adjective form, to distinguish it from maps of other types. See BASE MAP, COMPILED MAP, ENGINEERING MAP, GENERAL PURPOSE MAP, PLANETABLE MAP, PLANIMETRIC MAP, PLAINMETRIC BASE MAP, QUADRANGLE MAP, RECONNAISSANCE MAP, SHADED RELIEF MAP, SPECIAL PRINTING MAP, SPECIAL PURPOSE MAP and TOPOGRAPHIC MAP.

**MAP OF STANDARD FORMAT** - A map with dimensions, layout, lettering, and symbolization in accordance with the specifications for the series.

**MAPPING ANGLE** - The correction to be applied to geodetic azimuth before plotting an azimuth on a map projection.

**MAPPING CAMERA** - A camera specifically designed for use in surveying. Generally the term indicates a high precision camera although camera requirements for aerotriangulation may exceed the capability of a mapping camera.

**MAP PROJECTION** - A system of lines on a plane representing a corresponding system of imagery lines on an adopted terrestrial or celestial datum surface; also, the mathematical concept of such a system. For maps of the earth, a projection consists of (a) a graticule of lines representing parallels of latitude and meridians of longitude, or (2) a grid. A map projection may be derived by geometric construction or by mathematical analysis. Projections derived by mathematical analysis are generally used for maps constructed with survey data. See ALBERS CONICAL EQUAL AREA PROJECTION, LAMBERT CONFORMAL CONIC PROJECTION, MERCATOR PROJECTION, OBLIQUE MERCATOR PROJECTION, ORTHOGRAPHIC PROJECTION, POLYCONIC PROJECTION, STEREOGRAPHIC PROJECTION, TRANSVERSE MERCATOR PROJECTOR, UNIVERSAL TRANSVERSE MERCATOR PROJECTION and POLAR STEREOGRAPHIC PROJECTION.

**MAP REVISION (USGS)** - Updating, improving, and/or correcting map content at the same scale. A complete revision consists of the correction of all deficiencies in planimetry and relief features, including improvement of accuracy, vertical and/or horizontal, to result in a class 1 map which meets current specifications in all respects. See also STANDARD REVISION, LIMITED REVISION and INTERIM REVISION.

**MAP SCALE** - The relationship between a distance on a map and the corresponding distance on the earth. Map scale may be expressed as an equivalence, usually by different units (1/63,360 or 1:63,360); or graphically, as a bar scale. See FRACTIONAL SCALE and REPRESENTATIVE FRACTION.

**MAP SERIES** - (USGS) A family of maps conforming generally to the same specifications or having some common unifying characteristics. The term "*National Topographic Map Series*" is used to designate collectively the several quadrangle and other map series of the United States and its dependencies. The individual series are 7.5 Minute Series - Covers 7.5 minutes of latitude and 7.5 minutes of longitude.

Puerto Rico - 7.5 Minute Series - Bilingual & Metric. 15 Minute Series - Covers 15 minutes of Lat. & Longitude.

Alaska 1:63,360 series covers 15 minutes in latitude. 1:250,000 series generally covers 1° in latitude and 2° in longitude.

Metropolitan Area Series - Selected cities

National Park Series

State Series - Available as base maps

Topographic and shaded

United States Series -

International Map of the World Series - U.S. portion

30 minute series - now being superseded

1° degree series - now superseded by the 1:250,000 series.

Alaska Reconnaissance Series now being superseded by the 1:250,000 series.

**MARGINAL, DATA** - Information on the margin of maps, explaining symbols, geographic coordinates, and other data portrayed by the map.

**MARGINAL TICK** - See GRID TICK.

**MARINE LEAGUE** - A measure of distance commonly employed at sea, being equal to one-twentieth part of a degree of latitude, or three geographical or nautical miles.

**MARK** - 1) A definite object ( such as an imprinted metal disk) used to designate a survey point. Usually used with qualifying term such as a station mark, reference mark, azimuth mark, or bench mark. Sometimes refers to the entire survey monument. 2) A call used to indicate the instant of observation. 3) A call sometimes used by the rear chainman to indicate he is on the correct reading.

**MARSH** - Low-lying wet ground ordinarily covered with water. See SALT MARSH\* and SWAMP.

**MATCH LINE** - 1) The edge of an individual photograph in a mosaic. 2) The line at the edge of a mapped area.

**MEANDER LINE** - A traverse along the approximate mean high water line of a permanent natural body of water. See MEANDER LINE\*.

**MEAN ERROR** - An ambiguous term sometimes used to denote average error, error of the mean, or root-mean-square error.

**MEAN REFRACTION** - The average refraction effect on vertical angles in stated conditions of temperature, humidity, and barometric pressure.

**MEAN SEA LEVEL (USGS)** - The average height of the sea for all stages of the tide. It is obtained, at any particular coastal location, by averaging the hourly tide heights over a long period. The theoretical tide cycle is 19 years. See MEAN SEA LEVEL\*.

**MEDIAN** - See MEDIAN LINE\*.

**MERCATOR PROJECTION** - A map making system in which points on the ellipsoid are projected onto a cylinder whose axis is in the plane of the central meridian of the map and through the earth's center. The meridians appear as parallel lines and parallels are at right angles to them. The scale at any point is the same north and south which is achieved by mathematical calculation of parallel spacing. Generally used for maritime purposes.

**MERCATOR TRACK** See RHUMB LINE.

**MERIDIAN** - A north-south line; a line of constant longitude; a plane through the earth's axis.

**MERIDIAN CONVERGENCE** - See CONVERGENCE OF MERIDIANS.

**MERIDIAN, GRID** - A line on a grid that is parallel to the central meridian or y axis of the grid system.

**MERIDIONAL OFFSETS** - Small distances applied to the meridional differences in order to create the curves of the latitudes on a map projection.

**MESA** - A tableland; a flat-topped mountain or other elevation bounded on at least one side by a steep cliff.

**METER** - The new (1952) International Standard Meter is defined as 1,650,763.73 times the wavelength of krypton light where one foot equals 0.3048 meters.  
The American Survey Foot retains the old definition of the meter which is 39.37 inches.

**METES AND BOUNDS SURVEY\***.

**MICRODENSITOMETER** - Scanning optical machine which measures image densities. See DENSITOMETER.

**MICROMETER** - 1) Unit of length equal to  $10^6$  meter. 2) Reading device on a theodolite.

**MICRON (SYMBOL)** - Unit of length exactly to  $10^{-6}$  meter,  $10^{-4}$  centimeter, (the term is now replaced by micrometer).

**MICROWAVE** - Of, or pertaining to, radiation in the microwave region.

**MICROWAVE REGION** - Commonly, that region of the radio spectrum between approximately 1000 and 300,000 megahertz. Corresponding wavelengths are 30 centimeters to 1 millimeter.

**MID-LATITUDE** - 1) The latitude of the midpoint of a survey line. 2) The average of the latitude values for the end points of a straight line or a geodesic.

**MILITARY GRID** - A rectangular grid, coordinate, or reference system placed on a map projection to facilitate location and identification of map data for military purposes. The Universal Transverse Mercator (UTM) grid is used on maps at scales of 1:250,000 and larger between  $80^\circ$  north and  $80^\circ$  south. Beyond the  $80^\circ$  parallels the Universal Polar Stereographic (UPS) grid is used.

**MINE SURVEY** - A survey to determine the position and dimensions of underground workings and the associated improvements and boundaries. See MINE SURVEY\* and MINERAL SURVEY\*.

**MINERAL MANAGEMENT MAP SERIES** - A BLM compilation of planimetric and Land Status Data consisting of SURFACE MANAGEMENT MAPS and SURFACE-MINERALS MANAGEMENT MAPS.

**MISCLOSURE\***.

**MISMATCH** - The condition of map detail displacement along neatlines.

**MODEL** - A 3-dimensional image of the terrain seen when a pair of overlapping photographs is viewed stereoscopically. When the model is correctly oriented to the horizontal and vertical datums, the terrain is accurately represented in miniature.

**MODEL SCALE** - The relationship between a distance measured in a model and the corresponding distance on the terrain.

**MONOCOMPARATOR** - An optical instrument for measurement of coordinates on a photograph which employs one eyepiece (rather than stereo viewing). See COMPARATOR.

**MOSAIC** - An assembly of aerial photographs whose edges have been feathered and matched to form a continuous photographic representation of a portion of the earth's surface. Maps can be mosaiced for compilation purposes. See CONTROLLED MOSAIC, UNCONTROLLED MOSAIC, and FILM MOSAIC.

**MOSAICKING** - The process of making composite photographs or maps.

**MOUNTAIN** - A mass of land considerably higher than its surroundings, and of greater altitude than a hill; an eminence is often considered a mountain rather than a hill when its elevation from the foot to summit is well over 1,000 ft., but the distinction is arbitrary. The summit area of a mountain is small in proportion to the area of its base; in this respect it differs from a plateau.

**MOUNTAIN GROUP** - A group made up of several or many mountain peaks, or of short mountain ridges. The Catskill Mountains and the Black Hill are examples.

**MOUTH** - The exit or point of discharge of a stream into another stream or a lake or sea.

**MUD LUMPS** - Swellings of bluish-gray clay forming small islands of an acre or more, with the height of 5 to 10 feet above sea level, found at the mouths of the Mississippi; apparently caused by pressure of surface deposits upon buried clays.

**MULTIBAND** - Simultaneous use of two or more sensors to obtain imagery from different portions of the reflectance portion of the electromagnetic spectrum (most commonly used in connection with black and white photography).

**MULTIPLE BAND** - Images formed usually simultaneously in more than one portion of the photographic region of the electromagnetic spectrum and analyzed jointly.

**MULTIPLEX PLOTTER** - A stereoscopic plotting instrument of the double-projection anaglyphic type which uses reduced-scale diapositives, stationary lamphouses with condensing lenses, and projectors designed for an optimum projection distance of 360 mm.

**MULTISPECTRAL** - Designates imagery formed, usually simultaneously, in more than one spectral region and analyzed jointly. The simultaneous use of two or more sensors to obtain imagery from different portions of the electromagnetic spectrum.

**MULTISPECTRAL SCANNER SUBSYSTEM (MSS)** - The ERTS 1 equipment which oscillates a flat mirror between the field of view and the telescope and which gathers data on four bands simultaneously.

**MUSKEG** - Arctic alluvial areas with insufficient drainage over which moss has accumulated to a considerable depth. These swamps are usually covered with tamarack and fir trees. In places the surface is broken by tall hummocks.

## N

**NMAS** - United States National Map Accuracy Standards.

**NADIR** - 1) That point on the celestial sphere intersected by the plumbline extended downward; that point, directly opposite the zenith. 2) The point on the ground or at sea level datum vertically beneath the perspective center of the aerial camera lens, or the photographic image of that point.

**NADIRSCOPE** - A device for locating the nadir point of each exposure of a stereomodel when absolutely oriented in a direct-projection plotter. The plotted nadir point on the base sheet can be used to facilitate the orientation of succeeding stereomodels or to assist in the rectification of photographs for mosaicking.

**NANOMETER** - Unit of measure equal to one millimicron or one millionth of a millimeter.

**NARROW ANGLE LENS** - A lens having an angle of coverage up to 60°.

**NATIONAL ATLAS OF THE UNITED STATES** - A collection of maps and charts, with descriptive and bibliographic text, arranged to present an accurate graphic concept of the salient physical, historical, political, economic, social, and cultural features of the country.

**NATIONAL MAP ACCURACY STANDARDS** - See UNITED STATES NATIONAL MAP ACCURACY STANDARDS.

**NATIONAL TOPOGRAPHIC MAP SERIES** - See MAP SERIES.

**NATURAL SCALE** - 1) True scale as it exists in nature, without magnification or reduction. Some map projection tables are published at natural scale to permit easy conversion to a variety of map scales. 2) Map scale expressed as a fraction or ratio, independent of linear units of measure. See (preferred) FRACTIONAL SCALE.

**NEAR INFRARED** - That portion of the electromagnetic spectrum between visible light and thermal infrared with wavelengths from .7 to 4 microns.

**NEATLINE** - The line on a map at the boundary of the mapped area. Also called sheetline.

**NEAT MODEL** - The portion of the gross overlap of a pair of photographs that is actually used in photogrammetric procedures. Generally the neat model approximates a rectangle whose width equals the air base and whose length equals the width between flights.

**NEGATIVE** - In black-and-white photography, imagery in which the light and dark tones of the object are reversed. In color photography, imagery in which the light and dark tones of the object are reversed and the colors are complementary to those of the object.

**NEGATIVE ENGRAVING** - The operation of making a negative by removing portions of a coating applied to a scale-stable medium. See SCRIBING.

**NEGATIVE TITLING** - Information recorded on the negative for identification.

**NERITIC** - 1) Related to shallow water on the margins of the sea, generally that overlying the continental shelf. 2) Related to the shallow sea bottom, generally that of the continental shelf.

**NERTIC ZONE** - 1) That part of the sea floor extending from the low tide line to a depth of 200 meters. 2) A part of the pelagic division of the oceans with water depths less than 200 meters.

**NET** - A series of triangulation figures covering an area in such a way that the lengths and relative directions of all lines forming the triangles can be computed successively from a single base.

**NETWORK (USGS)** - A group or series of survey lines interconnected to form a number of closed loops or circuits.

**NEW YORK ROD** - A two piece leveling rod with a movable target. The rodman reads a vernier for target elevations.

**NO CHECK POSITION** - A horizontal control survey station observed from only two stations; an intersection station. An elevation determined from vertical angles sometimes is used to guard against gross blunders.

**NODAL POINTS** - Two points associated with a lens system, such that any ray in the object space directed toward the first or front point will emerge in the image space from the second or rear point and parallel to its former position.

**NOISE** - Any undesired sound; by extension, a noise is any unwanted disturbance within a useful frequency band, such as undesired electric waves in a transmission channel or device.

**NOMINAL FOCAL LENGTH** - An approximate value of the focal length, rounded to some standard figure, used for the classification of lenses, mirrors, or cameras.

**NORMAL** - In general, a straight line perpendicular to a surface or to another line; also, the condition of being perpendicular to a surface or line.

**NORMAL ANGLE LENS** - A lens having an angle of coverage between 60° and 75°.

**NORMAL POOL ELEVATION** - The level at which a controlled body of water is generally maintained.

**NORMAL SECTION** - A straight line cut by a plane perpendicular to the surface of the earth ellipsoid at the observer's station.

**NORMAL TENSION** - The pull applied to a tape which stretches the metal in an amount equal to the shortening caused by sag.

**NORMAL WATER LEVEL (USGS)** - The most prevalent water level in a watercourse, reservoir, lake or pond, generally defined by a shoreline of permanent land-type vegetation. Along large bodies of water, wave action may retard vegetation beyond the normal shoreline. See HIGH WATER MARK\*.

**NORTH** - The primary reference direction relative to the earth. See ASTRONOMIC NORTH, GEODETIC NORTH, GRID NORTH, MAGNETIC NORTH, and TRUE NORTH.

**NORTH AMERICAN DATUM OF 1927 (1927 NAD)** - This datum is identical with the North American Datum except that the azimuth was changed. It was adopted in 1927 after a readjustment of the triangulation of the entire country, in which Laplace azimuths were introduced. It is now standard geodetic datum on the North American continent.

**NORTH AMERICAN DATUM (NAD)** - A Geodetic Datum for horizontal surveys superseded by the North American Datum of 1927.

**NORTH ARROW** - A symbol indicating the direction and the type of meridian to which the control framework of a map or drawing is referenced. Auxiliary arrows may be shown indicating the direction of other meridians which may be of interest to the user of the map.

## O

**OCS** - Outer Continental Shelf.

**OCS/MINERAL MANAGEMENT MAP** - A series of maps for use in leasing outer continental shelf lands.

**OBJECTIVE LENS** - The lens, in a telescope or microscope, which is nearest the object.

**OBLATE SPHEROID** - The mathematical shape assumed by a homogenous rotating mass, used as an approximation of the earth's shape.

**OBLIQUE MERCATOR PROJECTION** - A map plotting system in which points on an ellipsoid are mathematically projected onto a cylinder oriented tangent to an oblique line at the map center; used in one of the Alaska State Plane Coordinate systems.

**OBLIQUE PHOTOGRAPH** - An aerial photograph taken with the camera axis intentionally tilted from the vertical.

**OBSERVATION SCENE** - Collection of the image data of one nominal framing area of the earth's surface; this includes all data from each spectral band of each sensor.

**OCCUPY** - To set up a survey instrument over a point.



**OCEAN** - The sheet of salt water which surrounds the great land masses of the earth; it is divided by them into several extensive portions, each known as an ocean, and altogether covers 71 percent of the earth's surface. The oceans may be divided into three district regions, the Littoral, the Pelagic, and the Abyssal. Alternatively, they may be divided according to depth into four regions: 1) the Continental Shelf, which adjoins the land, 2) the Continental Slope, immediately outside the continental shelf, 3) the deep-sea plain, a wide and almost level area forming most of the ocean floor, and varying in depth from about 2,000 to 3,000 fathoms, and 4) the Deeps.

**OFFICIAL OCS PROTRACTION DIAGRAM** - A series of maps which define lease blocks on the outer continental shelf.

**OFFSET PRINTING** - A process of lithographic printing from a flat or cylindrical pressplate in which the inked image on the pressplate is first transferred to a rubber-surfaced cylinder and then printed, or offset, onto a sheet of paper or other material.

**OFFSHORE (USGS)** - The zone extended seaward for an indefinite distance from the limit of mean low water (Atlantic and Gulf coasts) and from mean lower low water (Pacific coast).

**OPEN TRAVERSE** - A traverse which does not close upon itself or another known point.

**OPEN WINDOW NEGATIVE** - A negative having open areas, used as a mask where screens, rulings and tints are to be printed in the open areas.

**OPTICAL AXIS** - The straight line which passes through the center of curvature of a lens element. In a compound lens, if the centers of the curvature of all the components lie in one straight line, this line is the optical axis of the lens.

**OPTICAL COLOR COMBINER** - Instrument which produces false or "true" color images by linearly combining a few black-and-white films of the same scene. The films are usually obtained from multi-band or time-sequential photography. The films are put in projectors which are all focused on the same screen and which have various color filters placed in front of their lens. The brightness of the projector's lamp in each projector can be changed independently thereby changing chromaticity balance.

**OPTICAL DENSITY** - Photographic transmission density.

**OPTICAL FLAT** - A surface, usually of glass, specially ground and polished plane within a fractional part of a wavelength of light, used to test the flatness of other surfaces. See PLANE PARALLEL PLATE.

**OPTICAL PLUMB (ALSO OPTICAL PLUMMET)** - A device for optically determining a vertical line of sight, serving the same function as a plumb bob.

**OPTICAL SQUARE** - See PENTA PRISM.

**ORIENTATION** - 1) The act of establishing the correct relationship in direction with reference to the points of the compass. 2) The state of being in correct relationship in direction with reference to the points of the compass. 3) A map is in orientation when the map symbols are parallel with their corresponding ground features. 4) A planetable is in orientation when lines connecting positions on the planetable sheet are parallel with the lines connecting the corresponding ground objects. 5) A surveyor's instrument is in orientation if the horizontal circle reads  $0^\circ$  when the line of collimation is parallel to the direction it had at an earlier (initial) position of the instrument, or to a standard line of reference. If the line of reference is a meridian, the circle will show azimuths referred to that meridian. 6) A photograph is in orientation when it correctly presents the perspective view of the ground directly in front of the observer; or when the images on the photograph appear in the same direction from the point of observation as do the corresponding map symbols. See ABSOLUTE ORIENTATION, RELATIVE ORIENTATION and INTERIOR ORIENTATION.

**ORIGIN** - The point in a system of coordinates which serves as an initial point in computing and where  $X = 0$  and  $Y = 0$ .

**ORTHOGRAPHIC PROJECTION** - A map plotting system whereby parallel lines project from points on the sphere to a plane tangent to the sphere at the map center; not practicable for plotting survey data.

**ORTHOMETRIC CORRECTION** - A systematic correction which must be applied to a measured difference of elevation because level surfaces at different elevations are not exactly parallel.

**ORTHOMETRIC ELEVATION** - An elevation value to which the orthometric correction has been applied.

**ORTHOPHOTOGRAPH** - A photograph derived from perspective photographs and equivalent to a photograph made by orthographic projection. In a perfect orthophotograph, there are no displacements of images because of tilt or relief.

**ORTHOPHOTOMAP** - A photomap prepared from a orthophotograph or a precisely controlled assembly of orthophotographs. It is generally published in standard map format. See PHOTOMAP.

**ORTHOPHOTOMOSAIC** - As assembly of orthophotographs, usually precisely controlled, to form a uniform-scale photographic representation of a portion of the earth's surface.

**ORTHOPHOTOSCOPE** - An instrument for converting conventional perspective photographs into orthophotographs by differential rectification. It features a double-projection anaglyphic instrument and a movable exposing slit that is used to scan the ground surface of the projected stereomodel in a systematic pattern. It records the orthographically corrected imagery of the blue-filtered diapositive on film insensitive to red light.

**OUTER CONTINENTAL SHELF** - Under Public Law 212 (the Outer Continental Shelf Lands Act) it is that portion of the continental shelf which lies seaward of state boundaries as defined in Public Law 31 (the Submerged Lands Act).

**OVERLAP** - The amount by which one photograph duplicates the area covered by another photograph, usually expressed as a percentage.

**OVERLAY** - 1) A drawing on a transparent medium to be superimposed on another drawing. 2) A transparent medium on which flight lines and/or area to be photographed are plotted to be superimposed on a map, thus avoiding defacing the map.

**OVERSHEET** - A transparency or a print of a map compilation used for recording supplemental information.

**OXBOW** - A crescent-shaped lake formed in an abandoned river bend which has become separated from the main stream by a change in the course of the river.

## P

**PADS** - Position azimuth determination system.

**PI** - Photo Interpretation.

**PUG** - Punkt Übertragungs Geräte. See POINT MARKING AND TRANSFERRING DEVICE.

**PZS** - Pole-Zenith-Star or Pole-Zenith-Sun.

**PANCHROMATIC** - Photographic emulsion sensitive to all colors of light.

**PANEL** - An element of a target used for ground control or point identification during aerial photography.

**PANELING** - Marking points on the ground with material of suitable contrast, size, and shape to provide images which can be positively identified on aerial photographs.

**PANEL POINT** - A photo image of a paneled point.

**PANTOGRAPH** - A precision mechanical instrument for reproducing at some desired scale, generally at a reduction, details from stereomodels, photographs, maps, drawings, etc.

**PARALLACTIC ANGLE** - See ANGULAR PARALLAX.

**PARALLAX** - The apparent displacement of the position of an object with respect to a reference point or system caused by a shift in the point of observation. See ABSOLUTE STEREOSCOPIIC PARALLAX, X PARALLAX AND Y PARALLAX.

**PARALLAX BAR** - See STEREOMETER.

**PARALLAX DIFFERENCE** - The difference in the absolute parallaxes of two points imaged on a pair of photographs. Customarily used in the determination of the difference in elevations of the objects.

**PARALLEL** - 1) The relationship between two lines in the same plane which will not meet if extended. 2) A line on the earth (or a map) having the same latitude at every point.

**PARALLELOGRAM OF ZEISS** - See ZEISS PARALLELOGRAM.

**PARALLEL PLATE** - See PLANE PARALLEL PLATE.

**PASS** - A low and passable gap through a mountain barrier.

**PASSIVE SYSTEM** - A sensing system that detects or measures radiation emitted by the target.

**PASS POINT** - A point selected on imagery of the same object or point on the ground appearing on three or more photographs, used to relate adjacent stereomodels, or strips horizontally (and usually also vertically) in aerotriangulation; also, the corresponding point on the base sheet used to provide a basis for stereomodel positioning and orientation in map compilation. Pass points are usually chosen at classical points. See CLASSICAL POINT and TIE POINT.

**PATTERN** - 1) In a photo image, the regularity and characteristic placement of tones or textures. 2) The relations between any more-or-less independent parameters of a response; e.g., the pattern in the frequency domain of the response from an object.

**PEAK** - A top of a mountain or hill, standing above the level of the range or the surrounding country.

**PEDIMENT** - In arid and semi-arid regions, the gently sloping plain strewn with boulders that borders the mountains.

**PEELCOAT** - A transparent plastic material with an opaque coating which can be cut and peeled to prepare open windows for printing masks.

**PEG TEST** - A method of adjustment of a leveling instrument.

**PENCIL OF LIGHT** - A ray of light.

**PENINSULA** - A stretch of land almost surrounded by water.

**PENTA PRISM** - A five sided prism with angles such that any entering ray is reflected at 90°. See RIGHT ANGLE PRISM.

**PEN-TYPE GRAVER** - A pin vise with an angled head used in scribing.

**PERMANENT MARK** - A readily identifiable, relatively permanent, recoverable mark which designates precisely the location of a survey point.

**PERSONAL ERROR** - An error caused by an observer's personal habits, mental or physical reactions, or inability to perceive dimensional values exactly. It may be accidental or systematic. A systematic personal error is termed a "*personal equation*."

**PERSPECTIVE CENTER** - The point of origin or termination of bundles of perspective rays.

**PERSPECTIVE PHOTOGRAPH** - A photograph taken with any apparatus in which all object rays pass through a single point and all image rays also pass through a single point.

**PERSPECTIVE PROJECTION** - The projection of points by straight lines through a given point to an intersection with the plane of projection. Unless otherwise indicated, the point of projection is understood to be at a finite distance from the plane of projection.

**PERSPECTIVE RAY** - A straight line from a ground object through the lens to the image on the photograph.

**P-FACTOR** - Any of the considerations such as atmospheric and terrain conditions, photographic system capabilities, and photogrammetric system capabilities which influence the determination of a maximum flight height for photography consistent with a given requirement for compilation of planimetry. Generally used in a collective sense and referred to as "*the P-factor*" to denote the combined effect of these considerations.

**PHILADELPHIA ROD** - A sliding two piece leveling rod with a target.

**PHOTOALIDADE** - A photogrammetric instrument having a telescopic alidade, a plateholder, and a hinged ruling arm, all mounted on a supporting frame. It is used for plotting lines of direction and measuring vertical angles to selected features on oblique and terrestrial photographs.

**PHOTO BASE** - Distance between principal points of adjacent aerial photos, usually measured on one photograph after conjugate principal points are transferred.

**PHOTOCLINOMETRY** - Determination of slopes from study of brightness in one photographic image.

**PHOTOCONTROL DIAGRAM** - See PHOTOCONTROL INDEX MAP.

**PHOTOCONTROL INDEX MAP (USGS)** - A map showing the location and identifying data of the centers of the aerial photographs, the existing basic and supplemental control, the planned basic and supplemental control, and the quadrangle and (or) project boundaries. Sometimes an outline of the area covered by each aerial photograph is shown.

**PHOTOCONTROL POINT** - Any station in a horizontal and (or) vertical control system that is identified on a photograph and used for correlating the data shown on the photograph.

**PHOTODELINEATION** - The delineation of features on a photograph, usually with colored pencil.

**PHOTOGRAMMETRIC CONTROL** - Basic surveys established by photographic methods, used to position lower order surveys, mapping or photogrammetric surveys.

**PHOTOGRAMMETRIC ELEVATION (USGS)** - An elevation established by photogrammetric means. See T-ELEVATION.

**PHOTOGRAMMETRIC SYSTEM** - A combination of instruments, facilities, and procedures used in producing maps and surveys by photographic analysis including cameras, printers, photographic materials, plotting instruments, control pattern, and personnel.

**PHOTOGRAMMETRY** - The science or art of obtaining reliable measurements by means of photographs.

**PHOTOGRAPH** - A general term for a positive or negative picture made with a camera on sensitized material, or prints made from a camera original.

**PHOTOGRAPHIC MAP** - 1) A photographic copy of an assembly of individual aerial photographs which are arranged along the flight line in their proper relative positions. 2) An overlay containing the delineated boundary of each photograph, keyed to a base map, and depicting the location and area of coverage of each photograph and/or flight strips of photographs.

**PHOTOGRAPH PERPENDICULAR** - The perpendicular from the interior perspective center to the plane of a photograph.

**PHOTOGRAPH PYRAMID** - A surface formed by three image points on a photograph as a base and the apex of a pyramid at the perspective center.

**PHOTOGRAPH SCALE** - The ratio of the distance between two points on a truly vertical photograph, having no appreciable relief, and corresponding distance on the ground. If the photograph is tilted or if the terrain has appreciable relief, the photograph scale is not uniform. The nominal scale of vertical photographs is generally taken as the ratio between the focal length of the aerial camera and the flight height above mean ground. The scale of oblique photographs varies continuously in the direction of tilt, so that the term "*photograph scale*" represents an approximation only.

**PHOTOGRAPHY** - The art or process of producing images on sensitized material by the action of light. The proper term for the product in this process is photograph or photographs.

**PHOTOGRAPHY INDEX MAP** - A map of showing the location and numbers of the flight strips and photographs.

**PHOTOIDENTIFICATION** - The process of 1) showing the photographic location of ground points in relation to surrounding image detail, and 2) identifying, on the ground, points marked and described on the photographs. See PINPOINTING.

**PHOTOIMAGE MAP** - See PHOTOMAP.

**PHOTOINDEX** - An uncontrolled mosaic of photographs in shingle overlay, rephotographed at a reduced scale. It is generally used as a source of information for details of available photographic coverage.

**PHOTOINTERPRETATION** - The examination of photographic images for the purposes of identifying objects, determining their nature, describing them, and evaluating their significance.

**PHOTOMAP** - A map prepared on a base containing photoimagery which is retained as a part of the representation. It may incorporate special cartographic treatment, photographic line enhancement, color separation, or a combination of these. See ORTHOPHOTOMAP.

**PHOTOMECHANICAL ETCHING** - A process in which positive film copy is exposed by arc light onto sensitized paint-coated plastic. The paint is hardened where the light strikes and is unaffected in the unexposed areas. The nonhardened paint areas are removed by a solvent and hand rubbing. The resultant product resembles a scribed negative.

**PHOTOMORPHIC IMAGE** - A system component used in classification of land which combines airphoto information such as drainage density, photographic texture, settlement patterns and density of structures.

**PHOTOMOSAIC** - See MOSAIC.

**PHOTOTHEODOLITE** - An instrument combining the function of theodolite and camera, used in terrestrial photogrammetry.

**PHOTOTOPOGRAPHY** - 1) (USGS) Mapping in which topographic detail is obtained by photogrammetric methods. 2) (DOD) Mapping in which detail is plotted entirely from photographs at suitable ground stations.

**PHOTOTRIANGULATION** - The process for the extension of horizontal and (or) vertical control whereby the measurements of angles and (or) distances on overlapping photographs are related into a spatial solution using the perspective principles of the photographs. Generally, but not always, this process involves the use of aerial photographs and is called aerotriangulation.

**PHOTOTRIG** - A procedure for determining elevations trigonometrically wherein horizontal distances are determined photogrammetrically and vertical angles are either measured instrumentally in the field or are obtained from measurements on terrestrial photographs.

**PHOTOTRIG TRAVERSE** - A vertical angle traverse employing phototrig methods.

**PHOTOTYPE** - The product of a photographic process in which a master copy of a machine-composed lettering is made on film. Positive or negative copies are processed from the master image onto adhesive-backed stripping film. See STICKUP.

**PICTOMAP** - A color reproduction of a standard photomosaic on which the imagery has been converted into interpretable colors and symbols by means of tonal masking techniques.

**PICTURE AND CONTROL POINT** - See preferred PHOTOCONTROL POINT.

**PICTURE POINT CONTROL** - Generally, a survey station identified on a photograph. See preferred term PHOTOCONTROL POINT.

**PIN POINTING** - The process of identifying photoimages by ground comparison which results in thrusting a fine needle through one photograph and identifying the hole on the reverse side. See PHOTOIDENTIFICATION.

**PITCH** - 1) Rotation of an aircraft in a nose up-nose down direction. 2) Rotation of the camera or coordinate system about the Y axis - ( $\Phi$  O).

**PLANE COORDINATES** - In general, coordinates specifying the location of points on a plane. In surveying use, the "*plane*" is usually a projection of the earth's surface such as a developed cone or cylinder.

**PLANE PARALLEL PLATE** - A flat optical element having both surfaces ground flat and precisely parallel.

**PLANE SURVEYING** - A branch of surveying in which the surface of the earth is considered a plane. For small areas, precise results may be obtained with plane-surveying methods, but the accuracy and precision of the results decrease as the area surveyed increases in size.

**PLANETABLE** - A device for plotting survey data directly from field observation. A planetable consists of a drawing board on a tripod with some type of sighting instrument, generally a telescopic alidade, to measure and plot angles graphically.

**PLANETABLE MAP** - A map made by planetable methods. The term includes maps made by complete field mapping on base projections and by field contouring on planimetric bases.

**PLANETABLE SHEET** - See FIELD SHEET.

**PLANIMETER** - A device for measuring small areas by mechanical integration.

**PLANIMETRIC BASE MAP** - A map prepared from aerial photographs by photogrammetric method as a guide or base for contouring. Manmade features as well as water features are shown.

**PLANIMETRIC MAP** - A map which presents only the horizontal positions for the features represented; distinguished from a topographic map by the omission of relief in measurable form. Planimetric maps may show bench marks and/or elevations of significant features.

**PLANIMETRY** - The details of a map shown in plan, generally the culture and water features.

**PLASTIC RELIEF MAP** - A topographic map printed on plastic and vacuum molded to show relative terrain elevations.

**PLATEAU** - An extensive, level or mainly level area of elevated land. See MESA.

**PLATE COORDINATES** - The X and Y coordinates of control points, pass point or other images on a photograph, generally related to the fiducial marks.

**PLATEHOLDER, DIAPOSITIVE** - A frame or holder for the diapositive plate, specifically designed to facilitate the recovery of correct interior orientation of the diapositive in a particular type of photogrammetric plotting instrument.

**PLATEN** - The screen, usually a disk with a reflecting plane surface, on which the projected images are viewed in stereoscopic plotting instruments of the double-projection type. 2) The surface in the exposure chamber of the camera against which the film is held tight at the instant of exposure. This is usually a precise plane surface, but in some cameras it is curved.

**PLATE PERPENDICULAR** - See PHOTOGRAPH PERPENDICULAR.

**PLATFORM** - The vehicle on which a remote sensor is mounted.

**PLAYA** - An area of land, such as a Salt-Marsh or an Alkali Flat, which is temporarily filled with water and becomes a shallow, muddy lake after exceptionally heavy rainfall, or the flooding of a river, but dries up again in hot weather.

**PLAYBACK** - Later transmission of data which was recorded locally at the time of the occurrence.

**PLUMB POINT** - The nadir point in an aerial photograph.

**PLUMMET** - A plumb bob or plumbline.

**PLUS** - A fractional part of 100 feet used in designating a point on a standard survey line at the plus distance from an even station. See STATION.

**POINT** - 1) A position or location in a reference system determined by survey. 2) A headland or pointed land area projecting into a body of water.

**POINTING ERROR** - The sum of the discrepancies (usually small) in direction to a theodolite sighting caused by vision defects, heat waves, eye fatigue, parallax or optical illusion.

**POINT MARKING** - The procedure of designating discrete photographic locations for pass points, tie points, or control stations by physically marking the emulsion of a print, diapositive, or glass-plate negative. When corresponding image points are marked on overlapping photographs, the procedure is referred to as point transferring.

**POINT MARKING AND TRANSFERRING DEVICE** - A precision instrument for physically marking photographic emulsions to establish discrete points on a single photograph or corresponding points on a stereopair. Provision for stereoscopic viewing is either built in or added to enable accurate marking and transferring. See PUG and SNAP MARKER.

**POINT TRANSFERRING** - See POINT MARKING.

**POLARIZED LIGHT** - Light rays which have been modified such that the transverse vibrations are restricted to a single plane.

**POLAR PLANIMETER** - See PLANIMETER.

**POLAR STEREOGRAPHIC PROJECTION** - A stereographic map projection where the point of tangency is at the pole. Meridians appear as radial lines and parallels are concentric circles.

**POLE-ZENITH-STAR** - The astronomical triangle formed on the celestial sphere.

**POLYCONIC PROJECTION** - A map projection having the central geographic meridian represented by a straight line, along which the spacing for lines representing the geographic parallels is proportional to the distances between the parallels; the parallels are represented by arcs of circles which are not concentric, but whose centers lie on the line representing the central meridian, and whose radii are determined by the lengths of the elements of cones which are tangent along the parallels. All meridians except the central one are curved. The projection is neither conformal nor equal area, but it has been widely used for maps of small areas because of the ease with which it can be constructed.

**POLYESTER FILM** - A plastic material (such as polyethylene terephthalate) of high dimensional stability, widely used as a supporting base in aerial films, map manuscripts, and color-separation drawings.

**PORRO-KOPPE PRINCIPLE** - The system for elimination of known camera lens distortion by observing the photograph (or projecting it) using a lens with the same distortions as the camera.

**PORRO PRISM** - A prism that deviates a ray of light 180° - essentially two 90° prisms cemented together.

**POSITION** - 1) Data which define the location of a point with respect to a reference system. 2) The place occupied by a point on the surface of the earth. 3) The coordinates which define the location of a point on the geoid or ellipsoid. 4) A prescribed setting (reading) of the horizontal circle of a direction theodolite which is to be used for the observation on the initial station of a series of stations to be observed.

**POSITION=AZIMUTH DETERMINATION SYSTEM** - Military designation for inertial positioning and azimuth reference now termed the Auto Surveyor.

**PRAIRIES** - 1) The gently undulating, almost flat, generally treeless, grassy plains. 2) Open, grassy areas as small as 160 acres within forested regions of the northwest USA.

**PRECISION** - (USC & GS) Degree of refinement in the performance of an operation or in the statement of a result. Precision relates to the quality of execution, and is distinguished from accuracy which relates to the quality of the result. The term precision not only applies to the fidelity with which required operations are performed, but by custom has been applied to methods and instruments employed in obtaining results of a high order of accuracy. Precision is exemplified by the number of decimal places to which a computation is carried and a result stated. In a general way, the accuracy of a result should determine the precision of its expression. Precision is of no significance unless accuracy is also obtained. See ACCURACY.

**PRELIMINARY EDITION (USGS)** - A map printed and distributed for temporary use with the proviso that it will later be superseded.

**PRELIMINARY SURVEY** - Collection of data in the field as a basis of studies on a proposed project.

**PRESSPLATE (USGS)** - A thin metal plate containing a printable image processed from a color-separation drawing.

**PRESSURE PLATE** - A flat glass plate used for holding film in a plane position by pressing the film against another flat surface. See PLATEN.

**PRIMARY STATION** See MAIN-SCHEME STATION.

**PRIME VERTICAL** - The vertical circle whose plane is perpendicular to the plane of the celestial meridian. The two intersections of the prime vertical with the horizon are the east and west points.

**PRINCIPAL DISTANCE** - The perpendicular distance from the internal perspective center of a photographic system to the plane of a particular finished negative or print.

**PRINCIPAL LINE** - The trace of the principal plane on the aerial photograph. It is normal to the axis of tilt and passes through both the nadir and the principal point.

**PRINCIPAL PLANE** - The vertical plane containing the photograph perpendicular of a tilted photograph.

**PRINCIPAL POINT** - 1) The foot of the perpendicular from the internal perspective center to the plane of the photograph. 2) Intersection with the earth's surface of a line which is an extension of the optical axis of a return beam vidicon camera. This point differs from the format center by the boresight angle error from a nominal alignment.

**PRINCIPAL STATION** - See MAIN SCHEME STATION.

**PRINT** - A reproduction of another photograph, a map, a drawing, or other subject material. See CONTACT PRINT, PROJECTION PRINT and RATIO PRINT.

**PRINTER** - A device for producing reproductions. See DIAPOSITIVE PRINTER, CONTACT PRINTER and PROJECTION PRINTER.

**PRINT FILM** - Sensitized emulsion on transparent base manufactured for the special purpose of printing photographs, particularly color photographs.

**PRINTING PLATE** - A plate from which impressions are taken in a printing press. See PRESS PLATE.

**PROBABLE ERROR** - There is a 50-50 chance that any measurement will have an error less than the probable error. The probable error equals 0.6745 times the standard error. See STANDARD ERROR and ROOT MEAN SQUARE ERROR.

**PROCESS CAMERA** - See COPYING CAMERA.

**PROFILE** - A vertical section of the surface of the ground or underlying strata along any fixed line.

**PROFILE LEVELING** - The determination of elevations at selected points along an alinement for construction or map accuracy testing.

**PROFILING** - See PROFILE LEVELING.

**PROJECTION DISTANCE** - The distance from the external node of a projection lens to the plane onto which the image is projected.

**PROJECTION PRINT** - A photographic print made by projecting the imagery of a transparency onto a sensitized surface.

**PROJECTION PRINTER** - A precision diapositive printer in which a lens is placed between the negative and diapositive plate to produce a scale-changed diapositive. For some projection printers, the nominal printing ratio is expressed by the ratio of the nominal focal length of the camera (in millimeters) to the principal distance of the stereoplotter to be used (also in millimeters). Other projection printers, designated as “*universal*” are capable of producing diapositives in a wide range of printing ratios (i.e., from various camera focal lengths to a variety of stereoplotter principal distances).

**PROJECTION TABLES** - Mathematical values used for plotting various map projections.

**PROJECTOR** - An instrument by which an image can be projected onto a viewing surface.

**PROJECTOR, REFLECTING** - An instrument by means of which the image of an aerial photograph can be projected onto a map. By varying the position of the projector lens, the scale of the projected image can be varied, and, by tilting the table top, compensation can be made for any tilt in the photograph.

**PROMONTORY** - A headland; a cliff or crag projecting into the sea.

**PSEUDOSCOPIC IMAGE (Pronounced Soodoscopic)** - The apparent reversal of relief.

**PSYCHROMETER** - An instrument for measuring relative humidity of the atmosphere. It consists of two similar thermometers, the bulb of one being kept wet. Air is forced past the thermometers by means of a spring-wound or battery-driven fan motor or by hand whirling.

**PUBLICATION SCALE** - The scale at which a map is intended to be published.

**PUGGING** - See preferred term POINT MARKING.

**PUG POINT-TRANSFER DEVICE** - A brand of point transfer device having a binocular stereoscopic viewing system and a pair of mechanical drills for making holes of specified sizes in the emulsion.

**PULL UP** - A tracing of selected map detail with line weights and symbol sizes suitable for clarity when reduced to the scale of the map under revision.

## Q

**QUADRANGLE** – A four-sided figure, bounded by parallels of latitude and meridians of longitude, used as an area unit in mapping. The dimensions are not necessarily the same in both directions.

**QUADRANGLE MAP** – A map of a quadrangle. See STANDARD QUADRANGLE MAP.

**QUADRANGLE REPORT (USGS)** – A brief history of the mapping of a specific quadrangle. It is assembled in a folder beginning with the specification sheet. It accompanies the mapping material through each phase of production (basic control surveys, supplemental control surveys, photogrammetric compilation, field interpretation and completion, and map finishing) and is filed with the map material. The narrative summary for each operational phase stresses conditions that may affect later phases.

**QUADRIBRACH** – The four armed base of a survey instrument which carries opposed leveling screws.

**QUADRIPOD** – A four-legged stand for support of an observing platform, signals, etc.

**QUANTIZING** – The process by which each grey-tone in a digitized image is assigned a different value according to a mathematical model.

## R

**REV** – Return Beam Vidicon.

**RF** – Representative Fraction.

**RADAR** – Radio detection and ranging. An electronic instrument that indicates the distance from a transmitter to a reflecting object by measuring elapsed circuit time of travel of ultra-high-frequency radio waves of known propagation velocity.

**RADAR ALTIMETER** – An electronic instrument which determines height above terrain during flight.

**RADAR MAP** – A map produced by the application of radar techniques.

**RADIAL** – A line or direction from the radial center to any point on the photograph.

**RADIAL CENTER** – The selected point on a photograph from which radials to various image points are drawn or measured. The radial center can be either the principal point, the nadir point, the isocenter, or a substitute center. Also called center of radiation or center point.

**RADIAL DISTORTION** – See LENS DISTORTION.

**RADIAL LINE METHOD** – A system for updating minor detail on a map.

**RADIAL LINE PLOTTER** – A method of transferring data from stereo viewed photographs via mechanical linkage to a plotter position. A Kail plotter.

**RADIAL TRIANGULATION** – A method of locating photogrammetric control points on a control base by graphic or mechanical means. In this method, radials originating from the radial center of each photograph are used for extending the triangulation by intersection and resection.

**RADIANT ENERGY** – Energy which is transferred by electromagnetic waves without corresponding transfer of matter.

**RADIATION** – 1) The process of locating points using their directions and distances from a known point. 2) The process of propagation of electromagnetic energy through any medium or through space. 3) The process of particle emissions, especially radioactive particles. 4) Energy transmission through wave motion.

**RADIOMETER** – Instrument for detecting and usually also for measuring radiant energy.

**RADIOMETRIC** – Concerned with the combined electronic and optical transmission of data.

**RAISED BEACH** – A beach which has been raised by earth movement to form a narrow Coastal Plain; it is often bounded by inland cliffs. If more than one rise has taken place, there may be raised beaches at different levels.

**RANDOM ERROR** – Errors that occur without known physical law or pattern. In theory, small errors occur more frequently than large errors and there are as many positive errors as negative errors.

**RANGE** – In general, two points in line with the point of observation. The following are practical examples of a range: 1) The line defined by the side of a building or by a fence may be extended visually to its intersection with a survey line; the point of intersection thus determined is said to be in range with the side of the building or with the fence. 2) In hydrographic surveying, a range formed by two shore objects, if suitably located, aids in keeping a boat moving in a straight line – the line defined by the range. 3) In navigation, specially constructed aids mark ranges defining channels which are to be followed by vessels to keep them clear of dangers. 4) Boundary lines across water areas and boundary corners in water areas where permanent marks cannot be established are sometimes defined by intersection of range lines or by a range line and distance from a mark, the range lines being marked by permanent monuments on the land. See RANGE\*.

**RANGE TIE** – See RANGE.

**RASTER** – Pattern followed by the electronic beam exploring element scanning the screen of a cathode ray tube.

**RATIO PRINT** – A projection print made at a specified magnification or reduction ratio.

**RAVINE** – A long, narrow depression in the earth's surface, rather smaller than a valley but larger than a gully. Several gullies often lead to a ravine, and several ravines to a valley.

**REAL TIME** – Time in which reporting events or recording of events is simultaneous with the events.

**RECIPROCAL LEVELING** – leveling across a wide river (or other open barrier) by establishing a turning point of each bank of the river from one side and taking a backsight on each to determine the height of instrument on the other side. By using the mean of the two HI determinations, the effects of curvature and refraction on the long sights are compensated.

**RECIPROCAL VERTICAL ANGLES** – Vertical angles measured over a line at both ends in trigonometric leveling to reduce the effects of curvature and refraction.

**RECONNAISSANCE** – A general examination of a region with reference to its main features, usually as a preliminary to a detailed survey. It may be performed in the field or office, depending on the extent of information available.

**RECONNAISSANCE MAP** – The plotted results of a general examination or survey of the main features, or certain specifications, of a region, usually low order of accuracy and usually as a preliminary to more detailed surveys, examinations, or mapping.

**RECONNAISSANCE SURVEY** – A preliminary survey, usually executed rapidly and at low cost; a “windshield” survey.



**RECOVER** – To visit a survey station, identify its mark as authentic and in the original location, and verify the description.

**RECTANGULAR COORDINATES** – See PLANE COORDINATES and COORDINATE SYSTEM.

**RECTANGULAR SPACE COORDINATES** – The perpendicular distances of a point from planes defined by each pair of a set of three axes which are mutually perpendicular to each other at a common point of origin. In photogrammetry, space coordinates are also termed survey coordinates, and are the x-coordinates and y-coordinates which define the horizontal position of a point on a ground system, and the z-coordinate, which is the elevation of the point with reference to the ground system.

**RECTIFICATION** – The process of projecting a tilted photograph to produce the equivalent of an untilted photograph taken at the same exposure station except for effects of relief displacement. See TRANSFORMATION.

**RECTIFIED PHOTOGRAPH** – A photograph in which tilt displacements have been removed by transformation.

**REDUCTION TO CENTER** – The correction to be applied to a direction or angle observed from a set up at a point other than the station mark. See ECCENTRICITY.

**REDUCTION TO SEA LEVEL** – The application of a correction to a measured horizontal length on the earth’s surface (at any elevation) to convert it in its projected or corresponding length at sea level.

**REEF** – A submarine elevation of rock or coral forming a menace to navigation. See SHOAL and REEF\*.

**REFERENCE MARK** – A permanent supplementary mark near a survey station to which it is related by an accurately measured distance and direction, and (or) a difference in elevation. See REFERENCE MONUMENT\*.

**REFERENCING** – The process of tying a survey station to a supplementary mark or other natural or artificial features by distances and directions.

**REFLECTING PROJECTOR METHOD** – A system for updating maps from more recent source data. A variable ratio projector is used.

**REFRACTION** – The deflection from a straight path undergone by a light ray or other electromagnetic wave in passing obliquely from one transparent medium into another in which its velocity is different.

**REFRACTION, ATMOSPHERIC** – The bending of the path of light or other electromagnetic wave energy passing through air of varying density. See INDEX OF REFRACTION and MEAN REFRACTION.

**REGISTER (USGS)** – The relative positioning of components of a composite map. A map is in register when each component is in correct position relative to the others. The term is sometimes incorrectly referred to as registry or registration. See REGISTER\*.

**REGISTERING** – Alignment process by which two images or two digital images of the same ground area are positioned coincident with respect to one another so that their respective grey tones at any (x,y) coordinate or any resolution cell represents the sensor output for the same part of the same object.

**REGISTER PUNCH (USGS)** – A manually or mechanically operated device consisting of a precision punch and die assembly which cuts systematically uniform holes in component guides and manuscripts.

**REGISTER STUDS** – Precisely machined metal or plastic studs which, when inserted into prepunched holes, provide accurate register of component guides and manuscripts.

**RELATIVE APERTURE** – The ratio of the equivalent focal length to the diameter of the entrance pupil in a photographic or telescopic lens. Also termed “*f-number*” or “*speed*.”

**RELATIVE HUMIDITY** – The ratio of water vapor present in air to the maximum amount possible at that temperature.

**RELATIVE ORIENTATION** – Determination of the position and attitude of one of a pair of overlapping photographs with respect to the other.

**RELATIVE SETTING (DMA)** – In tilt analysis of oblique photography, the dihedral angle between the two planes passing through the principal point of the opposite obliques, the principal point of the vertical photograph, and the common exposure station. This angle is measured on the vertical photograph as the angle between the two isolines, or as the deflection angle between the perpendiculars from the principal point of the vertical photograph to the two isolines.

**RELATIVE SWING (DMA)** – In the tilt analysis of oblique photographs, the angle of rotation of the oblique camera about its own axis with respect to the plane of the vertical photograph, measured on the oblique photograph by the angle between the isoline and a line joining the fore and aft fiducial marks.

**RELATIVE TILT** – The tilt of a photograph with reference to an arbitrary plane, not necessarily a horizontal plane, such as that of the preceding or subsequent photograph in a strip. Also defined as the angle between the photograph perpendicular and a reference direction, such as the photograph perpendicular of the preceding or subsequent photograph in a strip.

**RELIEF** – Variations in the elevation of the ground surface, also features of height above a plain or reference datum. On a topographic map, relief is depicted by hachures or shading, or, more accurately, by contours or by spot elevations or both.

**RELIEF DISPLACEMENT** – Displacement of images radially inward or outward from the nadir point of the photograph. Relief displacement of images is caused by differences in elevation of the corresponding ground objects whether below or above, respectively, the elevation of the ground nadir.

**RELIEF FEATURES** – Landforms. For convenience, relief features are classified in three orders of magnitude: the first order comprising the continents and ocean basins; the second comprising mountains, plains, and basins, which are of constructional nature; and the third comprising smaller features formed by destructive forces – erosional features, such as gullies and valleys; residual features, such as peaks and monadnocks; and depositional features, such as deltas and moraines.

**RELIEF MODEL** – A representation of the physical features (natural or artificial) of the whole or a part of the earth’s surface, with topography physically expressed in three dimensions. The vertical scale is generally larger than the horizontal scale for accentuation.

**REMOTE SENSING** – Imaging or recording of physical phenomena at a distance by detecting the electromagnetic radiant energy which the phenomenon either reflects or emits.

**REPEATING INSTRUMENT** – A theodolite or transit so designed that successive measures of a horizontal angle may be accumulated and read on the graduated circle.

**REPRESENTATIVE FRACTION** – Map scale expressed as a fraction, as 1/24,000 or as a ratio 1:24,000.

**REPRODUCTION** – 1) The summation of all the map making processes involved in printing copies from an original drawing. The principal processes are photography, lithography or engraving, and printing. 2) A copy of an original by any of the processes of duplication or printing.

**RESEAU** – A network (or grid) of fine lines accurately ruled on a glass plate. Also, the glass plate bearing the network. In photogrammetric practice, the term generally refers to the network of lines ruled on the focal-plane plate of certain cameras to provide a means of measuring film distortion.

**RESECTION** – Literally “*to cut again*;” 1) The graphical or analytical determination of a position, as the intersection of at least three lines of known direction to corresponding points of known position. 2) The determination of the horizontal position of a survey station by observed directions from the station to points of known positions. Also, the line drawn through the plotted location of a station to the occupied station. 3) The determination of the position and/or altitude of a camera, or the photograph taken with that camera, with respect to the exterior coordinate system;

**RESOLUTION** – The minimum distance between two adjacent features, or the minimum size of a feature which can be detected by a photographic or other image-recording system. See GROUND RESOLUTION.

**RESOLUTION CELL** – The smallest element of a digitized image having a grey tone assigned to the area.

**RESOLVING POWER** – A mathematical expression of lens definition, usually stated as the maximum number of lines per millimeter that can be resolved (that is, seen as separate lines) in the image.

**RESOURCE PHOTOGRAPHY** – Aerial photographs flown for the purpose of management of the Natural Resource lands.

**RESTITUTION** – The photogrammetric process of determining the true position of ground objects, the image of which appears displaced or distorted on aerial photographs.

**RESURVEY** – To survey again, determining new or improved values. See RESURVEY\*.

**RETICLE** – A system of wires, hairs, threads, etched lines, or the like, placed in a telescope perpendicular to its axis and at its principal focus, to define the line of sight of the telescope, to permit specific pointings to be made on a target or signal, or readings to be made on a rod or scale. Also reticule.

**RETICLE RING** – The ring across which the wires, hairs, etc., of a reticule are stretched, or which supports the glass diaphragm on which the lines are etched.

**RETICULATION** – A network of minute depressions or corrugations in a negative, produced – either accidentally or intentionally – by any treatment resulting in rapid expansion and shrinkage of the swollen gelatin. Reticulation may be produced by solutions which are too warm or too alkaline, or by forced drying in an air current which is too hot.

**RETICULE** – See RETICLE.

**RETURN BEAM VIDICON CAMERA (RBV)** – a remote sensing subsystem containing three individual cameras operating in different spectral bands: blue/green, green/yellow and red/IR.

**REVERTED IMAGE** – An image in which detail is in reverse order, from left to right, as compared with the corresponding detail of the object. The order of detail from top to bottom remains unchanged. A mirror image.

**REVISION** – The process of updating a map, chart or publication to reflect current field status of an area.

**RHUMB LINE** – A line on the surface of the earth making the same angle with all meridians; a loxodrome or loxodromic curve spiraling toward the poles in a constant true direction. Parallels and meridians, which also maintain constant true directions, may be considered special cases of the rhumb line.

**RIGHT ANGLE PRISM** – A hand tool which defines a 90° line of sight by means of a pentaprism. Double pentaprisms provide accurate line of sight to left as well as right.

**RIGID GRAVER** – A tool having two feet and a needle point for scribing.

**RIVER** – A water course with a substantial stream of fresh water generally retaining some flow during dry weather in its natural state.

**RIVER CROSSING** – The process of carrying a line of leveling across a wide stream when no suitable bridge is available. Special observations are required from both sides of the stream.

**ROAD** – A rural route for vehicles usually traversable by passenger cars and by trucks. See JEEP TRAIL and HIGHWAY.

**ROD LEVEL** – a spirit level attached to a leveling rod to indicate when the rod is vertical.

**ROELOFS PRISM** – An optical device attached to the objective end of a theodolite to provide a means of pointing precisely on the center of the sun. Four overlapping images define a small square which are used as a point target.

**ROLL** – 1) Rotation of an aircraft about its longitudinal axis. 2) Rotation of camera or coordinate system about the X axis – (omega –  $\omega$ ).

**ROLLING GROUND or LAND** – Any undulating land surface; a succession of low hills giving a wave effect to the surface. A land surface much varied by many small hills and valleys.

**ROOT MEAN SQUARE ERROR** – The square root of the sum of the squares of individual errors (deviations from the mean) divided by the number of errors. See STANDARD ERROR.

**ROUND OFF** – The addition or subtraction of a small amount (one-half or less in terms of the last retained significant figure) to reduce the number of significant digits in a computed or measured quantity.

**ROUTE SURVEY** – Survey for construction of linear work such as highways, canals, pipeline, powerlines etc.

## S

**SETER** – Survey Equipment Technical Evaluation Report.

**SIA** – Stereo Image Alternator.

**SLAR** – Side Looking Airborne Radar.

**SLR** – Side Looking Radar.

**SADDLE** – A low point on a ridge or crest line, generally a divide between the heads of streams flowing in opposite directions.

**SAFELIGHT** – A light of such intensity and color range that it will not actinically affect the specific light-sensitive materials being handled and developed in a darkroom.

**SAG CORRECTION** – The difference between the effective length of a tape (or part of a tape) when supported continuously throughout its length and when supported only at the ends or at a limited number of independent points.

**SALES INDEX MAP (USGS)** – State maps for public distribution showing, by diagram or by listing, maps offered for sale by the Geological Survey. Quadrangle outlines, names, dates of survey, and authorship are shown by overprint. River surveys, are indicated by overprinting the river courses; lists of special maps available and items of general information are printed on the back.

**SALT MARSH** – See SALT MARSH\*.

**SAND DUNE** – A mound, ridge, or hill of loose sand, heaped up by the wind.

**SAND SPIT** – A narrow sand embankment, created by an excess of deposition at its seaward terminus, with the end away from the point of origin terminating in open water.

**SATELLITE GEODESY** – The surveying discipline which uses earth orbiting man-made satellites to obtain geodetic data.

**SATURATION** – Point at which additional input energy to the sensor results in no increase in sensor output.

**SCALE CONVERSION** – The changing of map materials from one scale to another, usually by photographic methods and usually without changing the graphic content.

**SCALE FACTOR** – In the State coordinate systems scale factors are applied to geodetic lengths to obtain grid lengths.

**SCALING** – The adjustment of a stereomodel to a scale of known ratio to the ground distances.

**SCANNING DENSITOMETER** – Device used to convert image data from film or photographic format to electronic video signal format. Usually the film is placed on a glass cylinder which rotates and slowly translates. A fine beam

of light is focused on the film, passed through the film and is detected by a photomultiplier where it is amplified to a usable video signal.

**SCATTERING** – Diffuse reflection of electromagnetic energy due to moisture and dust particles in the air.

**SCHEIMPFLUG CONDITION** – One of the two conditions of direct optical projection that must be satisfied to achieve maximum sharpness in a projected image. It requires that the object plane, the principal plane of the lens, and the image plane all intersect in a common line.

**SCRIBED DRAWING** – A scribing guide on which the negative scribing has been completed. See COLOR-SEPARATION DRAWING.

**SCRIBING** – The art or technique of cutting with specially designed tools through a photographically opaque coating applied to a transparent base, usually plastic. Portions of the coating are removed, creating a negative image on the lines, letters, and symbols desired for reproduction.

**SCRIBING COPY** – See COLOR-SEPARATION GUIDE.

**SEA LEVEL DATUM** – A determination of mean sea level that has been adopted as a standard datum for heights or elevations. The Sea Level Datum of 1929, the current standard datum for geodetic leveling in the United States, is based on tidal stations along the coasts.

**SEA LEVEL FACTOR** – The factor applied to ground measurements to reduce measurements to sea level datum.

**SECANT CONE** – A cone which cuts another surface in two places.

**SECONDARY STATION** – A survey station established in conjunction with the main scheme, but observed with a lower order of accuracy and precision, to increase the density of control.

**SECOND ORDER** – Designation of survey work of next to the highest category of precision and accuracy. See CONTROL SURVEY CLASSIFICATION.

**SECOND ORDER LEVELING** – Differential leveling which closes on First Order Bench Marks using specified equipment and methods which achieve closures of 0.035 ft./mile or less.

**SECOND ORDER MAGNITUDE RELIEF FEATURE** – Mountains, plains and basins of constructional nature.

**SECOND ORDER TRAVERSE** – A closed survey which has a closing error of 1 in 10,000 or less which also complies with specifications for angle, distance and azimuth observations.

**SECOR** – Acronym for Sequential Collation of Range. An electronic distance measurement system for satellite observation.

**SECTION (U.S.C. & G.S.)** – That portion of a line of levels which is recorded and abstracted as a unit. See SECTION\*.

**SELF LEVELING LEVEL** – See AUTOMATIC LEVEL.

**SELF READING ROD** – A level rod which has a movable tape which can be set to read elevation values from a given HI.

**SEMIANALYTICAL AEROTRIANGULATION** – A category of aerotriangulation methods in which the positions and/or elevations of ground stations are obtained by the mathematical adjustment of model, section, or strip coordinates derived from models oriented in a stereoplottting instrument. See BZ CURVE.

**SEMI-MATTE PRINT** – A non-glossy paper with only a faintly lustrous surface.

**SEMITANGENT** – The line segment between the Point of Curvature and the Point of Intersection on a curved route survey.

**SENSOR** – Detecting device which collects and conveys some interpretable data; the component of an instrument that converts an input signal into a quantity which is measured by another part of the instrument.

**SENSOR PLATFORM** – Vehicle on which a remote sensor is mounted and carried aloft; an aircraft platform, space platform, etc.

**SERIES CONVERSION (USGS)** – The preparation of a 15-minute map from source materials originally used to publish 7½ -minute maps, with approximate cartographic changes.

**SET-UP** – 1) The transit or leveling instrument's location for observation. 2) A correction in precise taping.

**SHADED-RELIEF MAP** – A map on which the hypsography is made to appear three dimensional by the use of graded shadow effects. A shaded-relief map may also contain contours or hachures in combination with the shading.

**SHOAL** – A submarine elevation over which water is shallow, which is detached from the shore and composed of any material other than rock or coral and which is a menace in navigation. See REEF.

**SHORE** – The land which is covered and uncovered by the rise and fall of the normal tide.

It is the strip of land between the mean high-water and mean low-water lines. In its strictest use, the term applies only to land along tidal waters.

**SHORELINE, OCEAN** – The line along which the land surface meets the water surface of a lake, sea, or ocean.

Strictly speaking, it is not a line, but a narrow strip or area, embracing that part of the land surface which comes in contact with wave action both above and below the surface of the water. The term does not apply on tidal flats or

marshes which are overflowed by the tides, but essentially to strips where the land surface has an appreciable slope toward the water. See COASTLINE.

**SHORELINE, RIVER** – The shoreline is the line which is washed by the water wherever it covers the bed of the river within its banks. It lies along the bank at the mean level attained by the waters of the river when they reach and wash the bank without overflowing it.

**SHUTTER** – A mechanism for controlling the interval of time during which light is allowed to pass through an optical or photographic system.

**SIDE CANYON** – A small ravine draining into a main river.

**SIDELAP** – The area common to two adjacent strips of aerial photography.

**SIDE-LOOKING RADAR (SLAR)** – A radar system using a stabilized antenna oriented at right angles to the aircraft's flight path, using for radar mapping at night or through cloud cover.

**SIDE SHOT** – Observations taken from a survey station to a point not on the continuous line of survey. A point whose position or elevation was so determined.

**SIDE SIGHT** – A sight to a point not on the line of traverse. It may be a side shot or an observation to locate an in-and-out station, an azimuth mark, or an intersected point.

**SIGNAL** – A natural or artificial object or structure located at or near a survey station and used as a sighting point or target for survey measurements.

**SIGNAL-TO-NOISE RATIO** – Ratio of the value of the signal to that of the noise.

**SIGNATURE** – Unique reflectance or emission response from a particular object or environmental association.

**SIMULTANEOUS LEVEL LINE** – See DOUBLE RODDED LINE.

**SKETCHMASTER** – A trade name for a mounted semisilvered mirror used for transformation of aerial photographs in updating maps.

**SKEW MERCATOR** – See OBLIQUE MERCATOR.

**SLANT RANGE** – A line of sight distance between two points of different elevation.

**SLOTTED TEMPLET** – A card with precision slots cut along radial lines determined from pass points; used in radial triangulation.

**SLOUGH** – A swampy ditch. See BAYOU.

**SLOTTED TEMPLET TRIANGULATION** – Radial phototriangulation using slotted templets. Also called a laydown.

**SMALL SCALE MAP** – A map covering a very large area as a 1:1,000,000 base map. See LARGE SCALE MAP.

**SNAP MARKER** – A point transfer device designed to be used with a mirror stereoscope. A steel ball is struck by a spring-loaded hammer to make a small indentation about 100 microns in diameter in the emulsion.

**SONAR** – 1) A sonic device used in hydrography for the detection and location of underwater objects. 2) A system for determining depths by measuring the interval of time between transmission of an underwater sonic or ultrasonic signal and return of its echo.

**SONNE CAMERA** – A system for taking continuous strip photography by moving the film across a slit at a speed corresponding to the ground speed.

**SOUND** – 1) A relatively long arm of the sea or ocean forming a channel between an island and a mainland or connecting two larger bodies, as, a sea and the ocean, or two parts of the same body; usually wider and more extensive than a strait. 2) To measure or ascertain the depth of water, as with sounding lines.

**SOUNDING** – Measuring the depth of water with a lead line or by other means.

**SOURCE MATERIAL** – Data of any type required for production of maps and charts.

**SPACE COORDINATES** – See RECTANGULAR SPACE COORDINATES.

**SPADING** – Removing scribe coating with a wide flat blade.

**SPATIAL MODEL** – The three-dimensional image seen by stereoscopic methods.

**SPECIAL PRINTING PLANIMETRIC MAP (USGS)** – Standard 7 1/2 – and 15-minute series and 1:250,000-series topographic maps on which the contours and woodland data are omitted.

**SPECIAL PURPOSE MAP (USGS)** – A map designed to meet limited objectives emphasizing or representing certain classes or types of information. Typical examples are the geologic map of the United States; the shaded-relief map of Massachusetts, Rhode Island, and Connecticut, and a State index map.

**SPECTRAL CHARACTERISTIC** – Relation, usually shown graphically, between wavelength and some other variables.

**SPHERICAL COORDINATES** – Pairs of angular values such as latitude and longitude or right ascension and declination which locate points on a sphere in reference to fixed, or defined, great circles.

**SPHERICAL EXCESS** – The amount by which the sum of three error free angles of a triangle on a sphere exceeds 180 degrees.

**SPHERICAL TRIANGLE** – A triangle, on the surface of a sphere, whose sides are arcs of three great circles.

**SPHEROID** – Any figure differing slightly from a sphere. In geodesy, it is a mathematically defined figure closely approximating the geoid in form especially used in connection with gravity observation. See ELLIPSOID.

**SPHEROIDAL EXCESS** – The amount by which the sum of three error-free angles of a triangle on a spheroid exceed 180 degrees. See SPHERICAL EXCESS.

**SPIRIT LEVELING** – The determination of elevations by use of a leveling rod and an instrument incorporating a spirit level to establish a horizontal line of sight; the term has now been broadened to include leveling by means of other types of precise levels, such as an automatic level.

**SPIT** – A narrow, low-lying tongue of sand or gravel, or small point, projecting into the sea. It differs from a bar in that it is attached to the land at one end, and it is often formed by shore currents across the entrance to a bay.

**SPLINES** – Flexible curve rulers which are adjusted to the points of a curve to be drawn and held in place by lead weights.

**SPOT ELEVATION (USGS)** – An elevation shown on a topographic map to supplement the information shown by contour lines and bench marks. Where the exact location of the elevation is not evident, it is indicated by a brown cross.

**SPUR** – A submarine prolongation of a mountain range onto or across a continental or insular shelf.

**SPUR LINE** – A survey line connected at only one end to similar surveys of equal or higher order.

**STABLE BASE** – A film used in cartography having a high dimensional stability over a period of many years.

**STADIA** – A technique of distance measurement wherein the observer reads the intercept subtended on a graduated rod between two hairs or marks on the reticle of the telescope, the distance to the rod being proportional to the rod intercept. A rod specially designed for this use is called a stadia rod; the marks on the reticle are called stadia wires; such a survey is called a stadia survey, etc.

**STANDARD** – An exact value (a physical entity or abstract concept) established and defined by authority, custom, or common consent to serve as a reference, model, or rule in measuring quantities, establishing practices or procedures for evaluating results. See STANDARD\*.

**STANDARD-ACCURACY MAP** – A map which complies with the National Map Accuracy Standards.

**STANDARD-CONTENT MAP (USGS)** – A map that represents natural and manmade features according to current standards. Topographic instructions specify classes and dimensions of various map features shown so that uniform treatment is attained throughout a map series. Maps conforming to these specifications are considered to have standard content.

**STANDARD ERROR** – Also standard deviation. The root-mean-square value based on the differences between the average error and the individual errors of a set. It is a measure of the precision of a single observation.

**STANDARD MAP** – See STANDARD QUADRANGLE MAP.

**STANDARD MERIDIAN** – A meridian on a map projection along which scale is as stated.

**STANDARD PARALLEL** – A parallel of latitude which is used as a control line in the computation of a map projection. See STANDARD PARALLEL\*.

**STANDARD QUADRANGLE (USGS)** – A quadrangle of a specific series, conforming to the systematic pattern of the series.

**STANDARD QUADRANGLE MAP (USGS)** – A designation for one of a series of quadrangle maps conforming in content and format to the standards in effect at the time the map was produced. See MAP OF STANDARD FORMAT, STANDARD ACCURACY MAP and STANDARD CONTENT MAP.

**STANDARD REVISION (USGS)** – The updating and correction of a map to reflect changes that have occurred since the original survey or latest revision. The accuracy of the existing map is preserved, and current specifications pertaining to map symbolization, content, and format are generally applied. See MAP REVISION.

**STANDARD TENSION** – The pull on a survey tape at which the tape was standardized.

**STATE BASE MAP** – A base map of a state as a unit.

**STATE COORDINATE SYSTEMS** – The plane-rectangular coordinate systems established by the United States Coast and Geodetic Survey, one or more for each state in the United States, used for defining positions in terms of plane-rectangular (x and y) coordinates. Also called State Plane Coordinate Systems.

**STATE PLANE COORDINATE SYSTEMS** – The plane-rectangular coordinate systems established by the U.S. Coast and Geodetic Survey, one for each State in the Union, used for defining positions of geodetic stations in terms of plane-rectangular (x and y) coordinates.  
The two principal systems in use in the United States are the Lambert Conformal Conic Map Projection and the Transverse Mercator Map Projection. See OBLIQUE MERCATOR PROJECTION.

**STATION** – 1) A point whose position has been or will be determined by surveying methods. 2) Any survey point whose position is given by its accumulated distance from a starting point. 3) A 100 foot distance between points on route surveys; a unit of measure.

**STATOSCOPE** – An altimeter.

**STEREO BASE** – A line representing the distance and direction between complementary image points on a stereo-pair of photos correctly oriented and adjusted for comfortable stereoscopic vision.

**STEREOCOMPARATOR** – A stereoscopic instrument for measuring photograph coordinates of image points.

**STEREOCOMPILATION** – 1) The procedure of producing a map from aerial photographs by means of stereoplotting instruments. 2) The map data produced with stereoplotting instruments.

**STEREOGRAM** – A stereoscopic pair of photographs or drawings correctly oriented and mounted or projected for stereoscopic viewing.

**STEREOGRAPHIC PROJECTION** – A map plotting system in which points on the ellipsoid are projected onto a plane parallel to a tangent plane from a point on the opposite side of the sphere from the point of tangency. The polar case is most useful. See POLAR STEREOGRAPHIC.

**STEREOIMAGE ALTERNATOR** – A device for viewing stereoscopic models in direct-viewing double-projection plotting instruments, consisting of synchronized, rapidly rotating shutters placed in both the projection field and the viewing field. The shutters in the projection field cause the imagery of the left and right diapositives to be projected on the tracing table in rapid alternation. The shutters in the viewing field, rotating in phase with those in the projection field, permit each eye to see only the imagery of the corresponding (left or right) diapositive for attainment of the stereoscopic effect.

**STEREOMETER** – A measuring device comprising a micrometer movement by which the separation of two index marks can be changed in order to measure parallax difference on a stereoscopic pair of photographs. Also termed parallax bar.

**STEREO PAIR** – Two aerial photographs taken from separate positions of the same area with sufficient overlap to permit stereoscopic viewing.

**STEREOPLANIGRAPH** – Brand name of a universal stereoplotting instrument.

**STEREOPLOTTERS** – A stereoscopic plotting instrument of several types: Stereometers, Paper Print Plotters, Direct Viewing Projection Plotter, Mechanical Projection Plotters, Optical Double Projection Plotters.

**STEREOSCOPE** – An optical instrument used for viewing two properly related photographs or diagrams simultaneously to obtain the mental impression of a three-dimensional model. See ZOOM STEREOSCOPE.

**STEREOSCOPIC PLOTTING INSTRUMENT** – An instrument for compiling a map or obtaining spatial solutions by observation of stereoscopic models formed by stereoscopic pairs of photographs.

**STEREOSCOPIC PRINCIPLE** – The formation of a single, three-dimensional image by binocular vision of two photographic images of the same terrain taken from different exposure stations.

**STEREOSCOPY** – The science and art that deals with the use of binocular vision for observation of a pair of overlapping photographs or other perspective views, and with the methods by which such viewing is produced.

**STEREOTEMPLET** – A slotted templet derived from a stereoscopic model and made in two parts, each covering the same area. The composite templet is adjustable in scale and is representative of the horizontal plot of the model.

**STEREOTEMPLET TRIANGULATION** – A mechanical analog system of horizontal aerotriangulation that features the adjustment of pass points to horizontal control by means of stereotemplates.

**STEREOTRIANGULATION** – A triangulation procedure that uses a stereoscopic plotting instrument to obtain the successive orientations of the stereoscopic pairs of photographs into a continuous strip. The spatial solution for the extension of horizontal and (or) vertical control using these strip (or flight) coordinates may be either graphical or computational procedures often called bridging.

**STICKUP** – Adhesive-backed film or paper on which letters or symbols have been photographed or printed. Also, the operation of applying such lettering and symbols to color-separation guides. See PHOTOTYPE.

**STREET** – a public thoroughfare (generally urban) over 20 feet in dedicated width.

**STRENGTH OF FIGURE** – A number expressing the relative strength of a triangle as a function of its shape; a smaller number indicates greater relative strength. The strength of figure is independent of the size of the triangle or of the precision of angle measurements.

**STRIP** – A series of consecutive overlapping serial photographs or stereomodels in a flight line that may be treated as a unit in aerotriangulation.

**STRIP ADJUSTMENT** – The adjustment of consecutive photographs, models, or groups of these into a homogeneous strip. The adjustment may be horizontal or vertical or both; it is often an intermediate step in analytical of semianalytical aerotriangulation. See BLOCK ADJUSTMENT.

**STRIP CAMERA** – See SONNE CAMERA.

**STRIP WIDTH** – The average dimension, measured normal to the flight line, of a series of neat models in the flight strip. Strip width is generally considered as equal to width between flights.

**SUBDIVISION SURVEY** – A land survey, usually filed in County records, dividing land into three or more separate lots and providing access thereto. See **URBAN SUBDIVISION\*** and **SUBDIVISION OF SECTION SURVEY\***.

**SUBLITTORAL** – Refers to the benthonic zone extending from low tide level to the edge of the continental shelf or some comparable depth of water. It may be separated into inner and outer zones at some depth ranging from about 50 to about 300 feet.

**SUBMARINE BULGE** – Fanlike sedimentary deposit, presumed to have been formed by turbidity currents, on the outer continental slope at the mouth of a submarine canyon. Term is applicable where data are inadequate to distinguish between deltas and alluvial fans.

**SUBMARINE CANYON** – Steep valleylike submarine depression crossing the continental margin region, except for isolated portions of outer ridges, less than 1 to more than 10 miles wide, less than 60 to more than 6000 feet deep.

**SUBMERGED LANDS ACT\***.

**SUBSTITUTE CENTER** – A photo image used instead of the principal point because it is easily identified.

**SUBTENSE BAR** – A horizontal held bar of precisely determined length, used to measure distances by observing the angle it subtends at the distance to be measured.

**SUPER WIDE ANGLE LENS** – A lens having an angle of coverage greater than 100°.

**SUPPLEMENTAL CONTOUR** – See preferred term **SUPPLEMENTARY CONTOUR**.

**SUPPLEMENTAL CONTROL** – Vertical (and sometimes horizontal) control of selected photo-identifiable points to be used in photogrammetric compilation.

**SUPPLEMENTAL STATION (USGS)** – A secondary triangulation station generally established to obtain an elevation by vertical angles for photogrammetric mapping.

**SUPPLEMENTAL BENCH MARK** – See **BENCH MARK, NONMONUMENTED**.

**SUPPLEMENTAL CONTOUR** – A contour line drawn between basic-interval contour lines on a map of an area that has wide variation in slope. Supplemental contours are only used where it is necessary to portray local features not adequately shown by basic contours.

**SUPPLEMENTARY CONTROL** – See preferred **SUPPLEMENTAL CONTROL**.

**SURFACE MANAGEMENT MAPS** – Part of the Mineral Management Series which combines surface ownership (Land Status) and planimetric or Topographic data.

**SURFACE-MINERAL MANAGEMENT MAPS** – Part of the Mineral Management Series which combines sub-surface ownership (Land Status) and planimetric or Topographic data.

**SURGE ZONE** – The region between the breaker zone and the 50-60 feet depth contour, where the effect of sea waves and swell produces oscillatory surges causing sediment transport and abrasive erosion.

**SURVEILLANCE PHOTOGRAPHY** – Aerial photography for the purpose of detection of trespass or other infraction of laws.

**SURVEY (USGS)** - 1) the orderly process of determining data relating to the physical or chemical characteristics of the earth. The list of orderly processes which can be properly termed “*surveys*” is long and may be divided into classes according to the type of data obtained, the methods and instruments used, and the purposes to be served. Examples: geodetic survey, topographic survey, hydrographic survey, land survey, geologic survey, geophysical survey, soil survey, mine survey, engineering survey. 2) The associated data obtained in a survey. The data obtained in a particular project may be designated by the name of the project, as “*the topographic survey of the District of Columbia.*” 3) An organization engaged in making a survey. Such an organization is often given an official name which includes the word “*survey.*” Examples: “*The United States Geological Survey,*” “*The Massachusetts Geodetic Survey.*” See **MINERAL SURVEY\***, **PRELIMINARY SURVEY**, **RECONNAISSANCE SURVEY**, **SUBDIVISION SURVEY**, **TOWNSITE SURVEY\*** and **TRANSIT-STADIA SURVEY**.

**SURVEYING** – The science or art of making the measurements necessary to determine the relative position of points above, on, or beneath the surface of the earth, or to establish such points. See **PLANE SURVEYING**.

**SWALE** – A slight, marshy depression in generally level land.

**SWAMP** – Low lying land saturated with moisture and overgrown with vegetation but not covered with water. See **SWAMP\***.

**SWING** – 1) the correction applied to an observation made to an eccentric signal. 2) The rotation of a photograph in its own plane around the photograph perpendicular.

**SWING OFFSET** – The perpendicular distance from a point to a transit line found by moving the tape in an arc until a minimum horizontal distance is obtained.

**SWIVEL GRAVER** – A tool for scribing curved lines.



**SYMBOL** – A diagram, design, letter, or abbreviation placed on maps and charts, which by convention, usage, or reference to a legend is understood to stand for or represent a specific characteristic or object.

**SYSTEMATIC ERROR** – An error that occurs according to a known pattern or law. Systematic errors can be compensated for partially by corrections and appropriate measuring techniques.

## T

**T.B.M. (USGS and USC & GS)** – Temporary bench mark. See TURNING BENCH MARK.

**TIR** – Thermal infrared.

**TP** – Turning point.

**TABLELAND** – Land elevated much above the level of the sea and generally offering no considerable irregularities of surface. 2) A flat or undulating elevated area; a plateau or mesa.

**TABLEMOUNT** – A seamount (roughly circular or elliptical in plan) generally deeper than 100 fathoms, the top of which has a comparatively smooth platform. Syn: SEAMOUNT; GUYOT.

**TACHYMETRY, TACHEOMETRY** – Surveying method used to denote the procedures for obtaining horizontal distances and differences in elevation by indirect methods, which are based on the optical geometry of the instruments employed. Sometimes referred to an optical distance measurement, telemetry, or stadia.

**TALUS** – A collection of fallen disintegrated material which has formed a slope at the foot of a cliff.

**TANGENT** – 1) That part of a traverse or alinement included between the point of tangency of one curve and the point of curvature of the next curve. 2) Sometimes applied to a long straight line of a traverse, especially on a route survey, whether or not the termini of the line are points of curve. See TANGENT\* and SEMITANGENT.

**TANGENTIAL DISTORTION** – See LENS DISTORTION.

**TANGENT PLANE** – A plane that touches a curved surface of double curvature at one and only one point or that touches a curved surface of single curvature along one or more parallel straight lines which are elements of the surface, without intersecting the surface.

**TANGENT SCREW** – A knob mounted on a fine threaded screw giving a tangential movement for making the final setting to an instrument of precision, as a surveyor's transit.

**TAPE** – A steel, fabric or Invar ribbon used for direct distance measurement.

**TAPE CORRECTION** – A quantity or quantities applied to a taped distance to eliminate or reduce errors due to the physical condition of the tape and to the way in which it is used.

**TARGET** – A symmetrical pattern centered over a point to be recorded on a photograph. See PANEL.

**TARGET IDENTIFICATION OR RECOGNITION** – Process by which targets from image format data are identified by means of a decision rule.

**TARGETING** – The distinctive marking of a ground point with material of any kind, placed in a symmetrical contrasting pattern about the point to facilitate the identification and precise recovery of that point on an aerial photograph. Also called paneling.

**TELESCOPE LEVEL** – A sensitive spirit level attached to a transit's telescope, with its axis parallel to the telescope axis.

**T-ELEVATION** – A photogrammetrically determined elevation, shown on map manuscripts. The elevation figure is followed by the letter "T," as 1057T, to indicate that the elevation is unchecked. See SPOT ELEVATION.

**TELLUROMETER** – A trade name of an electronic measuring system.

**TEMPERATURE CORRECTION** – An amount added algebraically to a measurement to account for length changes due to thermal variance from standard conditions.

**TEMPLET** – 1) A representation of a photograph or a stereomodel for use in aerotriangulation. 2) The design-cross-section of a road, canal, etc. See SLOTTED TEMPLET TRIANGULATION.

**TEMPLET LAYDOWN** – See RADIAL TRIANGULATION.

**TEMPLET MATCHING** – An operation used to find out how well two photographs or images match one another.

**TEMPORARY BENCH MARK** – See BENCH MARK, NONMONUMENTED.

**TERRACE** – 1) A flat, level or nearly level, narrow area of land bordering a river or lake, bounded on at least one side by a definite steep slope rising upward from it, and on the other sides by downward slopes. 2) A low embankment of ridge of earth constructed across a slope to control surface runoff and minimize soil erosion. 3) Sloping ground cut into a succession of benches and steep inclines for purposes of cultivation.

**TERRAIN** – An area of ground considered as to its extent and topography.

**TERRAIN FACTORS** – Terrain factors consist of land forms, drainage features, the ground, the vegetation, and the cultural features or manmade changes in the surface of the earth.

**TERRESTRIAL CAMERA** – A phototheodolite; a camera for use on the ground.

**TERRESTRIAL PHOTOGRAPH** – A photograph of a portion of the earth's surface taken by a camera located on the ground.

**TEXTURE** – A distribution of grey tones and photographic features in a small area which produces easily recognizable discrete tonal features.

**THEMATIC MAP** – A map that portrays selected phenomena and/or factual contents.

**THEORETICAL CORNER** – A USGS term which designated corners on the map for which no evidence was found on the ground and which were located by land line adjustment.

**THERMAL RADIATION** – Electromagnetic radiation emitted by any substance as a consequence of the thermal excitation of its molecules.

**THERMAL RESOLUTION** – Image resolution expressed as a function of the minimum temperature difference between two objects of phenomena.

**THETA** – A Greek letter much used in mathematics. Usually the mapping angle in a Lambert Map projection.

**THIRD ORDER LEVELS** – Differential leveling which closes on higher order work with no lines longer than 30 miles. Maximum closing error 12 mm multiplied by square root of distances in kilometers.

**THIRD ORDER MAGNITUDE RELIEF FEATURE** – Features formed by destructive forces-erosional features, (such as gullies and valleys), residual features (such as peaks and ridges) and depositional features (such as deltas and moraines).

**THIRD ORDER TRAVERSE** – A closed survey with a maximum closing error of 1 in 5,000 which meets minimum standards for angle measurements and azimuths.

**THIRD ORDER WORK** – The lowest order of control survey for which monumentation is authorized. See CONTROL SURVEY CLASSIFICATION.

**THREE-POINT METHOD** – See RESECTION.

**THREE POINT PROBLEM** - The three point method. See RESECTION.

**THREE WIRE LEVELING** – A method for reading a level rod employing three cross wires which compares the average of the three readings with the middle wire reading, especially useful with a rod graduated in yards.

**TICK MARK** – A small mark placed along a line or edge of a map to indicate a point of measurement. See GRID TICK.

**TIDAL BENCH MARK** – A bench mark set to reference a tide staff at a tidal station. The elevation of the bench mark is determined with relation to the local tidal datum.

**TIDELANDS** – All coastal areas that are situated above mean low tide and below mean high tide, particularly as such areas are alternately uncovered and covered by the ebb and flow of the ordinary daily tides.

**TIE** – A survey connection from a point of known position to a point whose position is desired or a connection to close a survey on a previously determined point.

**TIE POINT** – 1) Point of closure of a survey, either on itself or on another survey. 2) A pass point common to two or more strips in aerotriangulation.

**TIE STRIP** – An overlay containing all planimetric and relief features in the area along the edge of a map or chart. It is used to insure matching of these features on adjoining sheets.

**TILT** – The angle at the perspective center between the photograph perpendicular and the plumbline. See X TILT and Y TILT.

**TILT DISPLACEMENT** – Displacement of images on a tilted photograph radial from its isocenter. Tilt displacement is outward or inward with respect to the isocenter, according to whether the images are on the low or high side of the isometric parallel (the low side is closest to the earth, or the object plane).

**TILTING LEVEL** – A leveling instrument in which the final leveling of the telescope is obtained by small controlled amount of rotation of the telescope about a horizontal axis.

**TIP** – Tilt of the aircraft at exposure of a photograph in which one wing is lower than the other.

**TITLING** – 1) That information lettered on photographic negatives for identification purposes. Supplementary information may be added for special purposes. 2) The placing of such information on the negatives.

**TOLERANCE** – The allowable variation from a standard or from specified conditions.

**TONE** – Each distinguishable variation in shade of grey between black and white.

**TONGUE** – A low narrow strip of land, projecting into a body of water.

**TOPOGRAPHIC EXPRESSION (USGS)** – The effect achieved by shaping and spacing contour lines so that topographic features can be interpreted with ease and fidelity. Good expression is achieved by delineating the contours in appropriate relationship to each other, with due consideration of the scale and contour interval of the map. To achieve appropriate relationship, the contours sometimes must be adjusted (without exceeding accuracy tolerances) to (1) show features that otherwise might be missed; (2) emphasize significant characteristics of the

terrain; or (3) omit minor features that are relatively unimportant or that might lead to an incorrect interpretation of the terrain.

**TOPOGRAPHIC FEATURE** – A relief feature generally of third-order but sometimes of second-order magnitude. See RELIEF FEATURE.

**TOPOGRAPHIC LICENSE** – See CARTOGRAPHIC LICENSE.

**TOPOGRAPHIC MAP (USGS)** – A map which presents the horizontal and vertical positions of the features represented; distinguished from a planimetric map by the addition of relief in measurable form. A topographic map generally shows the same features as a planimetric map, but contour lines or comparable symbols are used to show mountains, valleys, and plains; and depth curves are used to show depths in bodies of water.

**TOPOGRAPHIC SURVEY** – A survey which has for its major purposes the determination of the configuration (relief) of the surface of the earth (ground) and the location of natural and man-made objects thereon.

**TOPOGRAPHY** – The features of the surface of the earth considered collectively as to form. A single feature, such as a mountain or valley, is termed a “*topographic feature*.” Topography is subdivided into hypsography (the relief features), hydrography (the water and drainage features), and culture (manmade features).

**TOWER, SURVEYING** – A structure used to elevate a surveying instrument so that lines of sight are above obstacles. A tower usually has two independent components, one built within the other; the inner component supports the instrument, and the outer component supports the observer and a signal.

**TRACING PAPER METHOD** – A system for updating minor detail on a map using newer aerial photos. Mutually identified image points are marked on tracing paper and the map position determined by graphical resection.

**TRACING TABLE** – An instrument used in conjunction with a direct-viewing double-projection plotter to observe the stereomodel, to make precise measurements in it, and to delineate mapworthy detail, including contours, on a map manuscript. The instrument includes a viewing screen (see platen) for observing corresponding imagery, a reference mark (see floating mark), and a vertical leadscrew with a scale or digital counter.

**TRAIL** – A pathway marked clearly enough to be followed on the ground or on photographs but not suitable for passenger cars.

**TRANSFORMATION** – The process of projecting (mathematically, graphically, or photographically) a photograph, or points on it, from its plane onto another plane by translation, rotation, and/or scale change. See RECTIFICATION.

**TRANSFORMED PRINT** – See TRANSFORMING PRINTER.

**TRANSFORMING PRINTER (USGS)** – A projection printer specifically designed for the transformation of intentionally tilted photographs according to preset parameters. The most common application is in the conversion of low-oblique photographs into equivalent “*vertical*” photographs, assuming a nominal value for the obliquity of the original photographs.

**TRANSIT-STADIA SURVEY** – A survey in which horizontal and vertical directions or angles are observed with a transit and distances are measured by stadia.

**TRANSIT TRAVERSE** – A traverse in which the angles are measured with a transit or theodolite and the lengths with a metal tape. See ELECTRONIC TRAVERSE.

**TRANSPARENCY** – A photographic print on a clear base, especially adaptable for viewing by transmitted light. Also, the light-transmitting capability of a material.

**TRANSPONDER** – A combined receiver and transmitter whose function is to transmit signals automatically when triggered by an interrogating signal.

**TRANSVERSE** – A map projection in which a meridian is treated as an equator.

**TRANSVERSE LOW-OBLIQUE PHOTOGRAPHY** – Twin-low oblique photography in which the two cameras of a couple are oriented so that the plane containing their optical axes is at right angles to the flight line.

**TRANSVERSE MERCATOR MAP PROJECTION** – A conformal map plotting system in which points on the ellipsoid are mathematically projected onto a cylinder whose axis is oriented 90° (transverse) to the axis of the ellipsoid. The cylinder surface may meet the ellipsoid at the map center or it may cut below the surface (secant) creating two meridians where the scale is exact. The secant form of this projection is the basis of State Plane Coordinate Systems where the zone extends north-south more than east-west.

**TRAVERSE** – a sequence of lengths and directions of lines connecting a series of stations, obtained from field measurements and used in determining positions of the stations. See CLOSED TRAVERSE, OPEN TRAVERSE, ELECTRONIC TRAVERSE and TRANSIT TRAVERSE.

**TRIANGLE CLOSURE** – An error of angular closure; the amount by which the sum of three measured angles of a triangle fails to equal 180° plus the spherical excess.

**TRIANGLE OF ERROR** – The triangle formed when three plotted rays intersect.

**TRIANGULAR DIVISION METHOD** – A system for updating minor detail on a map using newer aerial photos. Equivalent areas are divided into homologous triangles.

**TRIANGULATION** – A method of surveying in which the stations are points on the ground at the vertices of a chain or network of triangles. The angles of the triangles are measured instrumentally and the sides are derived by computation from selected sides or bases, whose lengths are obtained by direct measurement on the ground or by computation from other triangles. See ARC TRIANGULATION and AREA TRIANGULATION.

**TRIANGULATION STATION** – A marked point on the earth whose position is determined by triangulation.

**TRIANGULATION TOWER** – See TOWER, SURVEYING.

**TRIBRACH** – The three-arm base of a surveying instrument which carries the foot-screws used in leveling the instrument. See QUADRIBRACH.

**TRIBUTARY** – A river or stream which contributes its water to a main river by discharging it into the latter, from either side, and at any point along its course.

**TRIGONOMETRIC LEVELING** – The determination of differences of elevation from observed vertical angles and measured or computed horizontal or inclined distances.

**TRILATERATION** – A method of determining horizontal positions by measuring the lengths of triangle sides, usually with the use of electronic instruments.

**TRIMETROGON CAMERA** – An assembly of three cameras equipped with wide-angle Metrogon lenses, in which one of the cameras is vertical and the other two are 60 degree obliques.

**TRIMETROGON MAPPING** – A method of compiling map data from aerial photographs taken with an assembly of three cameras, one aimed vertically downward, the others to either side of the flight line at 60° from the vertical. This name was chosen originally because the cameras contained Metrogon wide-angle lenses. The angular coverage in a plane normal to the flight line exceeds 180°, providing overlap between the vertical and both oblique photographs as well as inclusion of both horizons.

**TRIVET** – A low support for a surveying instrument which is used where a tripod cannot be used.

**TRUCK MOUNTED TOWER (USGS)** – A surveying tower hinged to a motor truck which is equipped with a mechanical device for quickly hoisting the tower to or lowering it from a vertical position.

**TRUE** – Correct or actual values as differentiated from relative, measured or fictitious values, i.e., true north vs magnetic north, true sun vs fictitious sun, true altitude vs measured altitude. Depending on the use, “true” can have an exact meaning. The generally accepted interpretation is that true north means a meridian determined with respect to the earth’s axis by astronomic methods.

**TRUE HORIZON** – The trace on an oblique photograph of a horizontal plane passing through the perspective center.

**TRUE NORTH** – The direction of the earth’s axis of rotation. See preferred ASTRONOMIC NORTH.

**TUNDRA** – One of the level or undulating treeless plains characteristic of arctic regions, having a black muck soil and a permanently frozen subsoil.

**TURNING BENCH MARK** – A bench mark set during continuous leveling and used as a turning point.

**TURNING POINT** – A temporary point on which the rod is held, after a foresight has been made on it, while the instrument is moved to another station so that a backsight can be made on that elevation.

**TWIN-LOW OBLIQUE PHOTOGRAPHS (USGS)** – Photography with a twin-camera arrangement consisting of a pair of aerial cameras coupled rigidly together and exposed simultaneously. In Geological Survey practice wide-angle precision cameras are used with their respective optical axes in a common vertical plane, making an angle of 20° with a plumbline and 40° with each other.

## U

**UPS** – Universal Polar Stereographic.

**U.S.A.S.I.** – U.S.A. Standards Institute (Formerly A.S.A.).

**UTM** – Universal Transverse Mercator.

**U.V.** – Ultra Violet.

**ULTRAVIOLET ABSORBING FILTER** – A haze cutting filter used mainly in photography with color films to avoid excessive bluishness and loss of contrast in the pictures; usual designations are U.V.; Haze; Wratten 2A.

**ULTRAVIOLET RADIATION** – Electromagnetic radiation of shorter wavelength than visible radiation but longer than X-Rays; roughly, radiation in the wavelength interval between 10 and 4000 angstrom units.

**ULTRA-VIOLET RAYS** – Radiant energy in the ultraviolet portion of the electromagnetic spectrum.

**ULTRA-WIDE-ANGLE LENS** – A lens having a coverage in excess of 100°. See SUPER WIDE ANGLE LENS.

**UNCONTROLLED MOSAIC** – A mosaic in which the photographs have not been positioned by reference to horizontal control.

**UNDA** – That part of the floor of the ocean which lies in the zone of wave action, and in which the bottom is repeatedly stirred and reworked by storm waves.

**UNDAFORM ZONE** – That part of the ocean floor which lies in the zone of wave action and in which, therefore, the bottom is repeatedly stirred and reworked by storm waves.

**UNDERGROUND MARK** – A surveying mark set and plumbed below the center of a surface mark and separated therefrom so as to preserve the station in case of accident to the surface mark.

**UNDERWATER CONTOUR** – A contour shown in an inundated area. See DEPTH CURVE.

**UNITED STATES NATIONAL MAP ACCURACY STANDARDS** – 1) Horizontal accuracy; For maps at publication scales larger than 1:20,000, 90 percent of all well-defined features, with the exception of those unavoidably displaced by exaggerated symbolization, will be located within 1/20 inch (0.85 mm) of their geographic positions as referred to the map projection; for maps at publication scales of 1:20,000 or smaller, 1/50 inch (0.05 mm). 2) Vertical accuracy: 90 percent of all contours and elevations interpolated from contours will be accurate within one-half of the basic contour interval. Discrepancies in the accuracy of contours and elevations beyond this tolerance may be decreased by assuming a horizontal displacement within 1/50 inch (0.50 mm). Commonly referred to as Map Accuracy Standards.

**UNIVERSAL PLOTTER** – A stereoplotter capable of compiling contour maps from vertical or oblique aerial photography as well as terrestrial photography. A true universal plotter will accept photographs from any focal length camera.

**UNIVERSAL POLAR STEREOGRAPHIC** – A map designed for military use based on a Polar Stereographic Projection covering to the poles from 84° N. and 80° S. latitudes.

**UNIVERSAL PROJECTION PRINTER** – See PROJECTION PRINTER.

**UNIVERSAL TABLE FRAME** – A supporting frame for stereoplotters, specially designed to accommodate the projectors of any of the various types of direct-viewing double-projection plotters.

**UNIVERSAL TRANSVERSE MERCATOR PROJECTION** – A special case of the transverse Mercator projection. Abbreviated as the UTM grid, it consists of 60 north-south zones, each 6° wide in longitude.

**UNIVERSAL WATER CHARTS** – A series of blank charts at 1:1,000,000 scale, published for each 4° band of latitude. They are used for aerial navigation over water or for plotting positions, distances, and courses in land travel over unmapped areas, such as in Antarctica.

**UPDATING** – Addition of recent changes to a map. See SKETCHMASTER, RADIAL LINE METHOD, TRIANGULAR DIVISION METHOD and REFLECTING PROJECTOR METHOD.

## V

**VABM** – Vertical Angle Bench Mark.

**VACUUM BACK** – The back of a film magazine which is so constructed that a suction may be applied to keep the film flat and in the focal plane during the exposure.

**VALLEY** – Any hollow or low-lying land bounded by hill or mountain ranges.

**VECTOR** – 1) A quantity which has magnitude and direction. 2) One of a series of simultaneous equations.

**VERNIER** – A scale reading device using alinement of graduated marks named for Peter Werner, a mathematician, who used the name Pierre Vernier in his writings. See NONIUS\*.

**VERTICAL ANGLE** – The angle between a horizontal plane and the surface of a cone passing thru the point of reference with the apex at the point of observation.

**VERTICAL ANGLE, ASCENDING** – A vertical angle, measured at the perspective center, between the true horizon and a ray to a point above the horizon.

**VERTICAL ANGLE, DESCENDING** – A vertical angle, measured at the perspective center, between the true horizon and a ray to a point below the horizon.

**VERTICAL ANGLE BENCH MARK** – A monumented point whose elevation is determined by trigonometric leveling.

**VERTICAL ANGLE LEVELING** – See TRIGONOMETRIC LEVELING.

**VERTICAL COLLIMATOR** – A nadir mounted telescope with leveling bubbles used as an optical plummet.

**VERTICAL CONTROL** – Survey data furnishing elevations to be used for a framework of subsidiary surveys.

**VERTICAL CURVE** – 1) A parabolic curve used as transition between different grades or slopes. 2) Synonym for BZ curve.

**VERTICAL GEODETIC DATUM** – The assumed or fixed elevation of a specific point or level surface, usually mean sea level.

- VERTICAL PHOTOGRAPH** – An aerial photograph taken with the camera axis vertical or as nearly vertical as practicable.
- VIDICON** – An imaging tube having a photo-sensitive surface and is a device used to convert image data from photographic format to electronic video signal format. An electron beam is scanned like a TV raster across the photo-sensitive surface and it generates a signal whose amplitude corresponds to the light intensity focused on the surface at each point. This electron beam signal is then amplified to a usable video signal.
- VIEWFINDER** – A device similar to a camera but with the ground glass in the focal plane of the lens. The viewfinder is mounted vertically in the floor of an airplane for the purpose of viewing the landscape and determining when photographs should be taken.
- VIGNETTING** – A gradual reduction in density of parts of the photographic image due to the stopping of some of the rays entering the lens. Thus, a lens mounting may interfere with the extreme oblique rays. An antivignetting filter is one that gradually decreases in density from the center toward the edges; it is used with many wide-angle lenses to produce a photograph of uniform density by cutting down the overexposure of the center of the photograph.
- VINCULUM** – A short horizontal line placed over the seconds digits of a numerically expressed angle or direction to indicate that the seconds are used in connection with a value of minutes 1 less than is recorded. A double vinculum indicates association with a value of minutes 2 less than is recorded.
- VOLCANO** – 1) A vent in the earth's crust from which molten lava, pyroclastic materials, volcanic gases, etc., issue. 2) A mountain which has been built up by the materials ejected from the interior of the earth through a vent.

## W

- W/H** – Width-height ratio.
- WWV** – Radio time signal station call letters originally at Wheeling, West Virginia but now in Boulder, Colo.
- WWVH** – Radio time signal call letters for the Hawaii station.
- WARPED MODEL** – A photogrammetric model which will not fit the vertical control.
- WATER COTE** – A tradename for a dichromate coating.
- WATER GAP** – A pass in a mountain ridge through which a stream flows.
- WATER LEVELING** – A method of obtaining relative elevations by observing heights with respect to the surface of a body of still water.
- WAVELENGTH** – Displacement of a wave which occurs during one complete period. Wave Velocity = Frequency x Wavelength.
- WAVING THE ROD** – Slowly pivoting a leveling rod back and forth so the instrument operator can observe the smallest reading.
- WEIGHT** – The relative worth of an observed value or quantity, expressed numerically.
- WEIGHTED MEAN** – The value obtained by dividing the product of individual observations and their weights by the sum of all the weights.
- WIDE ANGLE LENS** – A lens having an angle of coverage between 75° and 100°.
- WIDTH BETWEEN FLIGHTS** – The distance between adjacent flight lines.
- WIDTH-HEIGHT RATIO** – In aerial photography, the ratio of the distance between adjacent flight lines to the flight height. In photogrammetry, the ratio of the width of a neat stereomodel (that is, the dimension normal to the flight lines) to the flight height. For some photographic conditions these two W/H values may not be exactly equal, but differences are usually insignificant.
- WIGGLING IN** – The process of setting an instrument on direct line between two fixed points by successive approximations and sightings.
- WING POINT** – A pass point at the extreme right or left of the flight line.
- WITNESS MARK** – A mark placed at a known distance and direction from a survey station to aid in its recovery and identification. Sometimes called witness post.
- WORLD AERONAUTICAL CHARTS (WAC)** – A standard series of 1:1,000,000-scale charts designed for aerial navigation. For areas outside the United States, this series has been superseded by the Operational Navigation Charts (ONC). For blank charts used over water or unmapped land areas, see UNIVERSAL WATER CHARTS.
- WRATTEN FILTER** – A trade name of any one of a series of filters used in photographic processes, bearing a designation keyed to its spectral transmission.

## X

**X AVIS** – See AXIS.

**X PARALLAX** – See ABSOLUTE STEREOSCOPIC PARALLAX.

**X TILT** – The component of photograph tilt about the X axis; same as roll.

## Y

**YARD ROD** – A level rod graduated in 100<sup>ths</sup> of a yard so that the sum of three hair reading equals the foresight or backsight in feet.

**YAW** – 1) Rotation of an aircraft about a vertical axis causing deviation from flight line or crab. 2) Rotation of a camera or coordinate system about the Z axis. (Kappa K).

**Y PARALLAX** – The difference of the perpendicular distances of the two images of a point from the vertical plane containing the air base, indicating tilt in either or both photographs or of a difference in flight height and is confusing to a stereoscopic examination of the pair.

**Y TILT** – Component of photograph tilt about Y axis. Also (TIP).

## Z

**Z AXIS** – See AXIS, Z.

**ZTS** – Zoom Transfer Scope.

**ZEISS PARALLELOGRAM** – A mechanical analog of the rays to a photo image from two photographs. The parallelogram allows mechanical separation of the ray intersection. See BASE INSIDE and BASE OUTSIDE.

**ZOOM STEREOSCOPE** – A binocular viewing instrument with a specially designed optical system that features independent variable enlargement in each eyepiece to enable common-scale stereoscopic viewing of corresponding images in overlapping photographs at different scales.