

MANUAL OF INSTRUCTIONS
TO
U. S. DEPUTY MINERAL SURVEYORS
FOR THE
DISTRICT OF UTAH,

APPROVED APRIL 5, 1894.



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U. S. SURVEYOR-GENERAL'S OFFICE,

Salt Lake City, Utah.

To U. S. Deputy Mineral Surveyors

for the District of Utah:

GENTLEMEN: The Manual of Instructions to U. S. Deputy Mineral Surveyors, of May, 1890, contains several amendments and supplementary circulars.

Some additional changes being necessary, the entire subject has been rearranged, and, for your convenience, is published in this volume, which supersedes all previous instructions issued from this office.

This manual is issued under authority of the honorable Commissioner of the General Land Office, and is based upon the United States mining laws and judicial and authoritative interpretations of the same. You are therefore instructed and will be required to strictly comply with all the requirements of the United States mining laws and with these instructions, and no survey made by you will be accepted or approved until all the requirements have been fully met.

Very respectfully,

GEORGE W. SNOW,

U. S. Surveyor-General.

INSTRUCTIONS
TO
U. S. DEPUTY MINERAL SURVEYORS
FOR THE DISTRICT OF UTAH.

GENERAL RULES.

1. No return by you will be recognized as official unless it is over your signature as a U. S. deputy mineral surveyor, and made in pursuance of a special order from this office.

2. All official communications must be addressed to the surveyor-general. You will always refer to the date and subject-matter of the letter to which you reply, and when a mineral claim is the subject of correspondence you will give the name and survey number.

3. You are expected to know and conform to the U. S. surveyor-general's office rules, bound with and made a part of these instructions, in so far as they affect your business with this office. Habitual disregard of the same will be deemed just cause for the suspension of your commission.

4. Field notes and other reports must be written with non-copying ink, in a clear and legible hand, upon blanks furnished by this office. No interlineations, erasures, or cut sheets will be allowed, and no abbreviations or symbols must be used except such as are indicated in the specimen field notes.

5. You will make no survey of a mineral claim in which you hold an interest, nor will you employ as assistants on any survey parties who are in any manner interested therein.

6. You will promptly notify this office of any change in your post-office address. Upon permanent removal from the district you are expected to resign your appointment.

NOTIFY CLAIMANTS.

7. The claimant is required in all cases to make satisfactory arrangements with you for the payment for your services and those of your assistants in making the survey, as the United States will not be held responsible for the same.

8. You will call the attention of applicants to the requirements of the circular of this date in the appendix and made a part of these instructions.

9. Advise claimants that you are required to show conflicts with unsurveyed claims, or surveyed claims of later survey number, when the conflicting area is to be excluded in their application for patent.

NOT TO ACT AS ATTORNEY.

10. You are precluded from acting either directly or indirectly as attorney in mineral claims. Your duty in any particular case ceases when you have executed the survey and returned correct field notes and preliminary plat with your report to the surveyor-general. You will not be allowed to prepare for the mining claimant the papers in support of his application for patent, or otherwise to perform the duties of an attorney before the land office in connection with a mining claim. In short, you must have absolutely nothing to do with the case except in your official capacity as a surveyor. The foregoing does not preclude the preparation of any papers properly to be filed with your returns to the surveyor-general.

ance therewith and transmit full and correct returns of survey, accompanied by the copy of the record of location, the testimony, and a copy of the notice served on the claimant and adjoining proprietors, certifying thereon when, in what manner, and on whom service was made.

14. The act of Congress of May 10, 1872, expressly provides that "the location must be distinctly marked on the ground, so that its boundaries can be readily traced," and "that all records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim by reference to such natural objects and permanent monuments as will identify the claim."

These provisions of the law must be strictly complied with in every case to entitle the claimant to a survey and patent.

15. If the law has been complied with in the matter of marking the locations on the ground and recording the same, and any question arises in the execution of the survey as to the identity of monuments, marks, or boundaries which can not be determined by reference to the record, the deputy should take testimony in the manner hereinbefore prescribed for claims located prior to May 10, 1872. Having thus ascertained the true and correct boundaries originally established, marked, and recorded, make the survey accordingly.

✓ 16. In all cases, with your survey returns you will file the affidavits of two disinterested and reliable witnesses as to the identity of the discovery and the monuments which serve to fix the boundaries. When several locations are included in one survey it is not required that there should be as many documents to be filed as there are locations, but that all the necessary facts concerning each *location* should be named in one or more affidavits.

17. Orders for survey are not issued unless it is stated in the application that the "location has been distinctly marked on the ground so that its boundaries can be readily traced," and you are required to include in the field notes, under the head-

ing "Location corners," a statement giving connection, by course and distance with, and a full and complete description of each of the location corners and monuments as identified, and specifically stating whether the location corners, posts, etc., were found standing in place or otherwise.

INSTRUMENT.

18. All mineral surveys should be made with a transit with which horizontal and vertical angles can be accurately measured. The instrument and measuring apparatus used must have been previously submitted to the surveyor-general for examination and record.

THE TRUE MERIDIAN.

19. The weather permitting, the true course of at least one line of each survey must be ascertained by astronomical observations made at the time of the survey; the data for determining the same and details as to how these data were arrived at must be given. Or, in lieu of the foregoing, the survey must be connected with some line the true course of which has been previously established beyond question, and in a similar manner, by yourself, and, when such lines exist, it is desirable in all cases that they should be used as a proof of the accuracy of subsequent work.

20. When solar attachments are used the mountain standard (i. e., one hundred and fifth meridian) time of the observation, the declination, correction for refraction, the latitude and how the latitude was arrived at, must be given.

21. Solar observations should not be made within two hours of sunrise, or sunset, or noon. The reasons for this are given hereafter, together with a convenient and satisfactory method of finding the true course of any line from direct observation on the sun without the use of solar attachments. Whenever

practicable, the latitude used should be determined by observation and be checked by calculation through the public land surveys.

22. The magnetic bearing of each line of the survey should be observed and recorded for future reference when called for. The mean magnetic variation of the locality in which the survey is made must be given, as indicated in the specimen field notes, and if at any point throughout the survey the variation differs more than five minutes from the established mean, the new variation must be returned in its proper place in the field notes.

THE FIELD WORK.

23. The survey made and reported must, in every case, be an actual survey on the ground in full detail, made by you in person after the receipt of the order, and without reference to any knowledge you may have previously acquired relative thereto by reason of having made the location survey or otherwise, and must show the actual facts existing at the time.

24. If the season of the year, or any other cause, renders such personal examination impossible, you will postpone the survey and, under no circumstances, rely upon the surveys or the statements of other parties or upon a former examination by yourself.

25. The term survey in these instructions applies not only to the usual field work, but also to the examinations required for the preparation of your affidavit of \$500 expenditure, descriptive reports on placer claims, and all other reports.

26. You should keep a complete record of each survey made by you and the facts coming to your knowledge at the time, as well as copies of all your field notes, reports, and official correspondence, in order that such evidence may be readily produced when called for at any time.

27. Having established the true course of one line of the survey as required in section 19, the courses of the remaining

lines may be determined by plate angles, checked by magnetic bearings, as follows:

28. At each angle point take the magnetic course of the preceding, as well as the succeeding line, from which calculate the angle turned; the result should be in close agreement with the plate angle, and if it is not, the reading of the plate angle, as well as of the magnetic bearings, should be repeated to locate the error.

29. In all cases on each survey, independent lines such as connections with United States mineral monuments, corners of the public-land surveys, corners of adjoining or conflicting claims, and lines run to locate, define, and connect with the improvements included in the estimate of \$500 expenditure, must be actually run and measured, and must be duplicated or retraced, both with the instrument and tape, or in lieu of such duplicating or retracing, the lines of the survey must be connected with other surveys, made by yourself, in such a manner that the accuracy of the work can be checked by traverse through lines, actually run and measured, involving your own work only.

30: The field work of each survey must be so conducted as to check itself independently of any records in the surveyor-general's office, or in lieu thereof, the lines of the survey may be connected with other surveys, made by yourself, in such a manner that the accuracy of the work can be checked by traverse through lines, actually run and measured, involving your own work only.

~~NN~~ CORRECTIONS.

31. Connect at least one corner of your survey by course and distance with the nearest corner of the public-land survey and with a United States mineral monument, if the claim lies within two miles of such corner and monument. If there is no mineral monument within the required distance, you will estab-

lish one as provided in these instructions. In all cases the identity of corners of the public survey with which connections are given must be fully determined, and a record must be kept of the evidences thereof.

32. When a claim lies within more than one of the smallest legal subdivisions of the public survey, connection by course and distance with at least one corner of each of said subdivisions must, if possible, be made.

33. A connection by course and distance must be made from one or more established corners of your survey with at least one identified corner of each conflicting claim of earlier survey number and with each adjoining claim of earlier survey number having one or more points in common with your survey or about which doubt as to conflict may exist.

34. For consolidated claims where the several locations thereof do not have one or more posts in common (*see* specimen plat and field notes) at least one corner of each location must be connected by course and distance with the location previously described in the field notes.

35. Make all necessary surveys and connect by course and distance with corners of conflicting unsurveyed claims and conflicting surveyed claims of later survey number if the areas in conflict are to be excluded in the application for patent.

In this respect, however, bear in mind the requirements of Commissioner's letter "N," of December 4, 1884 (*see* section 65), and whenever it can be done without injustice to claimants cut off the end lines of your survey in such a manner as to avoid unnecessary and useless conflicts and the liability to amended surveys.

36. Locate and carefully define each improvement, included in the estimate of \$500 expenditure, by surveyed lines and connect the initial points thereof by course and distance with some corner of the claim.

SURVEY AND LOCATION.

37. The survey must be made in strict conformity to or be embraced within the lines of the location upon which the order is based. If the survey and location are identical that fact must be clearly and distinctly stated in the field notes. If not identical the bearing and distance must be given in the field notes from each established corner of the survey to the corresponding corner of the location. The lines of the location, as found on the ground, must be laid down upon the preliminary plat in such a manner as to contrast and show their relation to the lines of the survey.

38. In accordance with the principle that courses and distances must give way when in conflict with fixed objects and monuments, you will not, under any circumstances, change the corners of the location for the purpose of making them conform to the description in the record. If the difference between the claim as marked and identified on the ground and as described in the record of location be slight it may be explained in the field notes, but if there should be a wide discrepancy you will decline to make the survey until additional satisfactory evidence is furnished you that the claim as identified conforms strictly to that originally located, and in all such cases the additional evidence furnished must be included in your returns.

LODE CLAIMS.

39. The position of the middle of the vein at the surface must, in all cases, be shown upon the preliminary plat, and the alignment thereof must be given in the field notes. And when the middle of the vein at the surface is not defined by exploration or otherwise its locus, in so far as it affects your survey, may be assumed, starting from the center of the discovery shaft and running thence in that probable direction for which the claimant desires to make application for patent.

40. The end lines of lode claims must be parallel to each other, and should be established in such a manner as to cut off the claim at (*see* section 37) the point where the lode in its onward course or strike passes beyond the limits of the location thereof as described in the location notice and marked by monuments on the ground, except in case of conflicts described in sections 64 and 65 of these instructions.

41. Inasmuch as the rights of a claimant underground on a vein or lode are limited between vertical planes through parallel end lines, the intention of the locator, in this respect, can only be determined by the position of the location corners on the surface. You will, therefore, establish the end lines of your survey as nearly parallel to the end lines of the original location as is compatible with the further requirement that the end lines of your survey must be parallel to each other.

42. The position, as identified, of the original discovery, upon which the validity of the location and application for patent is based, must be shown upon the preliminary plat and be made the initial point for the description of the survey. It must be perpetuated in the manner prescribed for corners, and the discovery post or monument must be marked Dis., with the survey number, as: Dis. 2954; and in the case of consolidated claims add the name or initial letter thereof of the particular location to which this discovery applies.

43. Sufficient work should be shown at the discovery to warrant the presumption that an actual discovery, as required by law, has been made.

44. If, for any reason, the discovery monument can not be placed at the identical place of discovery, as in case of a shaft or tunnel, set a witness monument or post as near thereto as practicable, adding to the usual marks the letters W. C., as: W. C.—Dis. 2954; and in the field notes, beginning at the identical place of discovery in the usual manner, give the bearing and distance to the W. C. In cases of this kind, when the discovery is on the center line of the claim as surveyed, you

will invariably establish this witness monument on the center line also.

45. A single discovery should not be construed into two discoveries, in order to support two locations having a common end line, by merely running an imaginary line through the discovery point.

LODE AND MILL SITE.

46. A lode claim and mill site included in one survey will be distinguished by the letters "A" for the lode claim and "B" for the mill site, following the number of the survey, which will be the same for both. The corners of the mill site will be numbered independently of those of the lode. A corner of the mill site must be connected by course and distance with a corner of the lode claim, with a corner of the public survey, and with a United States mineral monument.

47. When mill sites are surveyed in connection with lode claims improvements are required to be shown upon the lode claim only.

PLACER CLAIMS.

48. Section 2331, Revised Statutes, provides that "where placer claims cannot be conformed to legal subdivisions (of the public survey), survey and plat shall be made as on unsurveyed lands." Section 2329, Revised Statutes, provides that placers "shall be subject to entry and patent under like circumstances and conditions as are provided for vein or lode claims." The general requirements as to survey are therefore the same for placer as for lode claims, subject to such slight modifications as the difference in the nature of the two classes of claims seem to require. (*See* section 67.)

49. In addition to the usual affidavits of identity, certificates of improvements and data to be filed with the field notes "Descriptive Reports" on placer claims are also required. You will therefore make a full examination at the time of your

survey and include this descriptive report in your field notes, stating:

(a) Whether the claim is wholly placer, or contains one or more lodes. (*See Placers and Lode Claims.*)

(b) Describe fully the quality and composition of the soil, kind and amount of timber, and other vegetation.

(c) The locus and size of streams, and such other matters as may appear upon the surface of the claim.

(d) The character and extent of all surface and underground workings, whether placer or lode, locating and describing them.

(e) The proximity of centers of trade or residence.

(f) The proximity of well known systems of lode deposits or of individual lodes.

(g) The use or adaptability of the claim for placer mining, and whether water has been brought upon it in sufficient quantity to mine the same, or whether it can be procured for that purpose.

(h) What works or expenditures have been made by the claimant or his grantors for the development of the claim, their situation and location with respect to the same as applied for.

(i) The true situation of all mines, salt licks, salt springs, and mill seats which come to your knowledge, or report that none exist on the claim, as the facts may warrant.

50. Said report must be made as a part of the field notes or under oath on blanks furnished by this office, and must be corroborated by the affidavits of two disinterested and reliable persons.

51. Descriptive reports on placer claims taken by legal subdivisions not accompanied by returns of survey thereof are authorized only by special order, and must contain a description of the claim in addition to the foregoing requirements.

PLACERS AND LODE CLAIMS.

52. When a placer claim includes a lode you will preserve a consecutive series of corner numbers for the whole survey in

the same manner as for consolidated claims, and in your field notes you will first describe the placer claim and afterwards the lode claim, setting posts or corners for the boundaries of the surface ground incident to or belonging with the lode as well as for the boundaries of the placer ground in a similar manner to that provided for consolidated claims.

CONSOLIDATED CLAIMS

53. Several contiguous locations held in common may be included in one survey and constitute a mining claim in so far as application for patent is concerned.

54. There will be one survey number for the consolidated claim.

55. Posts will be marked with post numbers in one series, running around one location after another, as they shall appear in the notes to have been surveyed. There will therefore be as many *marks* as there are location corners, but where one post is common to two or more locations, you may mark in the usual way two or more sides of the same post.

56. Let the field notes show the description of the boundaries and corners of each location in the survey giving intersections with the public survey, with conflicting prior surveys and with conflicting locations of the same survey number previously described.

57. One table of connections may be given in the deputy's report for the entire claim and must, in addition to connections with other surveys, show such connections as may be necessary to determine conflicts, etc., between the several locations of the consolidated claim.

58. But one connection with the public survey and one with a United States mineral monument will be required. (*See* Section 31, except as noted in Section 32.)

59. The table of areas should also be consolidated; after first giving the total area of the consolidated claim, each loca-

tion must be treated separately therein and must show conflict with other locations of the same survey, as well as with the several locations of prior surveys.

60. The deputy's certificate must distinctly state that the survey of each location included in the claim is identical with or is embraced within the ground originally located as identified.

61. In general, the survey and return of the connections, intersections, areas, and conflicts with all mineral claims and with the land surveys of each location of the consolidated claim must be as complete in all respects as if the survey and return were of a single location only, with the addition that the description by metes and bounds of the consolidated claims must be given in the field notes immediately following the description of the boundaries and corners of the several locations.

62. Detached locations must be covered by separate surveys, and the matter of including several surveys in one application for patent should be referred to the register of the land office.

63. It should be noted that the provisions of Circular N, of December 4, 1884, are as applicable to conflicting locations embraced in one survey as they would be if the several locations were covered by separate and distinct surveys. (*See* section 65.)

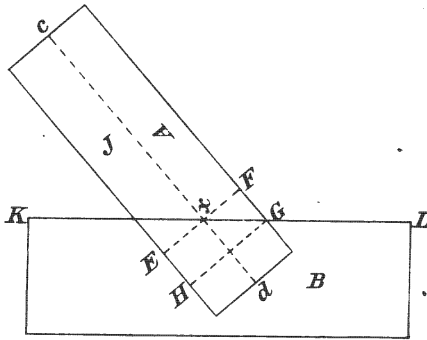
OVERLAPPING AND CONFLICTING CLAIMS.

64. *Lodes*.—When a lode claim is divided into two parts by intervening prior lode locations, surveys, or patented ground, the boundaries of the lode claim may be extended across the intervening ground and the conflict shown. The survey of a lode claim can not, however, be extended across a prior placer claim in the same manner, but must be confined to that part containing the discovery.

65. By General Land Office Circular N, dated December 4, 1884 (see circular to applicants and others in the Appendix), when a lode claim does not extend entirely across and beyond

intervening lode claims, as above described, you are prohibited from establishing the end lines of your survey beyond the point where the lode claimed, in its onward course or strike, intersects the exterior boundary of a prior valid lode claim or entry. In the application of this circular the term "lode claimed" must be construed to mean the middle of the vein at the surface. In explanation of this, reference is to be had to the accompanying sketch, in which A is the location claimed by the applicant for your survey.

B is a conflicting location.



cd is the lode line or middle of the vein at the surface of the claim A, and intersects one of the lines KL of the claim B, at x . If B is an older prior valid location than A, the end line of the claim A must be cut off at x , and in order to be parallel with the other end line takes the position EF . The surface ground xFG is necessarily excluded, although not in conflict. If A is an older prior valid location than B, the end line of A may be established at GH without regard to whether the claim B is patented or otherwise, in order that the location A, which is assumed to have been valid at the time it was made, can secure the surface ground xFG and any lodes which may be included therein.

66. If for any reason the ground in conflict is claimed by the applicant for the claim A, and is to be included in his application for patent, the lines of the survey may be extended to include the ground so claimed and the end line can be established wholly within the conflicting location as at *d*. In all such cases you will require from the applicant, his authorized agent, or attorney an affidavit that the ground in conflict is claimed and is intended to be embraced in his application for patent and will fully explain to the applicant that in the event of failure to prove and maintain his right to the ground in conflict, an amended survey on the ground must be made at his expense in order to move his end line back to the position G H or E F, as required by the foregoing regulations.

67. *Placers and Mill Sites*.—The exterior lines of placer claims and mill sites can not be extended over other claims and the conflicting areas excluded as with lode claims, it being the surface ground only, with side lines taken perpendicularly downward, for which application is made. The survey must accurately define the claim.

68. If by reason of intervening claims or surveys a placer claim should be divided into separate tracts, you will use a separate and independent series of corner numbers beginning with corner No. 1 for each tract and distinguish the detached portions with the letters A, B, C, etc., and will connect by course and distance a corner of each lot with an adjacent corner of the one previously described. The same rule applies to detached portions of a mill site, except that when the latter is surveyed with a lode claim already designated A the lettering will begin B, C, D, etc., for the separate tracts. In marking the posts the distinguishing letters should follow the survey number, as 1-2940 A, etc.

69. *Public Land Survey*.—Conflicts of all mineral locations, whether lode, placer, or mill site, with the smallest legal subdivision of the public land surveys, must be accurately shown and the conflicting areas must be named in the table of areas,

in the same manner prescribed for lode-claim conflicts with prior mineral surveys. (See section 32.)

SETTING AND MARKING CORNERS.

70. Corners may consist of:

(a) A stone at least 24 inches long by 6 inches square set 18 inches in the ground.

(b) A post at least 4 feet long by 4 inches square set 12 inches in the ground, and surrounded by a mound of stone or earth 2 feet high and four feet base.

(c) A rock in place.

71. All corners must be established in a permanent and workmanlike manner, and the corner and survey number must be neatly and distinctly chiseled or scribed on the sides facing the claim. When a rock in place is used its dimensions above ground must be stated and a cross chiseled at the exact corner point.

72. In case the point for the corner be inaccessible or unsuitable, you will establish witness corners, which must be marked W. C. in addition to the corner and survey number. Witness corners must be on one of the lines of the survey and as near as practicable to the true corner, with which they must be connected by course and distance. The reasons for and method of establishing witness corners must be stated in the field notes.

73. For your information as to the former regulations in the matter of marking corners you are advised that prior to December 31, 1892, corners were marked with the U. S. lot number and post number, as: U. S. L. 137, P. 3. The regulations now in force require (as in section 71) the corner number and survey number *only* to be marked, omitting the letters U. S. L. and P.; e. g., corner number 2 of survey number 2965 would be marked 2-2965. The first post set under the new system is 1-2940.

74. In all cases the corner monuments as set and marked, the size of the mounds (whether the latter are earth or stone), together with such additional description as will serve to identify the corners, must be given in the field notes.

BEARING OBJECTS.

75. Whenever practicable, the identity of all corners and the discovery point must be perpetuated by giving the courses and distances to two or more adjacent trees, prominent rocks, or other permanent and prominent objects, as shafts, tunnels, houses, etc. Such trees or other witness objects as can be hewed (private property excepted if the owner does not consent) are to be distinguished by a large, smooth blaze facing the corner marked in the manner prescribed for corners with the corner number, survey number, and the letters B T or B O, the latter to be used in all cases except when the bearing object is a tree or a stump. In recording distances to bearing trees give the distance from the corner to the center of the tree; for bearing objects state the point to which measurement was taken, and when practicable mark the exact point with a cross x.

76. The fact that but few bearing objects are, as a rule, recorded by deputy mineral surveyors suggests to this office that the requirements in this matter are treated with indifference. In future the regulations in this respect will be strictly enforced. You will in all cases omit from your field notes the stereotyped phrase, "No bearing objects available," and when less than two bearing objects are recorded at the discovery and at each corner of the claim you will be required in your reports to state fully the reasons why the required number of bearing objects were not marked and recorded in the field notes as required by the regulations.

TOPOGRAPHY.

77. Note carefully all topographical features of the claim, taking distances on your lines to intersections with all streams, gulches, ditches, ravines, mountain ridges, roads, trails, etc., with their widths, courses, and other data that may be required to map them correctly. If the claim lies within a town site, locate all municipal improvements, such as blocks, streets, and buildings.

78. You are also required to locate all mining and other improvements upon the claim by courses and distances from corners of the survey, or by rectangular offsets from the center line, specifying the dimensions and character of each improvement in full detail.

SURVEY RETURNS.

79. In order that the results of all surveys may be reported to this office in a uniform manner, you will prepare your field notes, preliminary plat, and deputy's report, and other papers forming a part of your returns in any given case in strict conformity to the official forms, specimen field notes, plat, and deputy's report which are bound with and made a part of these instructions. They are designed to furnish you with all needed information concerning the manner of describing the boundaries, corners, connections, intersections, conflicts, and improvements, and stating the magnetic variation, area, location, and other data connected with the survey of mineral claims, and contain forms of affidavits for the deputy surveyor and his assistants.

THE FIELD NOTES.

80. In addition to the requirements named in section 4 you are advised that the sheets furnished for the survey notes must be folded separately, must be arranged in consecutive order,

preceded and followed by title page and oaths on blanks furnished by this office, and be fastened together in the upper left-hand corner only. Numbering of the pages must be omitted.

81. The data and the results of the survey should be arranged in the field notes as follows:

(a) ~~The title-page sheet, containing names of and final oaths of assistants. With reference to the latter, it should be observed that hereafter no preliminary oaths are required. The stipulated oath is intended to be made after the completion of the work, but in your returns it is, for convenience in printing and binding, attached to the title-page sheet, the only change made therein from that formerly in use being the substitution of the words "following field notes" instead of, "foregoing field notes."~~

(b) Give the mean magnetic variation, and if during the progress of the survey any change amounting to five minutes of arc or more occurs therein it should be noted as indicated in the specimen field notes.

(c) Description of the boundaries, intersections, and corners of each location in the claim. Describe the marking of and material used for corners, kind and size of mounds, bearing trees, and all facts which will serve to identify the corners as set. Give the connections by course and distance, without any detail as to how they were determined, in the body of the field notes wherever they occur. In your first reference to any other mineral claim you will give the name and, if surveyed, the survey (or lot) number. In any subsequent reference to surveyed claims you will give the survey (or lot) number only, except in the case of consolidated claims, as to which you will at all times treat each location therein separately by giving the name of the particular location referred to and the survey (or lot) number and omitting unnecessary mention of the consolidation as a whole.

(d) Description by metes and bounds of consolidated claims. (See section 61.)

(e) Table of areas which—

(1) For lode claims, should first state the total area embraced within the exterior boundaries, followed by a statement in tabular form of the area in conflict with each intersecting survey or claim and conflict with each intersecting smallest legal subdivision of the public survey. (See section 59.)

(2) For lode claim with mill site, first give the total area of the lode claim and its conflicts, as in the preceding case, and then the area of the mill site.

(3) For placers and mill sites, the total area of the claim should be followed by the total area of each location in the claim, the areas of each separate part or lot of which each location is composed, and the areas in conflict between each location and the smallest legal subdivision of the public survey.

(f) Location corners. Under this heading you will give the required connections by course and distance, with a full and complete description of and the marks found upon the location corners. The connections and explanations given in this table should be omitted from the body of the field notes.

(g) The "general description," which, for lode claims, should state the facts, as indicated in the specimen field notes; for placer claims, should be a complete descriptive report, as required in section 49, and for mill sites, should be the same as for lode claims, substituting in place of "the ore sought for" all facts which are pertinent to and serve to determine the nonmineral character of the land.

(h) The deputy's certificate as to identity and improvements, giving full details. *(i) Final oaths of assistants*

(j) The required oath of the deputy surveyor upon blanks furnished by this office.

DEPUTY'S REPORT.

82. The following matters formerly included in the field notes have been separated therefrom, and will be included in the deputy's report.

The latter is to be made on the same size and form of blanks as the field notes, will be bound therewith, and is designed to furnish full details as to the survey, arranged in the following order, viz:

(a) Title page.

(b) Mention the instrument and measuring apparatus used, and state the last date when the same was submitted to the surveyor-general for inspection and record. If a chain is used it must be compared daily during progress of work with a standard steel tape kept for that purpose. All instruments or measuring apparatus should be submitted to the surveyor-general for examination and record at least once each year.

(c) State fully how the true meridian was determined, giving full details.

(d) Arrange all the connections by course and distance in tabulated form under the title "Table of Connections," designating each one by number, and state fully and in detail the data from which the course and distance were derived. In this table first give the connection with the public survey, and if any doubt exists as to the identity of the corner connected with state fully what steps were taken to verify it. This should be followed by the United States mineral monument connection, and then the connections, in regular order, with adjoining and conflicting claims as they occur in the field notes. Connections with location corners are not required in this table.

(e) Report all errors discovered by you in prior official surveys, giving full details, and state fully the methods used in the verification of your own work.

(f) Bearing objects: In the event that the required number of bearing objects are not given in the field notes you will insert under this heading such explanations as you may have to offer why the regulations in this respect have not been complied with. (*See section 76.*)

(g) Insert the deputy's certificate, using the exact language thereof in so far as consistent with the facts of each case, as

indicated in the specimen deputy's report, and sign the same with your official signature as a U. S. deputy mineral surveyor.

(h) List of papers filed with your returns.

83. Make this deputy's report as brief as possible consistent with stating the facts in detail.

PRELIMINARY PLAT.

84. The preliminary plat to be filed with the field notes must be on tracing muslin, protracted when practicable, on a scale of 200 feet to the inch. You will note thereon all topographical features and details of the survey in black waterproof drawing ink, in conformity with the specimen plat bound herewith, and show the lines of the location, as identified, in red ink. If the latter are identical with the surveyed lines it should be so stated on the plat and the red lines omitted. Let the top of the plat be north and the size always 14 inches in height by either 8 or 16 inches in width.

PAPERS TO BE FILED WITH FIELD NOTES.

85. The following résumé of papers to be filed with field notes will be found convenient. Those applicable to special cases only may be ascertained from the references given.

- (1) Field notes. (Sections 80 and 81.)
- (2) Preliminary plat. (Section 84.)
- (3) Deputy's report. (Sections 82 and 83.)
- (4) Certified copy of location notices, etc. (Section 12.)
- (5) Affidavits of identity and, if necessary, other papers pertaining thereto. (Section 13. *See also Sec 16*)
- (6) Affidavits of improvements. (Sections 86 to 92, inclusive.)
- (7) Affidavits as to descriptive reports on placer claims. (Section 37.)

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(8) Affidavit of claimant as to conflicts coming within the provisions of Circular N, December 4, 1884. (Sections 65 and 66.)

REPORT ON IMPROVEMENTS.

86. A report on improvements, in the estimate of \$500 expenditure required by law to be made by the claimant or his grantors, must specify with particularity and in full detail the position, extent, character, and value of each improvement. Define the position and extent as required in section 36, giving the sectional dimensions, such as the widths and heights of tunnels, adits, drifts; the size of shafts as well as their lengths or depths, etc.

As to the character, only such improvements are to be included as tend to the development of the claim as a mine; name the kind of material in which the excavations are made, etc.

87. Having given the value of each improvement, the value of the whole should be stated.

88. With your report on improvements, whether included in your field notes or made in pursuance of a special order from this office, you are required to file the affidavits of two disinterested and reliable witnesses that the improvements named therein—

(a) Were made by the claimant or his grantors; and,

(b) Have not been included in the estimate of expenditures upon any other claim.

89. Your own certificate (*see* specimen field notes) that the improvements named were made by the claimant or his grantors may be based upon the affidavits of the two disinterested and reliable witnesses filed with your report, and in this matter you are required to exercise proper care and discretion and must know or ascertain by the exercise of reasonable diligence that the witnesses are both disinterested and reliable.

90. In addition to the foregoing you will make such investigation from the office records and other sources as will enable

you to certify understandingly that no portion of said labor or improvements so credited to this claim has been applied upon any other claim.

91. For consolidated claims you are required to certify and to specify, in full detail, how and in what manner the improvements, as located, tend to the development of each and every location of the claim, and when, from an examination of the ground, the process of development is not self-evident you will file with your report the affidavit of the claimant or of one or more persons competent to testify giving full details relative thereto.

AFFIDAVITS.

92. All affidavits must be properly dated, filled out, and signed, and if sworn to before an officer having no seal must be accompanied with a certificate from the proper officer that he is legally qualified to administer oaths.

The honorable Commissioner of the General Land Office in a letter to the surveyor-general of Montana, dated January 20, 1890, says: "The deputy who surveys a mining claim in the employ of the claimants is not permitted to act as a notary in matters pertaining to the same claim."

ERRORS.

93. Your field work must be accurately and properly performed, and your returns made in conformity with the foregoing instructions. Errors in the survey must be corrected at your own expense, and if the time required in the examination of your returns is increased by reason of your neglect or carelessness, you will lose the priority in this office due to date of filing of your notes, and may be required to make an additional deposit for office work. You will be held to a strict accountability for the faithful discharge of your duties, and will be required to observe fully the requirements and regulations in

force as to making mineral surveys. If found incompetent as a surveyor, careless in the discharge of your duties, or guilty of a violation of the regulations, your appointment will be promptly revoked.

94. Whenever a survey has been reported in error, the deputy surveyor who made it will be required to promptly make a thorough examination upon the premises, and report the result under oath to this office. In case he finds his survey in error, he will report in detail all discrepancies with the original survey, and submit any explanation he may have to offer as to the cause. If, on the contrary, he should report his survey correct, a joint survey will be ordered to settle the differences with the surveyor who reported the error.

95. Under section 30 of these instructions deputy surveyors are practically permitted perfect freedom as to the method of making a survey in any given case. It is, however, believed that if the regulations as to field work are carried out in good faith, errors will be of rare occurrence; therefore, no further orders for surveys, except as provided in section 96, will be issued to deputies found in error until the requirements of section 94 have been fully complied with.

96. The exceptions to the rule named in section 95 will be:

(a) When application is made for a mineral-survey order for a claim situated in the same district as that in which the erroneous survey is situated. In which case the order will be issued subject to the condition that the erroneous survey shall be first examined.

(b) When, owing to the season of the year, a field examination for the survey and district involved is impracticable.

(c) When the deputy promptly files in this office a report, under oath, showing fully and in detail that he has satisfactorily complied with the requirements as to field work and requesting that a joint survey be ordered.

(d) When the claim covered by the alleged erroneous survey has been patented.

JOINT SURVEY.

97. A joint survey must be made within ten days after the date of order, unless satisfactory reasons are submitted, under oath, for a postponement.

98. The field work must in every sense of the term be a *joint* and not a separate survey, and the observations and measurements taken with the same instrument and chain, previously tested and agreed upon.

99. The deputy surveyor found in error, or, if both are in error, the one who reported the same, will make out the field notes of the joint survey, which, after being duly signed and sworn to by both parties, must be transmitted to this office.

AMENDED SURVEYS.

100. Inasmuch as amended surveys are, as a rule, ordered only by special instructions from the General Land Office, and the conditions and circumstances peculiar to each separate case and the object sought by the required amendment alone govern all special matters relative to the manner of making such survey and the form and subject-matter to be embraced in the field notes thereof, but few general rules applicable to all cases can be laid down. (*See also* section 17, circular to applicants.)

101. Amended surveys must be made in strict conformity with, or be embraced within, the lines of the original survey. If the amended and original surveys are identical, that fact must be clearly and distinctly stated in your field notes. If not identical, a bearing and distance must be given from each established corner of the amended survey to the corresponding corner of the original survey. The lines of the original survey, as found upon the ground, must be laid down upon the preliminary plat in such manner as to contrast and show their relation to the lines of the amended survey. If the amended

survey requires new corners to be established, the corresponding old corners must be obliterated and the fact that this has been done must be stated in the field notes of the amended survey.

102. The field notes of the amended survey must be prepared on the same size and form of blanks as are the field notes of the original survey, and the word "amended" must be used before the word "survey" whenever it occurs in the field notes.

The facts stated in the field notes should be confined to those matters requiring, or which are in any manner affected by, the amendment; and unnecessary repetitions from the original field notes should be avoided.

103. Your certificate in the field notes of the amended survey must state specifically how and in what manner the requirements (quoting the exact language relative thereto named in the order for survey) have been complied with, or give in detail your reasons why said requirements have not been fully met.

UNITED STATES MINERAL MONUMENTS.

104. In case your survey is situated in a district where there are no mineral monuments within the prescribed limit of 2 miles, you will proceed to establish a mineral monument, in the location of which you will exercise the greatest care as to site and construction.

105. The site should be some prominent point visible for a long distance from every direction, and should be so chosen that the permanency of the monument will not be endangered by snow, rock or land slides, or other natural causes. It should be, if possible, within sight of other mineral monuments.

106. The mineral monument itself should consist of a post 6 inches square and 8 feet long, set 3 feet in the ground, well tamped and protected by a well-built conical mound of stones 3 feet high and 6 feet in diameter at the base.

107. If the chosen site for the monument be solid rock in

place, a cross 6 inches each way and one-fourth of an inch deep must be cut in the rock, the post placed upon it and supported by a mound of stones.

108. The letters U. S. M. M., followed by the number of the monument, are to be cut into the post with a chisel or other suitable tool; mark the letters and number in plain characters not less than 3 inches high and a quarter of an inch deep, with clean cut, durable and unmistakable marks. There is no objection to establishing a mineral monument of larger size or of other material equally durable.

109. From the monument, connections by course and distance must be taken to two or three bearing trees or rocks, which must be properly scribed or marked with a chisel (trees should be marked B. T. and rocks B. O. with the number of the monument), and to any well known natural and permanent objects in the vicinity, such as the confluence of streams, prominent rocks, buildings, shafts, or mouths of adits. Bearings should also be taken to all other mineral monuments in sight, to prominent mountain peaks, and the approximate distance and direction ascertained from the nearest town or mining camp.

110. The new monument built and described as above must be connected by course and distance with the nearest existing mineral monument in the same or any adjoining mining district, and also with the nearest identifiable corner of the public land survey, provided such nearest monument or land survey corner be within 2½ miles in a direct line.

111. In establishing a new mineral monument and its connections with other mineral monuments or with a corner of the public survey, the true meridian referred to must be determined at or near the time of the survey by an astronomical observation, preferably on Polaris, made by the deputy himself.

112. A detailed report describing the ^{mineral} location monument itself, its location, bearing trees or objects, its connection (including complete details, plat, and calculations of the triangulations involved), with other monuments and public land corners, and the time and details of the determination of the true meridian must be returned with, but not attached to, the notes of the survey for which the monument was established.

DATA FOR DETERMINING THE MERIDIAN.

113. For your assistance in determining the true meridian, is given the following table of mean solar times, of the upper and lower culmination and greatest eastern and western elongation of Polaris for the longitude of Salt Lake City and for latitude 40° N., which may be used without change for the Territory of Utah, and with the correction given below, for years to and including A. D. 1900.

114. Mean solar time for Polaris.

1890 (month day).	At its—											
	Eastern elongation.			Upper culmination.			Western elongation.			Lower culmination.		
	<i>h.</i>	<i>m.</i>	<i>M.</i>	<i>h.</i>	<i>m.</i>	<i>M.</i>	<i>h.</i>	<i>m.</i>	<i>M.</i>	<i>h.</i>	<i>m.</i>	<i>M.</i>
January 1	0	37.8	P	6	32.0	P	0	30.2	A	6	34.0	A
January 11	11	58.3	A	5	52.5	P	11	46.7	P	5	54.5	A
January 21	11	18.8	A	5	13.0	P	11	07.2	P	5	15.0	A
January 31	10	39.3	A	4	33.5	P	10	27.7	P	4	35.5	A
February 10	9	59.8	A	3	54.0	P	9	48.2	P	3	56.0	A
February 20	9	20.4	A	3	14.6	P	9	08.8	P	3	16.6	A
March 2	8	41.0	A	2	35.2	P	8	29.4	P	2	37.2	A
March 12	8	01.6	A	1	55.8	P	7	50.0	P	1	57.8	A
March 22	7	22.2	A	1	16.4	P	7	10.6	P	1	18.4	A
April 1	6	42.9	A	0	37.1	P	6	31.3	P	0	39.1	A
April 11	6	03.6	A	11	57.8	A	5	52.0	P	11	55.8	P
April 21	5	24.3	A	11	18.5	A	5	12.7	P	11	16.5	P
May 1	4	45.0	A	10	39.2	A	4	33.4	P	10	37.2	P
May 11	4	05.8	A	10	00.0	A	3	54.2	P	9	58.0	P
May 21	3	26.6	A	9	20.8	A	3	15.0	P	9	18.8	P
May 31	2	47.4	A	8	41.6	A	2	35.8	P	8	39.6	P
June 10	2	08.2	A	8	02.4	A	1	56.6	P	8	00.4	P
June 20	1	29.0	A	7	23.2	A	1	17.4	P	7	21.2	P
June 30	0	49.9	A	6	44.1	A	0	38.3	P	6	42.1	P
July 10	0	10.7	A	6	04.9	A	11	59.1	A	6	02.9	P
July 20	11	27.6	P	5	25.8	A	11	20.0	A	5	23.8	P
July 30	10	48.4	P	4	46.6	A	10	40.8	A	4	44.6	P
August 9	10	09.2	P	4	07.4	A	10	01.6	A	4	05.4	P
August 19	9	30.0	P	3	28.2	A	9	22.4	A	3	26.2	P
August 29	8	50.8	P	2	49.0	A	8	43.2	A	2	47.0	P
September 8	8	11.6	P	2	09.8	A	8	04.0	A	2	07.8	P
September 18	7	32.4	P	1	30.6	A	7	24.8	A	1	28.6	P
September 28	6	53.1	P	0	51.3	A	6	45.5	A	0	49.3	P
October 8	6	13.8	P	0	12.0	A	6	06.2	A	0	10.0	P
October 18	5	34.5	P	11	28.7	P	5	26.9	A	11	30.7	A
October 28	4	55.2	P	10	49.4	P	4	47.6	A	10	51.4	A
November 7	4	15.9	P	10	10.1	P	4	08.3	A	10	12.1	A
November 17	3	36.5	P	9	30.7	P	3	28.9	A	9	32.7	A
November 27	2	57.1	P	8	51.3	P	2	49.5	A	8	53.3	A
December 7	2	17.6	P	8	11.8	P	2	10.0	A	8	13.8	A
December 17	1	38.2	P	7	32.4	P	1	30.6	A	7	34.4	A
December 27	0	58.7	P	6	52.9	P	0	51.1	A	6	54.9	A
December 31	0	38.9	P	6	33.1	P	0	31.3	A	6	35.1	A

NOTE.—In each case where the time changes from a. m. to p. m. there are eleven culminations or elongations instead of ten between the successive dates in the table.

115. The above table is true for the year 1890. To correct it for the year—

	Minutes.
1891, add	1.2
1892, prior to March 1, add	2.5
1892, after March 1, subtract	1.5
1893, add2
1894, add	1.2
1895, add	2.5
1896, prior to March 1, add	3.8
1896, after March 1, subtract2
1897, add	1.2
1898, add	2.6
1899, add	4.0
1900, add	5.4

116. To get the time for intervening days subtract 4 minutes (or more exactly 3.93 minutes) per day from the time given for the preceding date.

117. To reduce the time in the table to standard mountain time (which is also the legal time for Salt Lake City) for the longitude of Salt Lake add to the time as found from the table 27.6 minutes, and for each degree of longitude east of Salt Lake City 4 minutes less—for each degree west, 4 minutes more—than 27.6 minutes.

118. When the elongations are used it is evident that the line found for the star is to be corrected by the horizontal angle between it and the pole (or azimuth).

Below is a table of azimuths of Polaris at eastern and western elongation for years 1890–1900 and for latitude 37° to 42° N.:

Azimuths of Polaris.

Year.	Latitude.					
	37°.	38°.	39°.	40°.	41°.	42°.
1890.....	1 36.0	1 37.3	1 38.7	1 40.1	1 41.6	1 43.2
1891.....	35.6	36.9	38.3	39.7	41.2	42.8
1892.....	35.2	36.5	37.9	39.3	40.8	42.4
1893.....	34.8	36.1	37.5	38.9	40.4	42.0
1894.....	34.4	35.7	37.1	38.5	40.0	41.5
1895.....	34.1	35.3	36.7	38.1	39.6	41.1
1896.....	33.7	34.9	36.3	37.7	39.2	40.7
1897.....	33.3	34.6	35.9	37.3	38.8	40.3
1898.....	32.9	34.2	35.5	36.9	38.4	39.9
1899.....	32.4	33.8	35.1	36.5	38.0	39.5
1900.....	32.1	33.4	34.7	36.1	37.5	39.0

119. When Polaris is in either culmination an error in time of $2\frac{1}{2}$ minutes will cause an error of 1 minute (of arc) in the result, but at either elongation an error of 10 or 15 minutes of time will not appreciably affect the result.

OBSERVATIONS ON THE SUN.

120. The following formula for determining the true meridian by direct observation on the sun, which can be made with any transit having a vertical arc, will be found convenient and is particularly well suited to the needs of a deputy mineral surveyor, viz:

$$\cos. \frac{1}{2} \text{ az.} = \sqrt{\frac{\cos. S \cos. (S-P.D.)}{\cos. L. \cos. h}}$$

In which:

Az. = Sun's azimuth measured from the north.

P.D. = Sun's polar distance.

h = Observed altitude of the sun's center minus the correction for refraction.

S. = Half the sum of the polar distance, latitude and true altitude.

L. = The latitude of the place of observation.

121. In applying the formula, use logarithms, as in the following example, the figures inserted for illustration being those of an actual observation after correcting the observed altitude for refraction, as indicated above:

P.D.	=	113° 25'		
L.	=	38° 30'	Log. Sec. - 10 =	.106456
h	=	23° 31'	Log. Sec. - 10 =	.037657
2S.	=	175° 26'		
S.	=	87° 43'	Log. Cos. =	8.600332
S-P.D.	=	25° 42'	Log. Cos. =	9.954762

Square root = one-half the sum of the Logs. = $2)18.699207$

Gives Log. Cos. $\frac{1}{2}$ az. 9.349603

Therefore one-half the azimuth is $77^\circ 04' 31''$.

Multiplying by 2 gives azimuth $154^{\circ} 09'$ to the nearest minute.

122. The foregoing observation was made after noon. The true direction of the sun from the instrument at the time of this observation, from the north point around to the left, was therefore $154^{\circ} 09'$ or S. $25^{\circ} 51'$ W. Had the observation been made before noon the true course would have been SE. instead of SW., as above.

123. At the time this observation was made the bearing of the sun was $44^{\circ} 10'$ to the left of an established reference line. The true course of the reference line was therefore S. $70^{\circ} 01'$ W., and from this the courses of other lines of the survey were determined by plate angles checked by magnetic back and foresights at each angle point.

124. In the absence of a table of Log. secants use the arithmetical complement (a. c.) of the Log. Cos.

125. Several observations should be made at the same setting of the instrument. They should be made rapidly and checked independently of each other.

126. At each observation note the angle (as $44^{\circ} 10'$ left in the foregoing example) between the sun and some fixed line of reference.

THE POLAR DISTANCE.

127. The Polar Distance is obtained by adding or subtracting the sun's declination from 90° , i. e., the sun's declination is its angular distance north or south of the Equator and the Equator is 90° from the Pole. In the foregoing example the declination of the sun was $23^{\circ} 25'$ south; therefore the polar distance was $90^{\circ} + 23^{\circ} 25' = 113^{\circ} 25'$. Had the declination been $23^{\circ} 25'$ north then the polar distance would have been $90^{\circ} - 23^{\circ} 25' = 66^{\circ} 35'$.

THE DECLINATION.

128. The sun's declination is given in the Solar Ephemeris or American Nautical Almanac for each day in the year, and as

it is constantly changing the rate of *hourly change* is also given.

It will be observed also that declinations for the astronomical date are given in the almanac for Greenwich mean noon, and that the declination for any other time may be obtained by applying the hourly change for the interval between Greenwich mean *noon* and the time of your observation.

129. When the mountain standard time (i. e., 105° , meridian time, see section 107) of the observation is taken, the required astronomical time for the district of Utah may be obtained by the following rule:

(a) From A. M. time observations subtract 5 hours.

(b) To P. M. time observations add 7 hours.

(c) Omit the designation A. M. or P. M. and the result is the required astronomical date. It will be sufficient to take the observed time to within 10 or 15 minutes.

130. For example, an observation made January 31, 1893, at 8 hours 20 minutes A. M., subtracting 5 hours and omitting the designation A. M. gives the astronomical date January 31, 1893, 3 hours 20 minutes, i. e., 3 hours 20 minutes after Greenwich noon.

131. In the example above given, the observation was made December 18, 1891, at 2 hours 10 minutes P. M.; adding 7 hours and omitting the designation P. M. gives the astronomical date December 18, 1891, 9 hours 10 minutes, i. e., 9 hours 10 minutes after Greenwich noon.

The sun's declination for that date at noon, given on Sheet II for December, page 201 of the Ephemeris, is south $23^\circ 24' 12''.0$. A glance at the table shows that the declinations are increasing, and that the hourly change is $4.2''$, and for $9\frac{1}{4}$ hours the total increase in declination is $38.5''$. The sun's declination at the time of the observation was therefore $23^\circ 24' 12.0'' + 38.5'' = S 23^\circ 25'$ nearly, as used in the example given.

LATITUDE.

132. When the latitude of the place is not known it should be determined by observation as follows:

From the observed altitude of the sun, taken at the time when it crosses the meridian, subtract the error due to refraction, giving the true altitude then—

(a) When the declination is south the sum of the true altitude and declination is equal to the co-latitude.

(b) When the declination is north the difference between the true altitude and declination is equal to the co-latitude.

133. The time when the sun crosses the meridian is called apparent noon.

The local mean time corresponding to this is found by adding or subtracting from 12 o'clock, the equation of time for Greenwich apparent noon as explained at the head of the column on Sheet I of the Ephemeris, and the corresponding mountain standard time is to be ascertained as explained in section 117. The longitude for this purpose may be taken with sufficient accuracy from any correct map of Utah, the longitude of the Salt Lake meridian being $111^{\circ} 53' 47''$ west from Greenwich.

134. Errors due to determining the time of meridian passage of the sun may be entirely avoided by beginning your observation a few minutes before and continuing it until a few minutes after the calculated time. The greatest altitude attained by the sun is the required altitude to be used in determining the latitude.

135. If preferred an approximate meridian may be established by the magnetic needle and the greatest altitude ascertained by beginning your observations well in advance and continuing them until the sun has crossed the line so established and begins to descend.

136. When the position of the place of observation with reference to the public land survey is known, the latitude, determined by observation used in the formula, should be

checked by calculation, taking the distance through the public survey north or south of the Salt Lake base line.

The length of a degree of latitude on the 37° parallel is 5,516.18 chains.

On the 42° parallel it is 5,520.92 chains.

The average length of a degree of latitude in Utah is, therefore, 5,518.55 chains. As this average differs only 2.37 chains from the extremes, it may be used as a check for all parts of the Territory, and forms the basis of the following rule:

For each full township north or south of the Salt Lake base line the difference in latitude is $5' 13''$ and for each 100 feet additional distance the difference in latitude is $1''$. The latitude of the Salt Lake base line is $40^\circ 46' 04''$ north.

REFRACTION.

137. In the absence of tables the error due to refraction may be calculated by the formula:*

Refraction in seconds = $55''$ multiplied by the natural cotangent of the observed altitude. For example: If the observed altitude is 22° the cotangent is 2.47, which multiplied by 55 gives 135.85 or $135.85'' = 2' 16''$ nearly. While mean refraction of the tables is $2' 20''$.

138. The error due to refraction must always be subtracted from the observed altitude to obtain the true altitude.

139. The foregoing memoranda as to declination, latitude, etc., will be found serviceable to deputies using solar attachments, as well as for those who use formulæ similar to that in section 104, and avoid the use of solar attachments by making direct observations on the sun with an ordinary transit having a colored eyepiece or Davis solar screen. The latter can be

* This is adapted from a formula given by Prof. J. B. Davis, of the University of Michigan, in Buff and Bager's Catalogue, page 53, edition of 1891.

attached, at trifling cost, to any transit, needs no adjustment, and adds greatly to the accuracy in determining the altitude of the sun's center.

140. In the latter case the accuracy of the work depends upon the observed altitudes, and when the sun is nearing the meridian the error in azimuth due to an error of 1' in altitude or latitude rapidly increases. On the other hand, when the sun is near the horizon the error in azimuth due to an error of 1' in latitude or altitude is practically nothing. In the latter case, however, the errors due to refraction become extremely uncertain, and for this reason observations on the sun give the best practical results when taken about the middle of the forenoon or afternoon. (*See section 21.*)

APPLICATION TO U. S. SURVEYOR-GENERAL FOR SURVEY OF MINING CLAIM.

SALT LAKE CITY, UTAH, *January 1, 1894.*

U. S. SURVEYOR GENERAL,

Salt Lake City, Utah:

SIR: We, Hart & Son, attorneys for John Maxwell, claimant, hereby make application for an official survey, under the provisions of chapter six, title thirty-two, of the Revised Statutes of the United States, and regulations and instructions thereunder, of the mining claim known as the Gold and Silver Lodes, situate in Wasatch mining district, Salt Lake County, Utah, in section —, township No. —, range No. —. Said claim is based upon valid locations made on January 2, 1893, and January 3, 1893, and duly recorded on January 5, 1893, and is fully described in the duly certified copies of the record of the location certificates filed herewith. Said certificates contain the names of the locators, the dates of location, and such a definite description of the claim by reference to natural objects or permanent monuments as will identify the claim, and said locations have been distinctly marked by monuments on the ground, so that their boundaries can be readily traced.

We request that you will send us an estimate of the amount required to defray the expenses of platting and other work in your office, required under the regulations, that we may make proper deposit therefor, and that thereupon you will cause the survey to be made by John Trueman, U. S. deputy mineral surveyor, and proper action to be taken thereon by your office, as required by the U. S. mining laws and regulations thereunder.

JOHN MAXWELL,

Per HART & SON,

Claimant.

P. O. Address, John Maxwell, Mineral City, Salt Lake County, Utah.

RECORDER'S CERTIFICATE OF LOCATION NOTICE.

NOTICE OF LOCATION (SILVER).

Notice is hereby given, that the undersigned, having complied with the requirements of section 2324 of the Revised Statutes of the United States, and the local laws, customs, and regulations of this district, have located, fifteen hundred feet in length by six hundred feet in width, on this, the "Silver" lode, vein, or deposit, bearing gold, silver, and other

precious metals, situated in Wasatch mining district, Salt Lake County, Utah, the location being distinctly marked by stakes upon the ground and described as follows, to wit: Commencing at this monument and discovery stake and running thence N. 43° E., 300 feet, to a point on the north end line; thence S. 89° 30' E., 406.9 feet, to corner No. 1; thence S. 43° W., 1,500 feet, to corner No. 2; thence N. 89° 30' W., 813.8 feet, to corner No. 3; thence N. 43° E., 1,500 feet, to corner No. 4; thence S. 89° 30' E., 406.9 feet, to said point on north end line. This claim adjoins the King lode on the south and the Iron lode on the west.

The mining claim above described shall be known as the "*Silver*."

Located this third day of January, 1893.

NAMES OF LOCATORS.

James Namgiles, 750 feet. Fred Noyl, 750 feet.

Filed for record, January 5th, at 2 p. m., 1893.

ROBERT MARSH,
Recorder.

I, the undersigned recorder and custodian of the district records of the Wasatch mining district, Salt Lake County, Utah Territory, do hereby certify that the above and foregoing is a full, true, and complete copy of the location notice of the "*Silver*," as compared by me and recorded in Book I, page 970, of the mining records of this district, now in my possession.

In witness whereof I have hereunto set my hand and affixed the official seal of said district this 25th day of December, 1893.

[SEAL.]

ROBERT MARSH,
Recorder.

RECORDER'S CERTIFICATE OF LOCATION NOTICE.

NOTICE OF LOCATION (GOLD).

Notice is hereby given that the undersigned, having complied with the requirements of section 2324 of the Revised Statutes of the United States, and the local laws, customs, and regulations of this district, have located fifteen hundred feet in length by six hundred feet in width on this, the "Gold" lode, vein, or deposit, bearing gold, silver, and other precious metals, situated in Wasatch mining district, Salt Lake County, Utah, the location being distinctly marked by stakes upon the ground, and described as follows, to-wit: Commencing at this monument and discovery stake, and running twelve hundred feet easterly and three hun-

dred feet westerly, with three hundred feet on each side of the vein lying north of and adjoining the Bonanza, and between the Silver on the west and Treasure No. 2 on the east, and is also situated on both sides of Treasure Gulch, the claim running across same.

The mining claim above described shall be known as the "*Gold*."

Located this second day of January, 1893.

NAMES OF LOCATORS.

John Macintire, 750 ft. Samson Waters, 750 ft.

Filed for record January 5th, at 2 p. m., 1893.

ROBERT MARSH,
Recorder.

I, the undersigned, recorder and custodian of the district records of the Wasatch mining district, Salt Lake County, Utah Territory, do hereby certify that the above and foregoing is a true, full, and complete copy of the location notice of the "*Gold*," as compared by me and recorded in Book I, page 960, of the mining records of this district, now in my possession.

In witness whereof I have hereunto set my hand and affixed the official seal of said district this 25th day of December, 1893.

[SEAL.]

ROBERT MARSH,
Recorder.

SPECIAL INSTRUCTIONS ACCOMPANYING ORDER FOR SURVEY.

DEPARTMENT OF THE INTERIOR,
U. S. SURVEYOR-GENERAL'S OFFICE,
Salt Lake City, Utah, January 2, 1894.

JOHN TRUEMAN,

U. S. Deputy Mineral Surveyor:

SIR: You are hereby directed to make official survey and return of the Gold and Silver lodes mining claim, located in Wasatch mining district, Utah, at the expense of the claimant. The survey number for said claim is 2000.

The certified copies of the location notices are herewith transmitted.

You will make said survey strictly in accordance with the law and instructions, and return the same to this office within 30 days from the date of this order, or show cause for delay.

GEORGE W. SNOW,
U. S. Surveyor-General.

By _____,
Chief Clerk.

Filed.....

MINERAL SURVEY No. 2000.

UTAH LAND DISTRICT.

FIELD NOTES

OF THE SURVEY OF THE MINING CLAIM OF

JOHN MAXWELL,

KNOWN AS THE

Gold and Silver lodes, Wasatch mining district, Salt Lake County, Utah,
 section —, township —, range —, surveyed under instructions
 dated 1/2, 1894, by

JOHN TRUEMAN,
U. S. Deputy Mineral Surveyor.

Claim located—

“Gold,” January 2nd, 1893.

“Silver,” January 3rd, 1893.

Survey commenced January 3rd, 1894.

Survey completed January 4th, 1894.

[FORM 4—685 (modified).]

FINAL OATHS FOR SURVEYS.**LIST OF NAMES.**

A list of the names of the individuals employed by John Trueman, United States deputy mineral surveyor, to assist in running, measuring, and marking the lines, corners, and boundaries described in the following field notes of the survey of the mining claim of John Maxwell, known as the Gold and Silver Lodes, and showing the respective capacities in which they acted.

WALTER MILLER, *Chainman.*HUGH SCOTT, *Chainman.*———, *Axeman.*HENRY BRIGHT, *Flagman.*

[FORM 4—685 (modified).]

FINAL OATHS OF ASSISTANTS.

We, Walter Miller, Hugh Scott, and Henry Bright, do solemnly swear that we assisted John Trueman, United States deputy mineral surveyor, in marking the corners and surveying the boundaries of the mining claim of John Maxwell, known as the Gold and Silver lodes, represented in the following ^{following} field notes as having been surveyed by said deputy mineral surveyor and under his direction, and that said survey has been in all respects, to the best of our knowledge and belief, faithfully and correctly executed, and the corner and boundary monuments established according to law and the instructions furnished by the United States surveyor-general for Utah.

WALTER MILLER, *Chainman.*HUGH SCOTT, *Chainman.*———, *Axeman.*HENRY BRIGHT, *Flagman.*

Subscribed and sworn to by the above-named persons before me this 4th day of January, 1894.

[SEAL.]

JOHN R. SMITH,
Notary Public.

Feet.

GOLD LODE SURVEY No. 2000.

All courses herein named are referred to the true meridian.
Mean mag. var. $16^{\circ} 30' E$.

DESCRIPTION OF BOUNDARIES AND CORNERS.

Gold Lode.

Beginning at the identical place of discovery identified by affidavits filed herewith I set a sawed pine post $4'' \times 4'' \times 4$ ft. long $12''$ in the ground and mound of stones 2 ft. high, 4 ft. base, and marked same DIS.-2000-G, from which the center of discovery cut bears N. $10^{\circ} W$. 10 ft. dist., and a pine stump $12''$ in diam., 4 ft. high, blazed 2 ft. above the ground, and marked DIS.-2000-G., and just underneath blazed and marked B. T., bears S. $25^{\circ} 30' W$. 18 ft. dist.

Thence N. $87^{\circ} 09' E$.

along the center line of the lode.

1,045.8 Easterly end of the survey of this location, returning to the discovery.

Thence S. $87^{\circ} 09' W$.

along the center line of the lode.

365 Westerly end of the survey of this location and corner No. 1, where I set a sawed pine post $4'' \times 4'' \times 4$ ft. long, $12''$ in the ground, and mound of earth and stones 2 ft. high, 4 ft. base, and marked same 1-2000.

Thence N. $62^{\circ} 44' E$.

129.7 Intersect the west side line of the "Copper" survey 1995, N. $2^{\circ} 30' E$. 119 ft. from P. 1 of said survey.

135.7 Intersect the northwesterly side line of the "Iron" survey 1975, S. $43^{\circ} 00' W$. 450.3 ft. from P. 3 of said survey.

471.1 Corner No. 2, set a limestone boulder $6'' \times 8'' \times 30''$ $18''$ in the ground, marked with a \times on top and cut thereon with a chisel 2-2000, from which the center of the Dark Horse shaft bears N. $9^{\circ} 15' E$. 110 ft. dist.

U. S. mineral monument No. 3 bears N. $74^{\circ} 52' E$. 2,296.8 ft. dist.

Thence N. $87^{\circ} 09' E$.

Head of Treasure Gulch drains SE.

50
106.2 Intersect the southerly end line of survey 1995, N. $55^{\circ} 55' E$. 500.7 ft. from P. 1 of said survey.

cut this on a separate line

48
Gold Lode Sur No 2000

- Fect.**
124.6 Intersect the southeasterly side line of survey 1975, S. 43° 00' W., 228.5 ft. from P. 2 of said survey.
- 740.3 Intersect the northerly side line of the "Treasure" L. 314, N. 67° 30' E. 128.1 ft. from P. 1 of said lot.
- 936.4 Corner No. 3, a Norway pine tree, 15" in diam., which I blazed 2 ft. above the ground and marked 3-2000.
Thence S. 15° 58' E.
along easterly end line. (Local variation of the needle at this point is 16° 45' E.)
- 134.9 Intersect southerly side line of L. 314, N. 67° 30' E. 327.3 ft. from P. 4 of said lot.
- 200 Intersect westerly end line of the "Treasure No. 2," L. 315, N. 8° 30' W., 139.4 ft. from P. 4 of said lot.
- 336.2 Intersect southerly side line of L. 315, N. 67° 30' E., 18.2 ft. from P. 4 of said lot.
- 350 Center of wagon road bearing NE. and SW.
- 400 Corner No. 4, which intersects the northerly side line of the "Bonanza" survey 1960, N. 87° 09' E. 1,410.8 ft. from P. 4 of said survey, where I set a pine post 4" x 4" x 3 ft. long on solid rock in place in a mound of stones, 2 ft. high and 4 ft. base and marked same 4-2000, from which the N E. corner of the Bonanza boarding house marked x and 4-2000 B. O. bears S. 60° W. 187 ft. dist.
Thence S. 87° 09' W.
along northerly side line of survey 1960.
- 60 Center of wagon road bearing NE. and SW.
- 475 Treasure Gulch drains SE.
- 1,303.9 Intersect southerly side line of survey 1975, S. 43° 00' W. 787.8 ft. from P. 2 of said survey.
- 1,410.8 Corner No. 5, identical with P. 4 survey 1960, found standing, which is a hewed quaking asp post 4" x 4" x 3 ft. above ground set firmly in mound of earth and stones, 2 ft. high and 4 ft. base. I marked same on northerly face 5-2000, from which a prominent limestone rock in place 10 ft. high and running to a point at the top, which I marked with a x and cut with a chisel 5-2000 B. O. bears N. 80° 30' E. 27 ft. dist. P. 1 survey 1995 bears N. 22° 31' E. 143.8 ft. dist.
Thence N. 15° 58' W.
along westerly end line.
- 146.5 Intersect northwesterly side line of survey 1975, S. 43° 00' W. 605.6 ft. from P. 3 of said survey.
- 200 Corner No. 1, the place of beginning the survey of the boundary of this location.

Feet.

SILVER LODE SURVEY No. 2000.

Silver Lode.

Beginning at the identical place of discovery identified by affidavits filed herewith, &c. (Describe in detail; see instructions.)

Thence S. 43° 00' W.

along the center line of the lode.

1,200 Southerly end of the survey of this location. Returning to the discovery.

Thence N. 43° 00' E.

along the center line of the lode.

300 Northerly end of the survey of this location and southerly side line of the "King" L. 237.

Thence S. 89° 30' E.

along northerly end line and southerly side line of L. 237.

406.9 Corner No. 6, identical with P. 3, survey 1975, N. 89° 30' W. 377.7 ft. from P. 1 of L. 237. (State here whether a new post was set alongside or that you marked the post already found, describing it in detail; see corner No. 5.)

P. 2 "Gold" survey 2000 bears S. 2° 55' W. 175.9 ft. dist.

P. 1 L. 237 bears S. 89° 30' E. 377.7 ft. dist.

Thence S. 43° 00' W.

along northwesterly side line of survey 1975.

450.3 Intersect the northwesterly side line of the "Gold" survey 2000, N. 62° 44' E. 135.7 ft. from P. 1 of said survey.

458.4 Intersect the westerly side line of survey 1995, N. 2° 30' E. 115.8 ft. from P. 1 of said survey.

605.6 Intersect the westerly end line of the "Gold" survey 2000, S. 15° 58' E. 53.5 ft. from P. 1 of said survey.

1,228 Intersect P. 4 survey 1975 found standing.

1,500 Corner No. 7: No permanent monument could be built here, as the corner falls in a small gulch which is swept by snow-slides every winter.

Thence N. 89° 30' W.

along southerly end line.

100 Witness corner to Corner No. 7. (Describe material used for and bearing objects of the witness corner, the same as for any other corner.) Then say: and marked same W. C. 7-2000.

813.8 Corner No. 8: Set a, etc. (Describe corner and bearing objects in detail.)

2132—4

Proof this is on 4 separate p. . .

Gold and Silver ⁵⁰ *Collo Sur No. 2000*

- Feet. Thence N. 43° 00' E.
- 1, 500 Corner No. 9, which intersects the southerly side line of lot 237, N. 89° 30' W., 1,191.5 ft. from P. 1 of said lot, where set, etc.
- Thence S. 89° 30' E.
515. 9 along northerly end line and southerly side line of L. 237.
- Intersect westerly side line of survey 1995, N. 2° 30' E., 454 ft. from P. 1 of said survey.
813. 8 Corner No. 6, the place of beginning the survey of the boundary of this location.

DESCRIPTION BY METES AND BOUNDS.

Beginning at P. 2; thence N. 87° 09' E., 936.4 ft. to P. 3; thence S. 15° 58' E., 400 ft. to P. 4; thence S. 87° 09' W., 1,410.8 ft. to P. 5; thence N. 15° 58' W., 146.5 ft. to a point; thence S. 43° 00' W., 894.4 ft. to P. 7; thence N. 89° 30' W., 813.8 ft. to P. 8; thence N. 43° 00' E., 1,500 ft. to P. 9; thence S. 89° 30' E., 813.8 ft. to P. 6; thence S. 43° 00' W., 450.3 ft. to a point; thence N. 62° 44' E., 335.4 ft. to P. 2, the place of beginning.

TABLE OF AREAS.

- Total area of claim = 32.14 acres.
- Area of "Gold" = 11.56 acres.
- Area of "Gold" in conflict with L. 315 = 0.03 acres.
- Area of "Gold" in conflict with L. 314 = 1.34 acres.
- Area of "Gold" in conflict with survey 1975 = 2.02 acres.
- Area of "Gold" in conflict with survey 1975, not including conflict with survey 1995 = 1.29 acres.
- Area of "Gold" in conflict with survey 1995 = 0.72 acres.
- Area of "Gold" in conflict with survey 1995, not including conflict with survey 1975 = 0.0002 acres.
- Area of "Silver" = 20.66 acres.
- Area of "Silver" in conflict with "Gold" = 0.08 acres.
- Area of "Silver" in conflict with "Gold," not including conflict with survey 1995 = 0.08 acres.
- Area of "Silver" in conflict with survey 1995 = 1.16 acres.
- Area of "Silver" in conflict with survey 1995, not including conflict with "Gold" = 1.16 acres.

LOCATION CORNERS.

From P. 1 the location stake, which is a cedar post, marked with red keel, "NW. Cor. Gold location," found standing in place bears N. 15° 58' W., 200 ft. dist.

Gold and Silver Lodes in U 2000

From P. 3 the location corner bears N. 87° 09' E., 89.2 ft. dist. The location stake, a cedar post, no marks, was not standing in place, but had fallen over. Three feet up the hill I found the corner, viz: a hole which was identified to me as being the original place where the location stake stood.

From P. 4 the location stake found standing in place bears N. 87° 09' E. 89.2 ft. dist. (Describe in detail, kind of stake, how marked, etc.)

P. 5 coincides with the location corner, which is a mound of stones 18" high, 2½ ft. base. No marks.

P. 6 coincides with the location corner. (Describe in detail.)

Location post for P. 7 could not be found nor its exact position identified.

From P. 8 the location corner bears S. 70° W., 55 ft. dist. (Describe in detail.)

From P. 9 the location corner bears N. 89° 30' W., 35 ft. dist. (Describe in detail.)

GENERAL DESCRIPTION.

This claim is situated on the west side of Willow Fork of Bear Canyon about four miles northeast of Mineral City, in Wasatch Mining District, Salt Lake County, Utah.

The rocks in place upon the claim are limestone and quartzite.

The ore sought for is lead ore containing silver.

There are a few scattering pines and no water upon the claim.

The center lines of the lodes as described in the foregoing field notes, are (or are assumed to be) the middle of the veins at the surface.

The post-office address of the claimant is John Maxwell, Mineral City, Salt Lake County, Utah.

DEPUTY'S CERTIFICATE.

I certify that the survey of each location in this claim is identical with or is embraced within the ground originally located therefor, as described in the location certificates dated: "Gold," January 1, 1893; "Silver," January 2, 1893, and as marked by monuments on the ground, identified by Charles Lamb and Henry Moore, two disinterested, competent, and reliable witnesses, whose affidavits are filed herewith.

I also certify that five hundred dollars worth of labor has

Fect. | been expended or improvements made upon this claim, consisting of

First.—A tunnel and workings therefrom—

(a) The tunnel, 5 ft. wide, 6 ft. high and 142 ft. long, in solid rock, valued at \$1,065.

The mouth of this tunnel designated Sta. O, bears S. 6° 25' E., 315 ft. from P. 9 of this survey.

From Sta. O the tunnel runs S. 80° 23' E.

55 | to Sta. 1.

Thence S. 73° 12' E.

22 | to Sta. 2,

54 | to Sta. 3,

72 | to Sta. 4.

Thence S. 45° 05' E.

15 | to face of tunnel.

The workings from this tunnel are—

(b) At Sta. 2 a winze 4 ft. × 4 ft. × 15 ft. deep in solid rock, valued at \$75.

(c) A drift, 4 ft. wide, 6 ft. high and 12 ft. long in solid rock, valued at \$84.

This drift runs S. 4° 25' E. from said Sta. 3.

Second.—A cut, 4 ft. × 4 ft. × 20 ft. long, the upper two feet in loose rock, the lower two feet in solid rock, valued at \$40.

The centre of this cut bears N. 10° W. 10 ft. dist. from disc. post of gold and runs thence N. 20° E. and S. 2° W.

Third.—A tunnel and open cut—

(a) The tunnel, 5 ft. wide, 7 ft. high, and 23 ft. long, in solid rock, valued at \$184.

The mouth of this tunnel bears S. 64° 12' W. 367.8 ft. from P. 3, and the tunnel runs thence S. 3° 15' W.

(b) The open cut begins at the mouth of the tunnel, and runs thence N. 3° 15' E. It is 4 ft. wide, averages 8 ft. deep, and is 25 ft. long; 70 per cent thereof is loose rock and 30 per cent solid rock, and it is valued at \$40.

Fourth.—A tool-house and workshop of wood, 10 ft. high, 16 ft. × 24 ft., valued at \$150.

The NE. corner of this tool-house and workshop bears S. 49° 17' W. 514.8 ft. from P. 6 of this survey. It is said to have been built for the sole purpose of keeping and repairing tools and machinery used in connection with the work done in developing this claim. The total estimated value of improvements is \$1,638.

I also certify that said improvements tend to develop each location in this claim, in that they are located within and are distributed over the surface ground of both locations and are suitably situated for the convenient working thereof.

JOHN TRUEMAN,
U. S. Deputy Mineral Surveyor.

FORM 4-686 (modified).

FINAL OATH OF U. S. DEPUTY MINERAL SURVEYOR.

I, John Trueman, U. S. deputy mineral surveyor, do solemnly swear that, in pursuance of instructions received from the U. S. surveyor-general for Utah, dated January 1st, 1894, I have, in strict conformity to the laws of the United States, the official regulations and instructions thereunder, and the instructions of said surveyor-general, faithfully and correctly executed the survey of the mining claim of John Maxwell, known as the Gold and Silver Lodes, situate in Wasatch mining district, Salt Lake County, Utah, in section —, township No. —, range No. —, and designated as survey No. 2,000, as represented in the foregoing field notes, which accurately show the boundaries of said mining claim as distinctly marked by monuments on the ground, and described in the attached copy of the location certificate, which was received by me from the surveyor-general with said instructions, and that all the corners of said survey have been established and perpetuated in strict accordance with the law, official regulations and instructions thereunder; and I do further solemnly swear that the foregoing are the true and original field notes of said survey and my report therein, and that the labor expended and improvements made upon said mining claim by claimant or his grantors are as therein fully stated, and that the character, extent, location, and itemized value thereof are specified therein with particularity and full detail, and that no portion of said labor or improvements so credited to this claim has been included in the estimate of expenditures upon any other claim, as shown by affidavits filed herewith of Hugh Scott and Henry Bright, two disinterested and reliable witnesses.

JOHN TRUEMAN,
U. S. Deputy Mineral Surveyor.

Subscribed and sworn to by the said John Trueman, U. S. deputy mineral surveyor, before me this 5th day of January, 1894.

[SEAL]

JOHN R. SMITH,
Notary Public.

FORM 4-687 (modified).

**SURVEYOR-GENERAL'S CERTIFICATE OF APPROVAL OF FIELD NOTES AND
SURVEY OF MINING CLAIM.**

DEPARTMENT OF THE INTERIOR,
OFFICE OF U. S. SURVEYOR-GENERAL,
Salt Lake City, Utah, February 5th, 1894.

I, U. S. surveyor-general for Utah, do hereby certify that the foregoing and hereto attached field notes and return of the survey of the mining claim of John Maxwell, known as the Gold and Silver Lodes, situate in Wasatch mining district, Salt Lake County, Utah, in section —, township No. —, range No. —, designated as survey No. 2000, executed by John Trueman, U. S. deputy mineral surveyor, January 3-4, 1894, under my instructions, dated Jan. 2, 1894, have been critically examined and the necessary corrections and explanations made, and the said field notes and return and the survey they describe are hereby approved. A true copy of the location certificate filed by the applicant for survey is on file in this office.

GEORGE W. SNOW,
U. S. Surveyor-General for Utah.

DEPUTY'S REPORT

OF

DETAILS AFFECTING SURVEY NO. 2000 OF THE MINING
CLAIM OF JOHN MAXWELL, KNOWN AS THE
GOLD AND SILVER LODES,

SITUATED IN

WASATCH MINING DISTRICT, SALT LAKE COUNTY, UTAH,

FILED WITH THE FIELD NOTES AND RETURNS OF SAID SURVEY.

GOLD AND SILVER LODES SURVEY NO. 2000.

This survey was made with a W. and L. E. Gurley mountain transit No. 108, examined in the U. S. surveyor-general's office June 20th, 1893.

The distances were measured with a 100. ft. steel tape made by Keuffel & Esser and compared in the U. S. surveyor-general's office July 21st, 1893.

MERIDIAN DETERMINATION.

The true meridian to which all courses herein are referred was determined by me by a direct observation on the sun from a point on the south side line of the "Gold" about 200 ft. easterly from P. 5 of same on January 3, 1894, at 10 hrs. 20 min. a. m., standard mountain time.

Observed altitude of sun was $21^{\circ} 43' 30''$.

Refraction $2' 24''$.

True altitude is $21^{\circ} 41' 06''$.

Latitude of the place $40^{\circ} 37' 42''$ N. (State here whether determined from a direct observation on the sun or from the public-land surveys. If by a direct observation give full details thereof.)

From these data I find the sun's azimuth to be S. $27^{\circ} 06'$ E.

From the sun I turn $65^{\circ} 45'$ to the left to a point on the south side line of the "Gold," thus determining the course of said south side line to be N. $87^{\circ} 09'$ E.

From this course all other courses of this survey were determined by plate angles.

"TABLE OF CONNECTIONS."

- (1) Connection with public-land survey.
- (2) From P. 2 the United States mineral monument No. 3 bears N. $74^{\circ} 52'$ E. 2296.8 ft. dist. It being impossible to measure this in a direct line, I run as follows: From P. 2-2000 N. 60° E. 200 ft.; thence N. $13^{\circ} 52'$ E. 632 ft.; thence S. $43^{\circ} 27'$ E. 342 ft.; thence N. $85^{\circ} 22'$ E. 1662.7 ft., intersect U. S. M. M. No. 3.
- (3) 5-2000 coincides with 4-1960.
- (4) From 5-2000 N. $22^{\circ} 31'$ E. 143.8 ft. to 1-1995 by triangulation, viz:
 - Base (1-2000 to 5-2000) is S. $15^{\circ} 58'$ E. 200 ft.
 - The observed bearings are 1-2000 S. $61^{\circ} 38'$ E. to 1-1995, 5-2000 N. $22^{\circ} 31'$ E. to 1-1995.

- (5) 6-2000 coincides with 3-1975.
- (6) From P. 6 of the "Silver" P. 2 of the "Gold" bears S. $2^{\circ} 55'$ W. 175.9 ft. dist. measured on a direct line.
- (7) From 6-2000 S. $89^{\circ} 30'$ E. 377.7 ft to P. 1 "King" L. 237 determined by the following connections made by me between the "Silver," "Iron," and "King," viz: In my survey of the "Iron" I found the connection from P. 2-1995 to P. 1 L. 237 to be S. 89° E. 106.4 ft., and the connection between P. 3 and P. 2 of Sur. No. 1975 to be S. $89^{\circ} 30'$ E. 271.3 ft.
- P. 6-2000 being identical with P. 3-1975 the connection from said P. 6 to P. 1 L. 237 is S. $89^{\circ} 30'$ E. 377.7 ft. (The posts of the "King" L. 237 could not be found nor their position identified.)
- (8) From 7-2000 N. $43^{\circ} 00'$ E. 272 ft. to 4-1975 measured on a direct line.
- (9) From a point S. $15^{\circ} 58'$ E. 200 ft. from 3-2000, P. 4 of the "Treasure No. 2" L. 315 bears S. $8^{\circ} 30'$ E. 139.4 ft. dist. measured on a right line between points.
- (10) From a point S. $87^{\circ} 09'$ W. 196.1 ft. from 3-2000, P. 1 of the "Treasure" L. 314 bears S. $67^{\circ} 30'$ W. 128.1 ft. dist. As no posts of L. 314 were found standing after diligent search this connection was determined from the field notes of the official surveys of lots 314 and 315, on file in the U. S. surveyor-general's office. (Deputy will file a separate statement in cases of this kind showing fully and in detail the nature and extent of search for lost or obliterated corners and full details as to how the connection was determined from the records.)

List of errors
"BEARING OBJECTS."

State here any explanations you may have to offer why the required number of bearing objects for each post have not been returned in accordance with section 76 of instructions.

"DEPUTY'S CERTIFICATE."

I hereby certify that the foregoing facts were ascertained by me on the ground in person at the time and during the progress of said survey, and that the statements herein made are true.

JOHN TRUEMAN,
U. S. Deputy Mineral Surveyor.

LIST OF PAPERS.

In addition to this report the following is a list of all the papers filed at the same time and with the field notes of said survey, viz:

- 2 certified copies of the location notices.
- 1 preliminary plat.
- 1 certificate of identity of claim.
- 1 affidavit of five hundred dollars improvements.

JOHN TRUEMAN,
U. S. Deputy Mineral Surveyor.

CERTIFICATE OF IDENTITY OF CLAIM.

TERRITORY OF UTAH,

County of Salt Lake, ss :

Charles Lamb and Henry Moore, of lawful age, each for himself and not one for the other, being first duly sworn according to law, deposes and says that he is a citizen of the United States; that he is well acquainted with the Gold and Silver lodes mining claim, situated in the Wasatch mining district, county and Territory aforesaid, for which John Maxwell intends to make application for patent under the provisions of an act of Congress approved May 10, 1872; that he is not interested in the aforesaid mining claim, either directly or indirectly; that he was present on the 3d and 4th of January, 1894, on the ground of said mining claim, and that the survey of said mining claim made on that date by John Trueman, U. S. deputy mineral surveyor, is embraced within the identical ground originally claimed by its locators; and further, that the initial point of discovery of said lode or mining claim from which said survey has been made by the said surveyor are the original discoveries thereof and are the same places where the notices of location of said lodes or mining claim originally were posted.

CHARLES LAMB.
HENRY MOORE.

Subscribed and sworn to before me this 4th day of January, A. D. 1894, and I hereby certify that I consider the above deponents credible and reliable witnesses.

W. A. WILSON,
Notary Public.

My commission expires December 30th, 1895.

NOTE.—If the notices of location were not posted at the discovery this affidavit may be changed to suit the facts.

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AFFIDAVIT OF FIVE HUNDRED DOLLARS IMPROVEMENTS.

TERRITORY OF UTAH,

County of Salt Lake, ss :

Hugh Scott and Henry Bright, of lawful age, being first duly sworn according to law, depose and say that they are acquainted with the gold and silver lodes mining claim, in Wasatch mining district, county and Territory aforesaid, for which John Maxwell intends to make application for patent under the provisions of the act of Congress approved May 10, 1872, and that the labor done and improvements made thereon exceed five hundred dollars in value, and consist of a tunnel $5 \times 6 \times 142$ ft. long in solid rock, situated 300 ft. southerly from P. 9 of "Silver," running easterly, worth \$1,065; a winze $4 \times 4 \times 15$ ft. deep in solid rock, situated 77 ft. from the mouth of this tunnel, worth \$75; a drift $4 \times 6 \times 12$ ft. long in solid rock, situated 109 ft. from the mouth of this tunnel, running southerly, worth \$84; a cut $4 \times 4 \times 20$ ft. long, upper 2 ft. loose rock, lower 2 ft. solid rock, situated about 10 ft. north of the Disc. post of the "Gold," running northerly, worth \$40; a tunnel $5 \times 7 \times 23$ ft. long in solid rock, situated about 350 ft. southwesterly from P. 3 of the "Gold," running southerly, worth \$184; an open cut at mouth of this tunnel $4 \times 8 \times 25$ ft. long, 70 per cent loose rock, balance solid rock, running northerly, worth \$40; a toolhouse and workshop of wood, 10 ft. high 16×24 ft., situated about 500 ft. southwesterly from P. 6 of the "Silver," worth \$150, and said improvements were made by applicant or his grantors for the benefit of this claim, and have not been applied upon any other claim.

HUGH SCOTT.

HENRY BRIGHT.

Subscribed and sworn to before me this 4th day of January, A. D. 1894.

[SEAL.]

W. A. WILSON,

Notary Public.

My commission expires Dec. 30th, 1895.

CIRCULAR
TO
APPLICANTS FOR MINERAL SURVEYS,
AND ALSO TO
DEPUTY SURVEYORS AND OTHERS
IN OR HAVING BUSINESS WITH THE
U S. SURVEYOR-GENERAL'S OFFICE FOR DISTRICT OF UTAH

APPROVED APRIL 5, 1894.

CIRCULAR
TO
**APPLICANTS FOR MINERAL
SURVEYS,**
AND ALSO TO
DEPUTY SURVEYORS AND ALL OTHER PERSONS IN
OR HAVING BUSINESS WITH THE
U. S. SURVEYOR-GENERAL'S OFFICE
FOR
LAND DISTRICT OF UTAH.

Your attention is directed to the following requirements in the conduct of your business with this office, the same being mostly based upon the United States mining laws and circular and special instructions from the honorable the Commissioner of the General Land Office.

1. Mining claims are classified as lode claims, placer claims, and mill sites or lode claims with mill sites. When placers are on unsurveyed lands, or can not be conformed to the legal subdivisions of the public survey, survey for patent and plat of placers, as well as of the other classes of claims designated, is required to be made upon application therefor.

2. *Lode claims* are referred to in section 2320 of the Revised Statutes as follows: "Mining claims upon veins or lodes of

quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits." * * *

3. *Placer claims* are defined in section 2329 of the Revised Statutes as follows: "Claims usually called placers, including all forms of deposit, excepting veins of quartz or other rock in place, shall be subject to entry and patent," etc.

Deposits of common brick clay and saline deposits, though apparently included in the above definition, can not under the decisions of the Land Office be entered as placer claims. But it has been held that limestone, marble, slate or other building stone, asphalt, ozokerite, gilsonite or mineral wax, sulphur, alum, borax, carbonate or nitrate of soda, gypsum, and fire clay can be taken up as placer claims.

4. *Mill sites*.—Section 2337 of the Revised Statutes, approved May 10, 1872, provides: "Where nonmineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such nonadjacent surface ground may be embraced in an application for patent for such vein or lode. * * * The owner of a quartz mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his mill site as provided in this section."

SIZE AND LIMITATION OF CLAIMS.

5. Mineral locations are limited as to their extent by the laws and regulations in force at the date of their location.

6. Lode claims, whether located by one or more persons, if the locations are made subsequent to May 10, 1872, may equal but can not exceed 1,500 feet in length along the vein or lode. No claim shall extend more than 300 feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than 25 feet on *each side* of the middle of the vein at the surface, except where adverse rights render such limitation necessary. (*See Revised Stat-*

utes, section 2320.) The foregoing was modified by the local regulations of the miners in the various districts of Utah until the passage of the Territorial statute of March 11, 1886, which provided: "That any mining claim which shall hereafter be located upon any vein or lode of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits may extend 300 feet on each side of the middle of the vein or lode at the surface." (See Compiled Laws of Utah, vol. 2, p. 138, section 2790.)

Therefore, lode claims located after March 11, 1886, can not be restricted by miners' regulations to less than 300 feet on each side of the middle of the vein at the surface.

It is proper to observe, however, that more than 300 feet on each side can not be taken. For example: 400 feet can not be taken on one side and 200 feet on the other. And also that if, by reason of prior claims, say 100 feet only can be taken on one side, the locator is not limited to less than 300 feet on the other, although not compelled to take so much.

The *least* width on *either* side to which a lode claim may be limited, is 25 feet, unless it can be shown that prior claims render a less distance necessary. When the locator does not determine by exploration where the middle of the vein at the surface is, his discovery shaft must be assumed to mark such point.

7. The end lines of lode claims must be parallel to each other and deputy surveyors are required in their surveys to establish the *direction* of the end lines of claims as nearly in conformity to the end lines found staked upon the ground as may be compatible with the foregoing requirement.

8. After July 9, 1870, no location of a placer claim can be made to exceed 160 acres, whatever may be the number of locators associated together; and from and after May 10, 1872, no location made by an individual can exceed 20 acres, and no location made by an association of individuals can exceed 160 acres, which location of 160 acres can not be made by less than

eight bona fide locators; and no local laws or mining regulations can restrict a placer location to less than 20 acres, although the locator is not compelled to take so much. (Revised Statutes, sections 2330 and 2331.)

8b. There must be a discovery of mineral on each 20 acres in a placer location of 160 acres made by an association, and such a location of that amount, based upon a single discovery, is void except as to the 20 acres immediately surrounding said discovery. (See 18 L. D., p. 81.)

9. *Mill sites* are limited to 5 acres (see section 2337 of the Revised Statutes). This section was enacted for the development of the mineral resources, is applicable to quartz mills or reduction works, and does not include gristmills, factories, etc.

APPLICATION FOR SURVEY.

10. All applications for survey orders, descriptive reports on placer claims, or certificates of \$500 expenditure, should be addressed to the surveyor-general and be signed by the claimants, their agent or attorney.

11. Each application should contain—

(a) The name of the claimant in full, and as it is desired to appear in the application for patent.

(b) The name of each location embraced in the claim.

(c) The name of the mining district and the county in which the claim is located, and its position, if known, in the land-survey system.

RELATION OF SURVEY AND LOCATION.

12. You are required to file with each application for survey order, a copy of the record of location of the claim, properly certified by the recorder having charge of the records of the mining locations in the county where the claim is situate.

13. The deputy mineral surveyor is required to survey the

claim in strict conformity with the location upon which the order of survey is based.

The act of Congress of May 10, 1872, expressly provides that "the location must be distinctly marked on the ground, so that its boundaries can be readily traced," and "that all records of mining claims hereafter made shall contain the name or names of the locators, the date of location, and such a description of the claim or claims, located by reference to some natural object or permanent monument, as will identify the claim."

These provisions of the law must be strictly complied with in each case to entitle a claimant to a survey and patent, and therefore should a claimant under a location made *subsequent* to the passage of the mining act of May 10, 1872, file in this office a record of a location showing clearly on its face that the law had not been complied with and apply for an order for survey thereon, it will not be issued. If, so far as indicated by the record of location, the law has been apparently complied with and an order of survey issued therefor, and on examination the deputy finds the description in the record and the claim as marked and identified on the ground incompatible one with the other he will decline to proceed with the survey until additional instructions from this office are received.

The only relief for a claimant under these circumstances will be to make a new location or, if the circumstances admit of it, an addendum or amendment to the notice of location.

Claimants are, therefore, advised before filing their application to be sure that the record of their location is in compliance with the law, that the location is distinctly marked on the ground so that its boundaries can be readily traced, and that the claim as marked on the ground is in practical accordance with the description in the notice of location.

AMENDMENTS AND ADDENDA TO LOCATION NOTICES.

14. An addendum or amendment to a location notice is a statement more particularly describing the claim as located and hitherto claimed. Such a statement properly dated, signed by the claimant or claimants, containing a proper description of the claim as marked on the ground that has been posted on the claim and recorded in the proper record, becomes so far as this office is concerned, a valid and correct location notice upon which an order may issue and a survey be made and approved.

The date of both original and amended location notice will be placed upon the field notes in the certificate of the deputy surveyor, and upon the plats issued from this office.

15. An addendum or amendment to a location notice which describes ground other than that located and hitherto claimed is not permitted. The deputy surveyors are forbidden to make surveys upon such notices, nor will this office approve such surveys if made.

16. If a relocation of the claim is made, abandon the original number of the order for survey, and a new order will be issued in which a new number in the current series will be substituted.

17. An application for an amended survey of an approved claim must be accompanied with a statement setting forth fully the reasons for the proposed amendment and all the material facts in the matter.

EXPENSE OF SURVEY.

18. Applicants have the option of employing any U. S. deputy mineral surveyor in the district of Utah to execute the order for survey, and must make satisfactory arrangements with such surveyor for the payment for his services and that of his assistants in making the survey, as the United States will not be held responsible for the payment of the same.

The duty of the deputy surveyor in any particular case ceases when he has executed the survey and returned the same to this office. He is not allowed to prepare for the mining claimant the papers in support of his application for patent, being precluded from acting either directly or indirectly as attorney in mineral claims.

19. Paragraph 99, General Land Office circular, dated December 10, 1891, relating to the expense of office work connected with the survey of mineral claims, reads as follows:

With regard to the *plattng* of the claim and other *office work* in the surveyor-general's office, that officer will make an estimate of the cost thereof, which amount the claimant will deposit with any assistant United States treasurer or designated depository, in favor of the United States Treasurer, to be passed to the credit of the fund created by "individual depositors for surveys of the public lands," and file with the surveyor-general duplicate certificates of such deposit in the usual manner.

20. The following is the estimated cost of platting and other office work in connection with the survey of mineral claims:

Lode claim	\$27.00
Descriptive report on placer claim without survey	15.00
Placer claim	27.00
Mill site claim	27.00
Each lode claim included in the survey of a placer claim	15.00
Several lodes, placers, or mill sites in one survey, each location....	27.00
Additional for each conflict	5.00

21. Should any additional or unusual work in this office be caused by the filing of an addendum to a location notice or by any other act or request of the applicant, an additional deposit may be required.

22. The deposit should be made with the United States designated depository in Salt Lake City in the name of the applicant on account of "Office work surveys" of the ——— mining claim ——— mining district. Of the triplicate receipts you will receive immediately forward the original to the Secretary of the Treasury, the duplicate to this office, and retain the triplicate for your own use and security.

Under no circumstances will the deposit be made by the surveyor-general.

ORDER OF APPROVAL.

23. The order of approval of surveys of mineral claims is prescribed by General Land Office circular, dated March 3, 1881, as follows:

The mining survey first applied for shall have priority of action in all its stages in the office of the surveyor-general, including the delivery thereof, over any other survey of the same ground or any portion thereof.

The surveyor-general should not order or authorize a survey of a claim which conflicts with one previously applied for until the survey first applied for has been completed, examined, approved, and platted, and the plats delivered.

When the conflict does not appear until the field notes of the respective surveys are returned, then the survey first applied for should be first examined, approved, and platted, and the plats delivered before the field notes of the survey last applied for are taken up for examination or plats constructed.

When the survey first authorized is not returned within a reasonable period, and the applicant for a conflicting survey makes affidavit that he believes (stating the reasons for his belief) that such first applicant has abandoned his purpose of having a survey made, or is deferring it for vexatious purposes, to wit, to postpone the subsequent applicant, the surveyor-general shall give notice of such charges to such first applicant and call upon him for an explanation, under oath, of the delay. He shall also require the deputy mineral surveyor to make a full statement in writing explanatory of the delay, and if the surveyor-general shall conclude that good and sufficient reasons for such delay do not exist he shall authorize the applicant for the conflicting survey to proceed with the same; otherwise, the order of proceeding shall not be changed.

Whenever an applicant for a survey shall have reason to suppose that a conflicting claimant will also apply for a survey for a patent he may give a notice in writing to the surveyor-general, particularly describing such conflicting claim, and file a copy of the notice of location of such conflicting claim. In such case the surveyor-general will not order or authorize any survey of such conflicting claim until the survey first applied for has been examined, completed, approved, and platted, and the plats delivered.

CIRCULAR N OF DECEMBER 4, 1884.

24. Your attention is directed to the first two paragraphs of General Land Office circular, dated December 4, 1884, viz:

(1) The rights granted to locators under section 2322, Revised Statutes, are restricted to such locations on veins, lodes, or ledges as may be "situate on the *public domain*." In applications for lode claims where the survey conflicts with a prior valid lode claim or entry, and the ground in conflict is excluded, the applicant not only has no right to the excluded ground, but he has no right to that portion of any vein or lode the top or apex of which lies within such excluded ground, unless his location was prior to May 10, 1872. His right to the lode claimed terminates where the lode, in its onward course or strike, intersects the exterior boundary of such excluded ground and passes within it.

(2) The end line of his survey should not therefore, be established beyond such intersection, unless it should be necessary so to do for the purpose of including ground held and claimed under a location which was made upon public land and valid at the time it was made. To include such ground (which may possibly embrace other lodes) the end line of the survey may be established within the conflicting survey, but the line must be so run as not to extend any further into the conflicting survey than may be necessary to make such end line parallel to the other end line and at the same time embrace the ground so held and claimed. The useless practice in such cases of extending *both* the side lines of a survey into the conflicting survey and establishing an end line wholly within it, beyond a point necessary under the rule just stated, will be discontinued.

25. You will observe that a survey is in disregard of the above circular when the ground in conflict is to be excluded, the exclusion itself being an admission of the priority and validity of the conflicting claim. If, for any reason the ground in conflict is claimed by the applicant and is to be eventually included in his application for patent, the survey may be extended so as to include the ground so claimed.

Deputy surveyors, when surveying a claim to which the above circular may be applicable, will require of the applicant or his attorney an affidavit that the ground in conflict is claimed and is intended to be eventually embraced in the application for patent by the applicant or, in default thereof, will

establish the end line of his survey as required by Circular "N" of December 4, 1884, for claims conflicting with prior valid lode claims or entries where conflicts are excluded, and will state in the general description in the notes whether or not such an affidavit has been furnished by the applicant and if furnished will file the same in this office with their returns. (See section 55 of instructions.)

26. Applicants are advised of their right of appeal to the honorable Commissioner of the General Land Office from the approval or disapproval of the survey of their claims. The appeal must be in writing or in print, and should set forth in brief and clear terms the specific points of exception to the ruling appealed from.

U S SURVEYOR-GENERAL'S OFFICE RULES.

27. The office hours of the U. S. Surveyor-General's Office are from 9 a. m. to 4 p. m.

28. Mineral notes filed in this office will be taken up for examination, examined, and approved in the order of their filing, except as provided in section 23 of this circular.

29. All the agricultural and mining *records* of this office are open to deputy surveyors and to the public during office hours, but the *time* of the draftsmen there employed belongs to the United States.

30. Persons wishing to inspect or to have made copies of plats, notes, or other records of the office, whether such copies are to be certified or not, are requested to apply to the surveyor-general or, in his absence, to the chief clerk.

31. Information as to the status of claims undergoing examination will be furnished only to claimants, their attorneys, authorized agents, or the deputy who made the survey.

32a. Opinions as to the probable action of this office in any given case will not be expressed in advance of a written statement of fact, and then only when the matter in question affects business actually before the office.

32b. If deputies are in doubt as to their proper action in any given case, and require instructions in addition to those contained in the manual and order for survey, application therefor must be made in writing accompanied with a detailed statement of the facts.

33. Objections by deputy surveyors to the requirements as to any survey will only be considered when stated in writing.

34. Notes or other papers on which any action has been or may be taken once filed in this office become part of the records of the office.

35. Notes and other papers in this office are not open to public inspection until the approval or final disposition of same. The field notes and returns of mineral and other surveys may, however, be delivered to the deputy who made the survey for examination and correction of errors therein, and must in all cases be returned within the time specified in the letter of transmittal.

36. Deputies failing to return field notes and all papers accompanying same within the specified time will lose the priority in this office due to the time of filing their notes, and claimants will be promptly advised of the fact.

37. No records (other than those named in section 35) are to be removed from this office by any person except in the custody of the surveyor-general, at request of a court, or of an agent of the General Land Office.

38. Deputies will be furnished with a printed memorandum showing the routine of the examination of mineral returns in this office and will be required, in each case before filing, to compare their returns therewith.

The exercise of proper care in this respect will greatly facilitate the proper disposition thereof in this office.

GEORGE W. SNOW,
U. S. Surveyor General.

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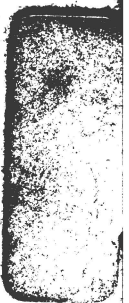
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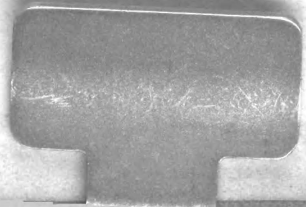
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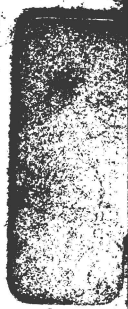
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